

**MARKETING EFFICIENCY AND VALUE CHAIN
DEVELOPMENT OF SELECTED FRUITS IN
KHAGRACHHARI DISTRICT**

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DEDICATION

This thesis is dedicated to my beloved mother.



Abbreviations

ASEAN	Association of South East Asian Nations
BADC	Bangladesh Agricultural Development Corporation
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BBS	Bangladesh Bureau of Statistics
BSTI	Bangladesh Standard and Testing Institute
BSMRAU	Bangabandu Sheik Mujibur Rahman Agricultural University
DAE	Department of Agricultural Extension
DAM	Department of Agricultural Marketing
CHT	Chittagong Hill Tracts
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FPMU	Food Planning and Monitoring Unit
GAP	Good Agricultural Practices
GHP	Good Hygienic Practices
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Points
HARS	Hill Agricultural Research Station
ICT	Information and Communication Technology
ISO	International Organization for Standardization
NCDP	Northwest Crop Diversification Programme
NCPHT	National Committee on Postharvest Technology and Value Addition Research in Agriculture
NFP	National Food Policy
NGO	Non Government Organization
RARS	Regional Agricultural Research Station
SMS	Short Message Service
SAU	Sher-e-Bangla Agricultural University
USAID	United States Agency for International Development
WHO	World Health Organization

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MARKETING EFFICIENCY AND VALUE CHAIN DEVELOPMENT OF SELECTED FRUITS IN KHAGRACHHARI DISTRICT

ABSTRACT

In support of stimulating growth, economic development, food security and alleviating poverty, the analysis of the marketing performance of fruits plays an important role in an on-going or future fruit development plan. The study was conducted at Khagrachhari Sadar upozila, Panchari and Dighinala upozila under Khagrachhari District to document socioeconomic profile of fruit growers and market intermediaries of selected fruits, to estimate marketing efficiency of fruit growers and market intermediaries in the study area, to identify the existing supply chain and value chain development of selected fruits and to identify the factors affecting value chain performance of selected fruits. The selected samples included 130 fruit growers (mango growers-56, jackfruits growers-34 and litchi growers-40) and 84 market intermediaries (wholesaler-16, Faria-20, Bepari-32 and retailer-16). For value chain development of selected fruits UNIDO's approach or basic steps of UNIDO's approach to agro-value chain analysis and development was followed. For identifying factors that affect value chain performance, factor analysis was done. In the study area 82.4 to 93 percent of fruit growers were male and rest were female whereas all the market intermediaries were male. Average age of fruit growers was 40 years to 43 years and intermediaries was 40 years to 46 years. 100 percent of both fruit growers and intermediaries were entitled to formal education. Result showed that, mango obtained the highest profit at Tk. 67388 per hectare. Jackfruit growers obtained highest profit Tk. 6201 per 100 pieces when they sold big jackfruit. Similarly litchi grower obtained highest profit at Tk. 2511 per 1000 piece. Results showed that for mango marketing the most efficient marketing channel was Fruit grower – Bepari (local)– Consumer (local) (1.77). For jackfruit marketing the efficient channel was Grower – Bepari (local)– Consumer (local) (1.37) and for litchi marketing the efficient channel was Grower – Bepari (local)– Consumer (local) (1.47). In the study area, nine supply chains were found for mango marketing of which three supply chains had gone out of the region. For jackfruit and litchi marketing six supply chains were found. For all fruits (mango,

jackfruit and litchi), the most important supply chain, grower to customer was supplied about 34 percent of total fruits supplied. In this area, value was added in some stages. These were grading, cleaning, packaging, storing and transportation. Highest value was added on grading process which was about 85 percent to 100 percent. Using factor analysis, several causes were found that affect value chain development which was categorized into four factors; marketing factor, economic factor, social factor and environmental factor. For developing value chain in the study area some constraints like post harvest losses, storage problem, lack of processing center, high packaging cost etc was found. In this area, emphasis should be given to improved storage and transportation system, offering credit and other services to improve effective production and marketing of mango, jackfruit and litchi.

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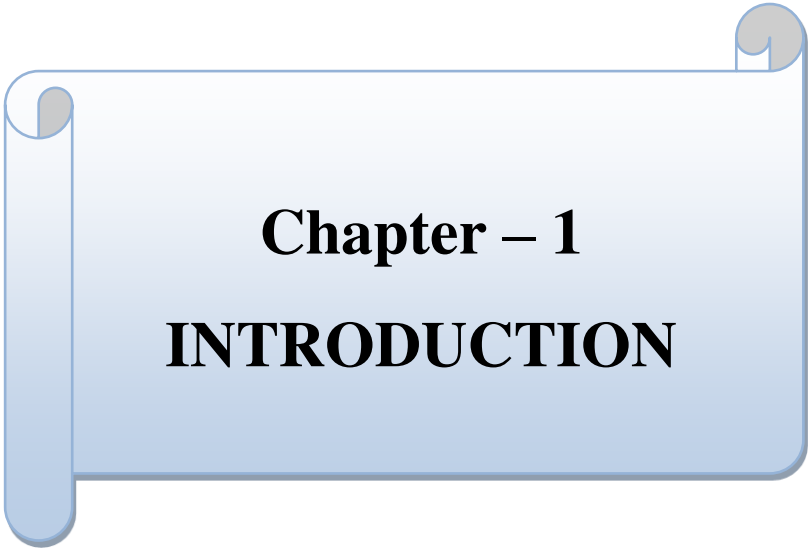
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Chapter – 1
INTRODUCTION

Chapter 1

INTRODUCTION

1.1 Background

The Chittagong hill tracts (CHT) cover an area of 13,295 square kilometers which are one tenth of Bangladesh. The area is becoming a seasonal fruit hub with immense potential for the development of a food-processing sector. Last year the CHT produced nearly 14 lakh tonnes of fruit, officials said, while a decade ago production in the region was 6 lakh tonnes. Fruit is grown on 77,000 hectares of land, up from 45,000 hectares in 2002 (The daily star, 2012).

The hilly lands offer great potentials for farming of fruits, not available elsewhere. Fruit growers count losses every year in the CHT, as they often are compelled to sell off their produced fruits at prices lower than production costs due to preservation constraints and poor infrastructure in the region. Many growers, who have been denied fair prices of their produce for long, say they now take least interest in producing seasonal fruits, which leads to the rise in joblessness in the three hill districts.

Fresh tropical fruits are on winning ground in world markets as to recent statistical figures. Its production has risen by 7 percent annually since 1997; and the bulk of these fruits (98percent) are grown in developing countries. Thousands of fruit growers in the three hill districts produce plenty of mango, jackfruit, papaya, pineapple, orange, and banana every year, but do not get fair prices of the perishable produces only because of lack of proper marketing facilities. There is a fruit revolution in the hill tracts now a days. Over 40 fruit varieties grow in the region, with litchis, jackfruit, mangoes, watermelons and bananas the most plentiful. The government has promoted fruit production in the CHT since independence of Bangladesh. Through the different project the government distributed free sapling of mango (Amropali), litchi, olive and orange etc.

Comparison of other two hill district, in Khagrachiri Hill District the total production of jackfruit was highest which was 81113.6 mt (Table 1.1). Also mango and litchi

production was noticeable. In 2010-11 average area of mango was 365.26ha, jackfruit was 1060.68 ha and litchi was 80.82 ha (Table 1.1). So, these fruits' value chains that offer more promising prospects for economic growth and poverty reduction in this hilly region. There are also a key issue that has an impact on industrial development and the capacity to produce more fruits which can supply to overall country as well as can export to other country.

Table 1.1 Average area, production and yield of selected fruits in Khagrachhari District over the period of 1995/96 to 2010/11

Fruits	Average area (ha)	Average production (mt)	Average yield (mt/ha)
Mango	365.26	2468.19	8.94
Jackfruits	1060.68	81113.6	74.76
Litchi	80.82	376.18	7.21

Source: BBS, 2010-11.

Even though fruit is economically and socially important, fruit Supply chain and their characteristics have not yet been studied and analyzed for the target study area (Khagrachhari District) where great potential of fruit production (Mango, jackfruit & Litchi) exists. Therefore, this study has the purpose of investigating fruits marketing chains and factors affecting fruit value chain to the market in Khagrachhari District, which will narrow the information gap on the subject and will contribute to better understand on improved strategies for reorienting marketing system for the benefit of small fruit growers and intermediaries.

1.2 Statement of the Problem

The fruit growers in the CHT region would get proper prices of their produces with development of agro-processing industry and proper marketing chain. Besides the agro-processing industry, the authorities should help develop a proper marketing chain so fruit growers can sell their produces at fair prices. Special financial assistance could also be provided to develop a transportation system for the goods, produced in the hill districts.

Evidently, there is good scope to increase income of the poor fruit growers by increasing varietal performance and improving production practices through

appropriate use of chemical and organic fertilizer, insecticides and pesticides as well as use of high-yielding varieties. Promotion of appropriate handling, packaging and transportation could help increase fruit growers' incomes at farm gate. An action research initiatives needs to be commissioned to determine the feasible practices/technologies for CHT.

However, over the whole CHT absence of food processing industries, lack of entrepreneurship, poor road communications, and huge amount of post harvest losses of fruits are happened. If fruit processing industries are established in this area, more fruit growers will produce fruit. Hundreds of hills remain fallow and cultivating them will make Bangladesh a fruit exporter. The situation stated above is further compounded by poor marketing infrastructures and huge postharvest losses. Due to seasonal glut and absence of proper marketing system, bulk quantity of harvested produce is wasted every year. The research study will helpful to assess the present status of value chain of mango, jackfruit and litchi that explain the total area production of selected fruits. The study can be a supportive study for new entrepreneurs by establishing a new entrepreneurship model for value chain of selected fruits. Thus, the study is a pioneer study in CHT, both growers and entrepreneurs will be benefited by the research. The study can also be a supportive research for national policy as well as for further research.

1.3 Rationale of the Study

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

In developing countries, a significant proportion of national funds are used to support agricultural production inputs – primarily seeds, fertilizers and irrigation systems. Traditionally, little attention has been paid to the value chains by which agricultural products reach final consumers and to the intrinsic potential of such chains to generate value added and employment opportunities. While high-income countries add nearly US\$185 of value by processing one ton of agricultural products, developing countries add approximately US\$40. Furthermore, while 98 percent of agricultural production in high-income countries undergoes industrial processing, barely 38 percent is processed in developing countries (Table 1.2). These data indicate that well developed agro-value chains can utilize the full potential of the agricultural sector (UNIDO, Vienna, 2009).

Table 1.2: Comparative data on processing of agricultural products in industrialized and developing countries

	Industrialized Countries	Developing Countries	Bangladesh
Agricultural product processed (percent)	98	38	0.5
Post-harvest losses (percent)	Min.	40	23.6-43.5*

Source: UNIDO, Vienna, 2009. *Hassan, 2010 (NFPCSP-FAO).

By revealing strengths and weaknesses, value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships which can lead to improvements in chain performance.

Agriculture in CHT can benefit from the emerging market opportunities. Present day CHT agriculture is characterized by smallholder, subsistence farming, with little or no influence from markets. In most parts of CHT markets are weakly organized with primitive communication system. Development of viable and sustainable supply chains requires new relationships, networks, skill, and coordination mechanisms to manage the flow of products between intermediaries and ensure that quality specifications are met.

For sustainable income growth, fruit growers need to position themselves precisely in high value added activities in the value chain. It requires grassroots level innovations and entrepreneurship skills to organize fruit growers in to self-help groups/

development of local clusters/ commodity groups at higher level to market their products. Ultimately the successful entrepreneurship resulted in higher and sustained revenues to the entrepreneurs. Entrepreneurial surplus is the return to the innovation of the ‘new product marketed’ and arises when the price of the product provides greater returns than are required to meet the cost of the innovation. These returns to innovation are a form of super-profit and act as an inducement to replication by other entrepreneurs.

1.4 Significance of the Study

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

1.5 Research Questions

This study attempted to answer the following research question:

1. What are the major fruit supply chains in the study area? And what is the role and linkage of marketing agents?
2. Through which actor large percent of the products enter to the market?
3. Who gets the major share of the marketing margins in mango, jackfruits and litchi supply chains at the study area?
4. What are the constraints and opportunities of fruit marketing in the study area?

5. What are the factors affecting value chain and entrepreneurial growth performance of selected fruits (Mango, Jackfruits, and Litchi)?

1.6 Objectives of the Study

- (i) To document socioeconomic profile of selected fruit growers and market intermediaries in Khagrachhari District.
- (ii) To estimate marketing efficiency of fruit growers and market intermediaries in the study area.
- (iii) To identify existing supply chain and value chain development of selected fruits (Mango, Jackfruits & Litchi).
- (iv) To identify the factors affecting value chain development of selected fruits.
- (v) To recommend policy required for establishing value chain development of selected fruits in Khagrachhari District.

1.7 Limitations of the Study

Some limitations were faced during conducting the study. These are;

- i. Fruit growers and market intermediaries did not record their production and marketing information so it was tough to collect accurate data,
- ii. For the study, data were collected during fruiting season and harvesting season, fruit growers were so busy on their job and it was tough to collect data from fruit growers,
- iii. Most of market intermediaries were came from different districts in market day and did not stay in study area; they were very busy to talk, this created lots of hamper to collect data.
- iv. Most of the respondents were not habituated with this type of research. So a huge amount of time had to spend to explain them about the purpose of the research,

1.8 Organization of the Thesis

Chapter one describes the background, statement of the problem, rationale of the

study, significance of the study, objectives, research questions, and limitations of the study. The second chapter provides review of literature. The third chapter consists of the research methodology. Chapter four provides the socio-economic profile of fruit growers and market intermediaries. Chapter five has briefly discuss about marketing cost, marketing margin and marketing efficiency of fruit growers and intermediaries in the study area; chapter six consists of existing supply chain and value chain development of selected fruits in Khagrachhari District; chapter seven contains about factors affecting value chain development in the study area and finally chapter eight contains summary, conclusions and policy recommendations.



Chapter – 2
LITERATURE
REVIEW

Chapter 2

LITERATURE REVIEW

Literature on the marketing efficiency and value chain development of fruits in CHT is considerably inadequate particularly in Bangladesh, because very little research has been done on these issues. Whatever attempts have been made to investigate related topics is remain scattered and inadequate. However, some relevant studies in respect of marketing efficiency, supply chain and value chain of fruits are available from Bangladesh as well as in other countries. This chapter is concerned with the review of literature related to marketing, marketing system, supply chain and value chain of fruits.

According to Backman and Davidson (1962) a market is one of the many varieties of systems, institutions, procedures, social relations and infrastructures whereby parties engage in exchange. A market is a point or a place or sphere within which price-making force operates and exchanges of title tend to be accompanied by the actual movement of the goods affected. While parties may exchange goods and services by barter, most markets rely on sellers offering their goods or services (including labor) in exchange for money from buyers.

Bain and Howells (1988) said that, a market can be described as simple arrangements to facilitate exchange of one thing for another. The most observable features of a market are its pricing and exchange processes and it is more than a physical place. No need to meet physically for a market to operate especially in today's information and communication technologies.

According to Kohls and Uhl, (1985) marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. The term marketing has been a very debatable concept and defined in so many different ways by different scholars. This is because marketing, or more specifically agricultural marketing, projects different impression to different groups of people in a society, like fruit growers, intermediaries and consumers. Marketing can be described as the performance of all business activities involved in the flow of food products and

services from the point of initial agricultural production until they are in the hands of consumers.

According to Penn State College of Agricultural Science, agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. Numerous interconnected activities are involved in doing this, such as planning production, growing and harvesting, grading, packing, transport, storage, agro- and food processing, distribution, advertising and sale. Some definitions would even include "the acts of buying supplies, renting equipment, (and) paying labor", arguing that marketing is everything a business does. Such activities cannot take place without the exchange of information and are often heavily dependent on the availability of suitable finance.

Branson and Norvel (1983) defined the marketing system in terms of what is otherwise known as supply chain. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers.

Islam *et al.* (2001) and Tadesse (2011) said marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers.

Raymon (2003) illustrated that marketing efficiency refers to the efficient allocation of resources to achieve the greatest possible consumer satisfaction. Efficiency of agricultural marketing refers to the efficiency with which resources are used in marketing, in terms of physical input and output ratios. An efficient firm or market produces the maximum possible output from the input used, given location and environmental constraints, and it minimizes resource inputs for any given output.

According to Chhina (2009) a market can be said highly efficient if the difference in price of the commodity at the different points of time in a year should not be more than the cost of storage; the difference of price of a commodity at different places should not be more than the cost of transportation

to that place; and the price with the change in the form of the commodity (processing) should not be more than the cost of processing. So, the efficiency of a market can be measured with the pricing of the product with the change of time, change of place and change of form.

Hassan *et al.* (2012) said that generally, market efficiency is measured on the basis of consumers' satisfaction at the minimum cost and the maintenance of high volume of outputs. Marketing efficiency is the ratio of market output (satisfaction) to market input (cost of resources). An increase in ratio indicates improved efficiency and a decrease denotes reduced efficiency.

According to Shepherd (1972) marketing efficiency is the ratio of the total value of goods marketed to the marketing cost. The higher the ratio the higher the efficiency and vice-versa. There are different expectations of the growers, traders and middlemen in marketing system. The growers wish to sell their produce at the highest possible prices in the shortest period and may realize the quick payment of their sale. The consumers wish to purchase the best quality products at the minimum prices. The traders wish to earn the maximum from their marketing business, and they wish to charge the maximum for their services.

According to Holloway and Ehui (2002) marketing cost is refers to those costs which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (packing and unpacking), costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (officials) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement.

Hassan *et al.* (2012) indicated various middlemen perform different functions in the process of marketing and they charge fees for the services they provide. These charges include costs for packaging, loading, unloading, sorting, grading, market fees, commission, etc. In the case of the profit of the middlemen, beginning from

the sale of the produce from the fruit growers till it reaches the consumers, different actors like 'Faria', 'Bepari', commission agent, wholesalers, retailers, and so on handle produce and they earn profit by adopting this profession. Their profit is included in the price of the commodity and it also becomes a part of the market margins.

According to Chhina (2009) it can be concluded that low marketing cost expressed as a percentage of the consumers' price is not an indicator of high efficient market and similarly the marketing cost expressed as a percentage of the consumers' price is always not an indicator of low efficiency market system.

Chinna (2009) also found that the cost of marketing of a particular commodity is influenced by different factors such as quantity of the product, perishability, bulkiness, risk involved, facilities in the market, grading, storage, transportation, regular or irregular supply, advertisement, processing, packaging, retail or wholesale, degree of market information and competition in the market. There are some important points to be considered to reduce marketing cost which include improvement of management, better handling of products, increase in the volume of business, reduction in market charges, creating the conditions for perfect competition, reduction of risk, practice of grading, and provision for market information.

Nagurney (2006) explained a supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer. In sophisticated supply chain systems, used products may re-enter the supply chain at any point where residual value is recyclable. Supply chains link value chains.

Kotler and Armstong (2003) said that supply chain is a business structure of interdependent organizations from the point of product origin to the consumer with the purpose of moving products to their final consumption destination.

Getachew (2002) visualized the analysis of supply chains is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (consumer). This knowledge is acquired by studying the participants in the process, i.e. those who perform physical marketing functions in order to obtain economic benefits. This channel may be short or long depending on the kind and quality of the product marketed, available marketing services, and prevailing social and physical environment.

According to Hobbs *et al.* (2000) the term supply chain refers to the entire vertical chain of activities: from production on the farm, through processing, distribution, and retailing to the consumer. In other words, it is the entire spectrum, from gate to plate, regardless of how it is organized or how it functions.

Abbott and Makeham (1981) said that marketing margin is a commonly used measure of the performance of a marketing system. It is defined as the difference between the price the consumer pays and the price that is obtained by producers, or as the price of a collection of marketing services, which is the outcome of the demand for and supply of such services.

Mendoza (1995) found that the size of market margins is largely dependent upon a combination of the quality and quantity of marketing services provided the cost of providing such services, and the efficiency with which they are undertaken and priced. For instance, a big margin may result in little or no profit or even a loss for the seller involved depending upon the marketing costs as well as on the selling and buying prices.

According to Chhina (2009) and Hassan *et al.* (2012) studying marketing margins is very important for several reasons such as to study marketing efficiency, compare different markets, improve marketing system, study the role of the middlemen, and implement different Government policies. Role of middlemen is an important aspect in influencing the marketing costs and margins. If the results of marketing margins of the different middlemen indicate that there are certain unreasonable charges, and inefficiency in the services of the middlemen, those can be improved accordingly. Another important aspect of marketing margin analyses is

the implementation of Government policy. The Government formulates policies with the objective of improving the efficiency of the marketing.

According to UNIDO (2011) a positive or desirable change in a value chain to extend or improve productive operations and generate social benefits: poverty reduction, income and employment generation, economic growth, environmental performance, gender equity and other development goals. Value chain development interventions can focus on improving business operations at the level of producers, processors and other actors in the chain and/or the (contractual) relationships among them, flow of knowledge and information and innovation. Value chain development can also foster overall coordination in the chain; participation of selected beneficiaries in local, national or global value chains; reduction of entry barriers and a higher share of value addition for certain actor.

Minten *et al.* (2010) said that the changing demand in domestic and international markets for high-value product creates challenges and opportunities. Small and marginal holders produce majority of the horticultural commodities like fruits and vegetables, but due to weak and fragmented value-chain, only a small percentage of the produce reaches the urban market.

Khandaker *et al.* (2009) found that appropriate marketing infrastructure is crucial for efficient marketing of fruits. Adequate transportation and product handling are also important for the trade of agricultural products and important factors in assuring good prices and poverty alleviation.

According to World Bank (2005) investment is required for improved maintenance of road and port infrastructures. In addition to infrastructure development, modification of policies and management are also needed to improve appropriate and timely shipping of perishables.

According to AGRICO (2004) value chain analysis also reveals the dynamic flow of economic, organizational and coercive activities involving actors within different sectors. It shows that power relations are crucial to understanding how entry barriers

are created, and how gain and risks are distributed. It analyses competitiveness in a global perspective. By revealing strengths and weaknesses, value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships, which will allow them to keep improving chain. The latter outcome is especially relevant in the case of new manufacturers including poor producers and poor countries that are seeking to enter global markets in ways that can ensure sustainable income growth.

AGRICO (2004) reported that the main advantages to commercial stakeholders from being part of an effective value chain are reductions in the costs of doing business, increased bargaining power, and improved access to technology, information and capital, leading to innovations in production and marketing processes to gain higher value and provide higher quality to customers. From a business perspective, ineffective value chain linkages causes for failure among commercial stakeholders and service providers translates into ineffective value chains. Value chains are organized linkages among groups of producers, intermediaries, processors and service providers who join together in order to improve productivity and add value to their activities. By joining together, the actors in a value chain increase competitiveness and are able to maintain competitiveness through innovation. The limitations of each single actor in the chain are overcome by establishing synergies and governance rules aimed at producing higher value.

AGRICO (2004) also reported that the core problem for agribusiness development in Bangladesh is the lack of effective value chain linkages among input providers, fruit growers, intermediaries, processors, and service providers. The lack of effective linkages is explained by various factors including policy, institutions, human resources, gender, and infrastructure.

IDAF (2009) reported that, a weak agricultural credit system, unorganized market structure, unfavorable weather, small land holding sizes and inadequate technology development contributes to low productivity in the smallholder sector. The absence of more productive agricultural technologies has resulted in land degradation due to continuous cultivation, soil erosion, deforestation and limited technology adoption on land and water management. There has been also been an erosion of extension

services. Smallholder agriculture is associated with a lack of value addition in agricultural products with little agro-processing and with most smallholders selling raw agricultural produce without adding value receiving no additional payment for quality.

According to AGRICO (2004) the lack of effective linkages among stakeholders in a value chain has several consequences. Perhaps the most obvious one is the predominance of supply chain bottlenecks. Bottlenecks result in produce from fruit growers not flowing to the market in the amount and quality necessary to ensure high and stable returns. As a result, fruit growers experience gluts of commodities; processors are not able to procure sufficient raw materials for their plants; retailers do not get sufficient products to meet the demand of consumers; and exporters are unable to meet foreign customers' requirements. The overall volume of domestic and international trade is reduced; in turn this implies that rural households and enterprises will not be able to reap the benefit from higher rural income and employment. In turn, a weak rural economy reduces the scope for further investment in rural areas and entails low aggregate growth. Without effective linkages among stakeholders, success cases of entrepreneurship remain isolated and do not translate into a wider growth of the agribusiness sector. To achieve wider growth effects, entrepreneurs need to be linked to each other, form associations and establish mechanisms to exchange information, including the formation of economic clusters which are locations where many similar enterprises group themselves to achieve economies of scope and scale.

Ayub. and Siraj (2008) found that mango marketing system has a complex supply chain. Different supply chain agents are involved in the local markets and they bargain with the fruit growers at the local level. The lack of market information and other supply chain agents is one of the factors contributing to the low income for the fruit growers. The local fruit growers did not take value addition initiatives. Knowledge regarding value addition and low adoption of new agriculture technology which could help farmer from earning more from mango crop. Lack of farmer's interest in adoption of these new technologies is also due to old age of mango farms. This therefore hampers the quality production of mango.

According to Hassan (2010) at the growers' levels, the problems are mainly related to unavailability, high price and poor quality of fertilizers, lack of irrigation water, insect infestation and disease attack. At the intermediary levels, the problems are mainly related to transport, lack of proper storage facility and capital. The most common problem is due to the lack of storage facilities. Second most important problem was the lack of proper transport facility. The problems of the wholesalers are mainly due to lack of proper storage, funds and obtaining LC (Letter of Credit) in time. At the retailers' level, lack of storage is also found to be an important constraint.

Hossain and Haq (2006) illustrated that the jackfruit canopy provides perennial cover to the soil, acting as a shade tree and absorbing the impact of rain on the soil. In upland situations, jackfruit trees are usually planted on slopes and hills to help control soil erosion. They can also be planted to help absorb groundwater to minimize flooding, as the tree has a widespread root system.

Haq (2006) reported that, no special care is taken by cultivators on small farms to maintain jackfruit trees and there is little maintenance cost incurred by the growers other than pruning costs.

According to ICUC (2005) jackfruit marketing involved three groups: producers, traders (middlemen) including wholesalers, and retailers. The marketing of jackfruit hinges not only on the development of suitable cultivars, production, post-harvest management strategies, processing and utilization systems but importantly on marketing and market development. Anon, 1986 reported that, the supply chains involved in the movement of jackfruit produce are complex. The channels may vary between large, medium and small fruit growers. Large fruit growers sell their produce long before fruits are mature. It helps cash flow and reduces risk. Wholesalers in the city and large towns are typical buyers who may assume all the risks associated with poor fruit production, including loss due to natural hazards.

Hassan (2010) reported that jackfruit at the 'Bepari' level, 80-90 percent of the 'Bepari' have problem with lack of adequate transport facility. The transport problems are concerned with unavailability, high price and the hegemony of the local transport brokers. The wholesalers also have problems in relation to the lack of storage.

Hassan (2010) found that for litchi marketing at the growers' levels, availability of agricultural inputs are found to be the major concerns, whereas at the intermediary levels, lack of storage and transport facilities and pericarp browning are observed to be the major constraints. The retailers of litchi fruits also acknowledge the problems related to skin browning and lack of storage.

According to Momen *et al.* (1993) litchi (*Litchi chinensis Sonn*) is one of the popular and delicious fruits of Bangladesh. It is grown almost all over the country but its production is mostly concentrated in the northern and eastern region. The leading litchis producing districts are Dinajpur, Rajshahi, Pabna, Jessore, Mymensingh, and Chittagong areas. At present, the area of this fruit under cultivation is 1681 hectares and production is 40195 metric tonnes. A considerable amount of litchi fruits losses every year during harvesting, sorting, storing, transportation, selling and consumption due to its perish ability. The perishability of this fruit is attributed to immense physiological changes after harvest.

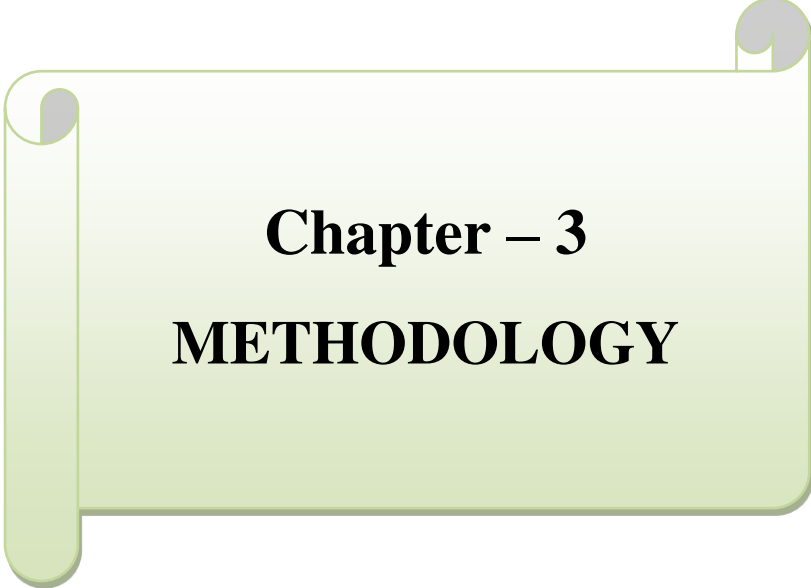
Siddiqu (2001) illustrated that litchi was found to grow well in the Government horticulture centers of three hill districts namely: Rangamati, Khagrachari and Bandarban and also in Jamalpur, Rajbari, Meherpur, Chapainawabgonj and Comilla. The expansion of the litchi area in these districts is relatively slow due to high mortality rate of young litchi plants. Most of the growers as well as extension agents do not have the required knowledge and skill in litchi cultivation as a result of which interested fruit growers very often fail to establish new orchards.

According to Department of Agriculture Extension (DAE) sources a silent revolution has taken place in litchi farming as hundreds of fruit growers have achieved self-reliance through farming of the most delicious, juicy and fleshy seasonal fruit in recent years everywhere in northern Bangladesh. The fruit growers have engaged all-out efforts now in nursing the litchi trees in the orchards when formation of the tender fruits continues superbly after recent rainfalls as the harvest will begin from the next month. The enthusiastic fruit growers have been expanding cultivation of high yielding and hybrid varieties litchi every year following repeated bumper production and excellent market price. According to the DAE sources, over 90 per cent of nearly

72 million litchi trees in about 9,000 small, medium and big-sized litchi orchards and homesteads have worn eye-catching looks with growing tender litchis.

Siddiqu (2001) reported that very good quality litchi grows in the Chittagong hill district area but the rate of expansion is extremely slow, which may be due to prevailing social unrest and difficulty in establishing new orchards. The present area under litchi is 295 acres in Rangamati, 245 acres in Khagrachari and 155 acres in Bandarban. This area can easily be expanded to a few thousand acres. The only limitation for the expansion of litchi in the area is inadequate irrigation facilities, which may be overcome by carefully choosing the expansion area and better management of residual soil moisture. The litchi area can easily be expanded with good varieties in the flood free areas in hill tracts.

Reviewing all these papers, there is a clear thing that in CHT there was no such researches about fruits supply chain and fruits value chain. But such a research is much needed because in CHT, most of the people now involved in fruits production. Some research will be helpful both local and national level for fruit growers and intermediaries to overcome all obstacles present in fruits marketing and value chain development.



Chapter – 3
METHODOLOGY

Chapter 3

METHODOLOGY

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

3.1 Description of the Study Area

Khagrachhari subdivision was turned into a district in 1983. The district of Chittagong hill district was established in 1860 by Remrochai Chowdhury, under the 'Frontier Tribes Act 22 of 1860'. Following the district of Chittagong Hill Tract Regulation Act the Chittagong Hill Tract was divided into three subdivisions (included Khagrachhari District) in 1900. The Khagrachhari District Local Government Legislative Council was formed in 1989 (in accordance with the Khagrachhari Districts Council, Act 20), which, on the basis of the historic 'Chittagong hill district Peace Accord', was turned into Khagrachhari District Council on 2 December, 1997. The district consists of 8 upazilas, 34 union parishads, 123 mouzas, 953 villages, one municipality, 9 wards and 61 mahallas. The Upazilas are Dighinala, Khagrachhari District sadar, Lakshmichhari, Mahalchhari, Manikchhari, Matiranga, Panchhari and Ramgarh.

Khagrachhari District with an area of 2699.55 square kilometers is bounded by the Indian State of Tripura on the north, Rangamati and Chittagong districts on the south, Rangamati district on the east, Chittagong district and the Indian State of Tripura on the west. Annual average temperature: maximum 34.6 DC, minimum 13 DC; annual rainfall 3031 mm. The hills of this region are composed of folded sedimentary rocks. Notable hill ranges Alu Tila, Bhangra Mura (416.66 m), Matai Pukhiri (213.36m), Matai Lakho (274.32 m); main rivers are Chingri, Maini, Feni and Halda; lake Mataipukhiri (Debotar pukur).

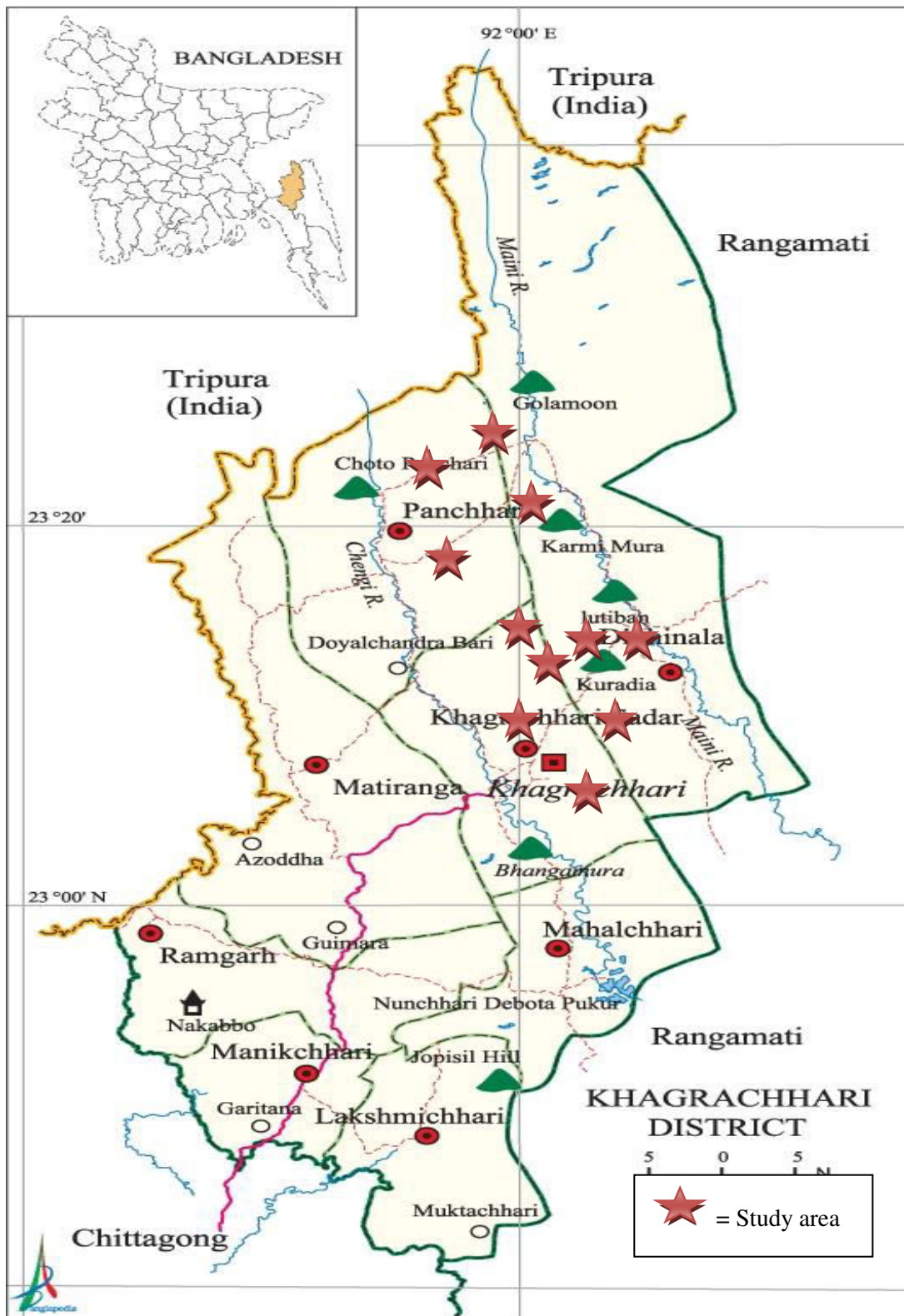
Khagrachhari (Town) was established in 1860 by Remrochai Chowdhury. Khagrachhari town consists of 9 wards and 61 mahallas. It has an area of 67.99 square kilometers. The town has a population of 39654; male 57.20 percent and female 42.80 percent; population density per sq km 583. Literacy rate among the town people is 50 percent. About 266 km by road from

Dhaka and 112 km from Chittagong. The district of Khagrachari represents the natural, wild, beauty of Bangladesh.

3.1.1 Selection of the study area

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

- Easily accessible and thus facilitate the researcher to complete the field work;
- Favorable for fruit production and marketing;
- Most of the fruit gardens are nearby to the road.



Picture 3.1 : Khagrachhari District map.

3.2 Source of Data and Collection Procedure

3.2.1. Desk top study

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

These are given below:

- i. *Value chain analysis of selected commodities institutional development across the agri-food sector (IDAF)- 9 ACP MAI 19 – report prepared by CYE Consult*
- ii. *Cassava Value Chains in Nkhotakota, Salima and Lilongwe-Report submitted to FAO by IITA/SARRNET-April 2008*
- iii. *Value chain analysis report, Cambodia Philippine Vietnam. Linking small fruit growers to market project. 2008. Asian Partnership for the development of Human Resource in Rural Asia (AsiaDHRRA) and Asian Foundation.*
- iv. *Value chain analysis of selected commodities institutional development across the agro-food. Sector (IDAF) – 9 ACP Mai 19. 2008 . EU.*
- v. *Final report, Agribusiness Development Project Bangladesh. AGRICO Limited, September 2004, New Zealand.*
- vi. *Food value chain analysis, A review of selected studies for Pakistan and Guidelines for further research, Pakistan strategic support program, 2012. Pakistan.*
- vii. *Karna. N., Surwar. R. , MacCarthy. G., Value chain analysis final report, CHT value chain portfolio, August 2010, Bangladesh.*
- viii. *Linking small fruit growers to markets, Building the next links in the value chain. South Asian Nation, February 2011.*
- ix. *Mapping the marketing initiatives by CSOs in Indonesia, Value chain analysis report of organic rice in Indonesia.2009. Indonesia.*

- x. *Pro-Poor value chain development, 25 guiding questions for designing and implementing agro industry projects, 2011, United Nations Industrial Development Organization. (UNIDO) Vienna, Austria.*
- xi. *Quesada, H., Gazo R., and Sanchez. S., Critical Factors Affecting Supply Chain Management: A Case Study in the US Pallet Industry, March 2010.*

3.2.2 Collection of secondary data

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

3.2.3 Pre-test of survey questionnaire

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

3.2.4 Final questionnaire preparation

From the pre-test result a final survey questionnaire was prepared. Final questionnaire also made to find out the problems regarding fruit production and marketing in the study area. Also to find out the existing supply chain and value chain of selected fruits.

3.2.5 Data collection

Data collection is not an easy task. It must be done sincerely, because a successful report depends on the reliable data. Before beginning the interview, each respondent was given a brief description about the aim and objectives of the study. Primary data were collected from the market actors including growers and intermediaries using pre-tested semi structured questionnaires, conduct FGD and the Key Informants Interviews (KII).

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

3.2.5.1 Data collection from growers

Fruit growers were select from Khagrachhari District. Formal survey data was complemented by key informant discussions and fruit growers. Growers selected from different area in Khagrachhari District like Gamaridala, Gargajjehari, Pujgang, Dighinala, Vaibon Chora, Voirofa, which are located outside the city. As the population size was not readily available, the fruit growers and market intermediaries were selected considering availability at the first sight. Inside the city, from each area respondents were selected. However, where ever possible, discussions were held with farming households on an informal basis. There were 130 respondents, where 56 respondents were mango growers, 34 were jackfruits growers and 40 were litchi growers.



Picture 3.2: Data collection from fruit growers with direct supervision of supervisor

3.2.5.2 Data collection from intermediaries

The intermediaries refer to those people who act between the growers and consumers. The important intermediaries are ‘Faria’, ‘Bepari’, ‘Aratdar’, ‘Wholesaler’ and retailer. Information was collected on trade volume, marketing costs (depreciation on investment capital, interest on running capital, transport cost, office cost, commission, market toll, wastage, etc.), mode of sales, purchase and sale prices, price formation, gross and net margins

and marketing constraints. For Bepari, Faria, Wholesaler and retailers, similar methods were followed. Among these intermediaries, Bepari and Wholesaler, they transport fruits to other districts in the country.

3.3 Market Intermediaries and Their Roles

In this study, different mango, jackfruit and litchi market participants were identified in the exchange functions between farmer and final consumer. Market participants in the study areas include: producer, local collectors, wholesalers, Retailers, processors and final consumers of the product. Even though, each participant was involved in different activities (Faria, wholesaler, retailer and Bepari), based on major activity undertaken, the sampled market participants were categorized into different categories.

Producers: These are the primary or first link actors who cultivate and supply mango, jackfruit and litchi to the market. The land for the above mentioned commodities was on its own plot to produce the already mentioned crops. Since the products are very perishable in nature, producers sell their produce right after harvest either at garden or local market. The process of mango and litchi selling had similar selling procedures; where matured fruits (mango) are collected once every week or on more intervals for almost four months and matured fruits (litchi) are sell as early as possible because of its perisability. Litchi (without preservatives) were found only 2/3 week in the market. But for jackfruit, right after collection, the products are taken either to road side, nearer local market, home side, etc; and it will be handed over to the local collectors, processors, retailers and a limited amount is sold directly to consumers or supply to the town market and intermediaries supply the fruits to other city in the country. These things happen per week during the season. Similarly, due to lack of adequate, reliable and timely market information, fruit growers are forced to dispose their produce within limited period at low selling price. Bamboo basket (locally called thurong/hallong), gunny sacks, plastic bag and plastics crates (used by big fruit growers) are the customary packaging material for collection and product delivery of avocado and mango in the study areas. Thus, due to limited production and supply of mango and litchi, storage was not a problem at the moment, because what is produced now is marketed immediately right after harvest. But it would be a critical problem in the near future when production and productivity of mango and litchi is intensified and supplied to market within the study area.

Wholesalers: These are known for purchase of bulky products with better financial and information capacity. They are major actors in the channel and they purchase mango and litchi either directly from fruit growers, Bepari or Faria. They are relatively large intermediaries having fixed establishment in the market and have permanent staff. Generally, the large share of their purchase was sold to Chittagong market and Fenny market (for jackfruits). They procure and consign large amount of mango, jackfruit and litchi to the local bazar and to town markets.

Retailers: They are known for their limited capacity of purchasing and handling products with low financial and information capacity. Besides, these are the ultimate actors in the market chain that purchase and deliver mango, jackfruit and litchi to consumers. In the study area, they had small permanent or temporary shops located in town market. They purchase fruits from wholesaler, Faria, Bepari or fruit growers and sell it to the ultimate consumers. Most of them were also involved in trading of commodities like pulses, oil or different types of necessary things.

Faria and Bepari: They are small intermediaries who have no fixed establishment and staff. They purchase fruits from fruit growers at the farm gate or in the local market and sold them to wholesaler, Bepari (other district) and partly to retailers. They also dealt in other agricultural commodities. In the study area, a number of Bepari were involved in jackfruits collection and supplied it to other district, they were not permanent resident in the Khagrachari district, came from Fenny, Comilla, Borishal and other district to trade fruits. This process was going on when the season was not gone.

Processors: In the study area, there are no processing centers for fruits. But some NGO's trained people especially women on fruits processing like preparing pickle, chips, jam, jelly etc. But few of them were practiced their technical know-how. Those who were involved with processing fruits they personally purchased fruits from local market (some had their own fruit trees) and garden and made processed product and sold it to local market or supply to other customers.

Consumers: From the consumers' point of view, the shorter the marketing chain, the more likely is the retail price going to be affordable. Consumers for this particular study mean those households who bought and consume fruits. They are individual households; they bought the commodity for their own consumption only.

3.4 Data Analysis

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

3.4.1 Statistical analysis

Production costs and margins of fruit growers

In the present study, the costs and margins of the growers of the selected fruits was calculated. The methods are briefly described in the following:

Production cost

Production costs include both variable and fixed costs. The variable costs include costs for seed/seedling, cost of human labour, cost of cultivation, cost of fertilizer, cost of irrigation, cost of insecticide and pesticide, etc. The fixed costs include mainly land use cost, interest on running capital and depreciation.

Profitability of fruit growers

The following profit equation was used to estimate the profitability of production of the selected fruits.

$$\Pi = PF \cdot QF - (TVC + TFC)$$

Where

Π = Profit of producer per unit per year

PF = Per unit price of fruits

QF = Quantity of fruits

TVC = Total variable cost

TFC = Total fixed cost

Gross returns of fruit growers

Gross return was calculated by multiplying the total volume of output by the per unit price of the commodity at the time of harvest. The following equation was used to estimate gross return (GR):

$$GR = \sum P_b \cdot Q_b$$

Where

GR = Gross return from fruits

P_b = Per unit price of fruits

Q_b = Quantity of fruits

Gross margin of fruit growers

The argument for using gross margin analysis is that the fruit growers were more interested to know their return over variable cost. The following equation was used to assess the gross margin.

$$GM = TR - VC$$

Where

GM = Gross margin

TR = Total return

VC = Variable cost

3.4.2 Marketing margins of market intermediaries

The net marketing margins of the intermediaries (after physical losses) were calculated by the following formula:

$$\text{Net marketing margin} = \text{Sales price} - (\text{Purchase price} + \text{Marketing cost})$$

The marketing costs mainly include costs for various market operations like transportation, loading and unloading, market toll, rents, staff salary, electricity, generator cost, commission, wastage, depreciation, and other miscellaneous costs. The items of the marketing costs vary with the type of intermediaries.

3.4.3 Marketing performance

Marketing performance was evaluated using different measures of marketing efficiency as described by Shepherd (1972), Hugar and Hireman (1984), and Acharya and Agarwal (2004).

In the present study, the efficiency of marketing were investigated by examining price spread, growers' share, Acharya's methods for estimating efficiency. The methods for studying these estimates are given in the following.

Price spread

Price spread = Price paid by consumers – Price received by the growers

Grower's share

$$\text{Growers' share (percent)} = \frac{\text{Price recived by the fruit growers}}{\text{Customers' price}} \times 100$$

3.4.4 Acharya's method for estimating marketing efficiency

In this method, the marketing efficiency will measure using the following formula:

$$\text{Marketing efficiency} = \frac{FP}{(MC + MM)}$$

Where

FP = Prices received by the intermediaries

MC = Total marketing cost

MM = Net marketing margin

3.4.5: Establishing factors affecting value chain development by factor analysis.

Factor Analysis

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

If $\{X_1, X_2, \dots, X_n\}$ be a set of n observed variables and $\{F_1, F_2, \dots, F_m\}$ be a set of unobservable variables then the factor analysis model can be expressed as

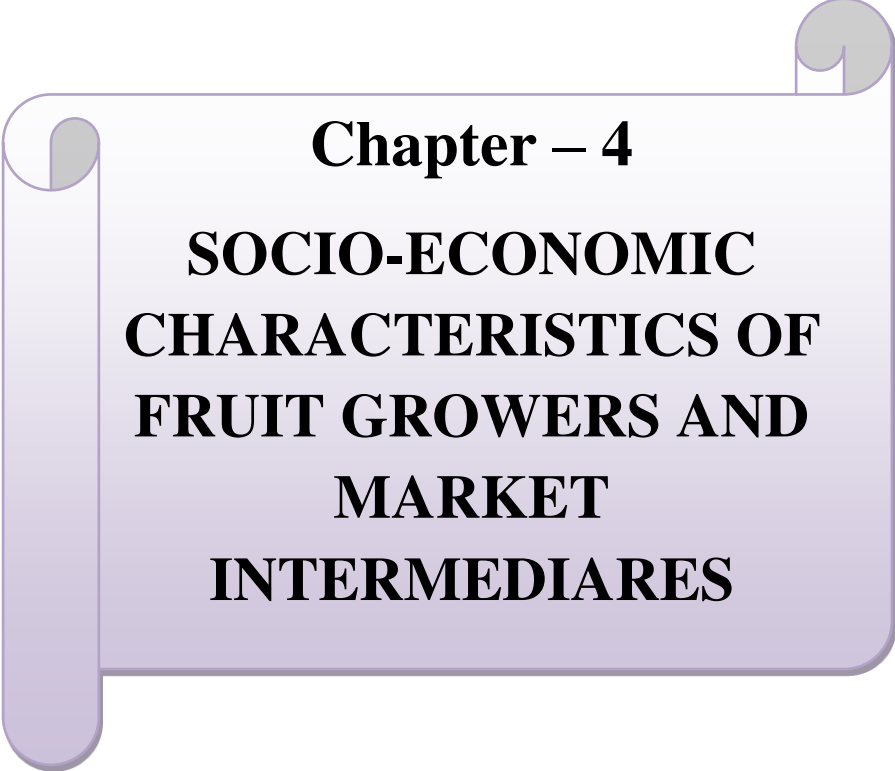
$$\begin{array}{l}
 X_1 - \mu_1 = l_{11}F_1 + l_{12}F_2 + \dots + l_{1m}F_m + \varepsilon_1 \\
 X_2 - \mu_2 = l_{21}F_1 + l_{22}F_2 + \dots + l_{2m}F_m + \varepsilon_2 \\
 \text{-----} \\
 \text{-----} \\
 X_n - \mu_n = l_{n1}F_1 + l_{n2}F_2 + \dots + l_{nm}F_m + \varepsilon_m
 \end{array}
 \left. \vphantom{\begin{array}{l}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

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

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

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

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



Chapter – 4

**SOCIO-ECONOMIC
CHARACTERISTICS OF
FRUIT GROWERS AND
MARKET
INTERMEDIARES**

Chapter 4

SOCIO-ECONOMIC PROFILE OF FRUIT GROWERS AND MARKET ACTORS

4.1 Socio-demographic characteristics of fruit growers

The economic information has many purposes; it is used for research in the social sciences, creation of policy, and identification of potential socio-economic networks. It is a guide to and starting point for research about basic information on the areas of investigation. This section provides the socio-demographic profile such as gender of the households, age, family size, education level etc. of the respondents.

4.1.1 Gender of the fruit growers

In survey area 93 percent mango growers were male, 7 percent mango growers were female. For jackfruit production 82.4 percent growers were male and rests 18 percent were female. About 93 percent litchi growers were male and 8 percent respondents were female. The participation of female in fruit production (mango, jackfruit and litchi) is lower than male (Table 4.1).

4.1.2 Age of fruit growers

Age of fruit growers play a vital role in the fruit production and in better management of the farming activities. The major demographic factor such as age, measured in years, provided a clue on working ages of households. The average age of the sample households was 40.5 years from mango fruit growers, 43.11 years were jackfruits growers and 41.47 years were litchi growers (Table 4.1).

4.1.3 Marital status of fruit growers

From the total 130 respondents 7.14 percent mango growers were unmarried; around 6 percent jackfruit growers were unmarried whereas 10 percent litchi growers were unmarried. The big portion of growers was married. From the total respondents' mango, jackfruit and litchi growers respectively 90.07 percent, 91 percent and 87.5 percent were married. The category of widow also found from respondents, all of them were female (Table 4.1).

4.1.4 Family size (person/family)

A family size ranging between two to ten is witnessed in the farming households; the available data indicated that average family member in each family was 5.27 for mango growers, around 5 for jackfruit growers and 5.25 for litchi growers. Bigger family size has supported to boost volume of supply in the study areas to impact for better participation in fruits production and marketing (Table 4.1). Thus existence of larger family size has positively affected the supply of marketable surplus mainly due to effective family member.

Table 4.1: Socio-demographic characteristics of fruit growers

Sl. No.	Characteristics	Fruit growers		
		Mango (n=56)	Jackfruits (n=34)	Litchi (n=40)
1.	Gender (no.)			
	Male	52 (92.85)	28 (82.4)	37 (92.5)
	Female	4 (7.14)	6 (17.6)	3 (7.5)
2.	Age (average)	40.5	43.11	41.47
3.	Marital status (no.)			
	Unmarried	4 (7.14)	2 (5.9)	4 (10)
	Married	51 (91.07)	31 (91)	35 (87.5)
	Widow	1 (1.78)	1 (2.9)	1 (2.5)
4.	Family size (person/family)	5.27	4.88	5.25

Note: Figures in the parentheses indicate percentages of total.

Source: Field survey, 2014.

4.1.5 Land ownership of fruit growers

In the study area above 90 percent respondents has their own land for fruits production. Only few of them 5 to7 percent respondents rented land. About 8 to12 percent fruit growers (mango, jackfruits and litchi) leased in their land (Table 4.2). The reality implied that majority of empty hill are now covered by different fruits garden. In the study area for all three types of fruit growers above ninety percent fruit growers own land ownership which indicates the awareness of hilly people about their livelihood and proper utilization of their own fellow hill.

Table 4.2 Land ownership and educational level of fruit growers

Sl.	Characteristics	Fruit growers
-----	-----------------	---------------

No.		Mango (n=56)	Jackfruits (n=34)	Litchi (n=40)
1.	Land ownership (no.)			
	Own	52 (92.85)	33 (97.1)	36 (90)
	Rent	3 (5.35)	0	3 (7.5)
	Govt./NGO	0	0	0
	Leased in	5 (8.93)	4 (11.8)	4 (10)
2.	Educational level (no.)			
	Illiterate	0	0	0
	Class 1-5	2 (3.57)	1 (2.9)	1 (2.5)
	Class 6-10	13 (23.21)	4 (11.8)	7 (17.5)
	SSC	14 (25)	7 (20.6)	10 (25)
	HSC	3 (5.36)	3 (8.8)	3 (7.5)
	Graduation or above	25 (44.64)	20 (58.8)	19 (47.5)

Note: Figures in the parentheses indicate percentages of total.

Source: Field survey, 2014.

4.1.6 Educational level of fruit growers

Education of the family members can contribute to ensuring food security at household level directly or indirectly. An educated person is much aware about nutrition, earnings etc. than an illiterate person. In the study area, above 44 percent of all fruits (mango, jackfruits and litchi) growers had graduation degree or above. Only 2 percent to 3 percent passed class five, 11-23 percent respondents passed class ten, 20 percent to 25 percent completed their SSC degree and 5 percent to 9 percent completed their HSC degree (Table 4.2). This increased educational entitlement had supported the production and marketing of fruits (mango, jackfruits and litchi) in the study area as well as this also helps to improve the ability to acquire new idea in relation to market information and improved production of the households.

4.1.7 Occupation of fruit growers

The respondents depend on different income generation activities. Among all them occupation is divided into two: main and secondary. According to the report, around 47 percent to 57 percent respondents main occupation was fruit production, about 38 percent to 44 percent were service holder, around 9 percent to 13 percent main occupation was business. In the study area around 38 percent to 47 percent respondents' reported that their secondary occupation was fruit production; 13 percent to 36 percent was involved in farming (Table 4.3).

Table 4.3 Occupational characteristics of fruit growers

Sl. No.	Characteristics	Fruit growers		
		Jackfruits (n=34)	Mango (n=56)	Litchi (n=40)
1.	Occupation (Main)			
	Fruit Production	16 (47.1)	32 (57.14)	22 (55)
	Service Holder	15 (44.1)	21 (37.5)	16 (40)
	Business	3 (8.8)	6 (10.71)	5 (12.5)
	Occupation (Secondary)			
	Fruit Production	16 (47.1)	21 (37.5)	18 (45)
	Business	0	0	0
	farmer	5 (14.7)	20 (35.71)	5 (12.5)

Note: Figures in the parentheses indicate percentages of total.

Source: Field survey, 2014

4.2 Socio-Economic Characteristics of Market Intermediaries

4.2.1 Age of market intermediaries

The analysis on this demographic characteristics highlighted that the average age of types of intermediaries was 40 years to 46 years. The maximum and minimum age of market intermediaries was reported as 55 and 35 years of age (Table 4.4).

4.2.2 Educational level of market intermediaries

It is a crucial factor of skill development and enhancing marketing decisions. Literate people can have a better access to the relevant information regarding food and livelihood security. The respondents reported that 100 percent of intermediaries (Faria, wholesaler and retailer) are entitled to formal education (Table 4.4) except Bepari. Around 66 percent of intermediaries have formal education and rest 34 percent were illiterate. The increase educational entitlement has supported the ability to acquire new idea in relation to market information and new technology.

Table 4.4: Socio-demographic characteristics of market intermediaries

Characteristics	Market Intermediaries			
	Faria (n=20)	Wholesaler (n=16)	Retailer(n=16)	Bepari (n=32)
1. Age (years)	45.53	40.94	41.13	41.16
2. Level of education				
Illiterate	0	0	0	11 (34.38)
Class (I-V)	11 (58)	13 (81.25)	4 (25)	9 (28.13)
Class (VI-X)	0	0	6 (37.5)	12 (37.5)
SSC	8 (42)	3 (18.75)	6 (37.5)	0
HSC	0	0	0	0
Graduation or above	0	0	0	0

Note: Figures in the parentheses indicate percentages of total.

Source: Field survey, 2014.

4.3 Contextual Information of Fruit Growers and Market Intermediaries

This section provides the information about year of establishment of gardens (for fruit growers) and business (for intermediaries), garden (for fruit growers) type, business (for intermediaries) type, collection and selling point of fruits, source of finance etc.

4.3.1 Contextual information of fruit growers

4.3.1.1 Year of establishment

Before a decade ago the awareness about fruits production was lower than at present. In this area the revolution of fruits production happened after 2004 except jackfruit. According to the result, almost all mango gardens established between the periods of 2002 to 2006. The respondent reported that most of the jackfruits garden was established in 1998 and for litchi garden the period was between 2002 to 2005 (Figure 4.1).

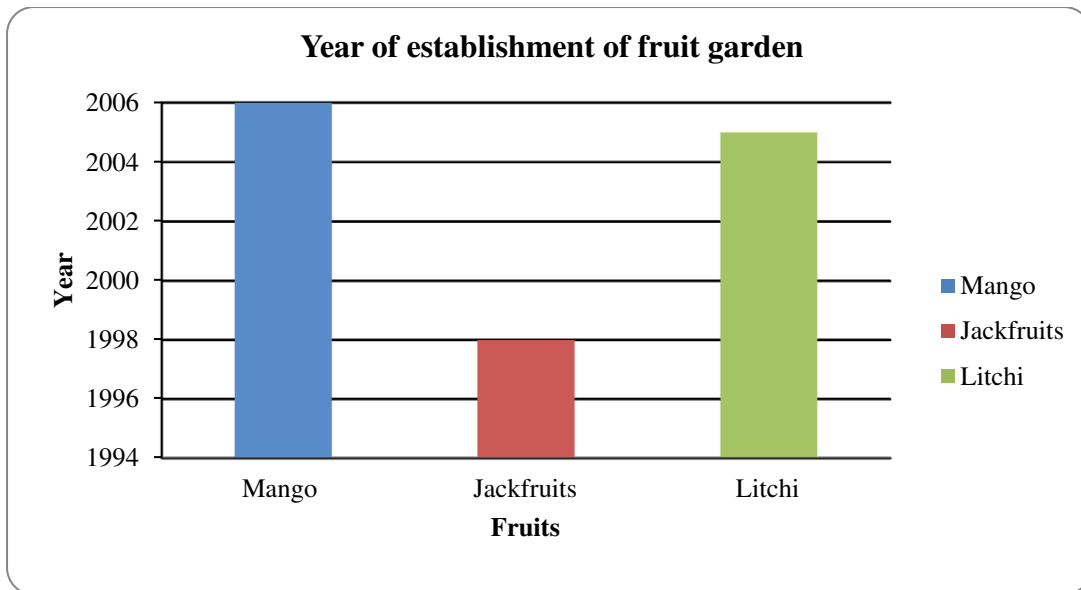


Figure 4.1: Year of establishment of fruits garden.

4.3.1.2 Age of the garden

Around 41 percent to 55 percent garden is eight to eleven years old (Figure 4.2). The next dominant part is four to seven years old garden which is 29 percent to 38 percent of total. Jackfruit is dominating in above fifteen years old garden which is 6 percent than mango and litchi.

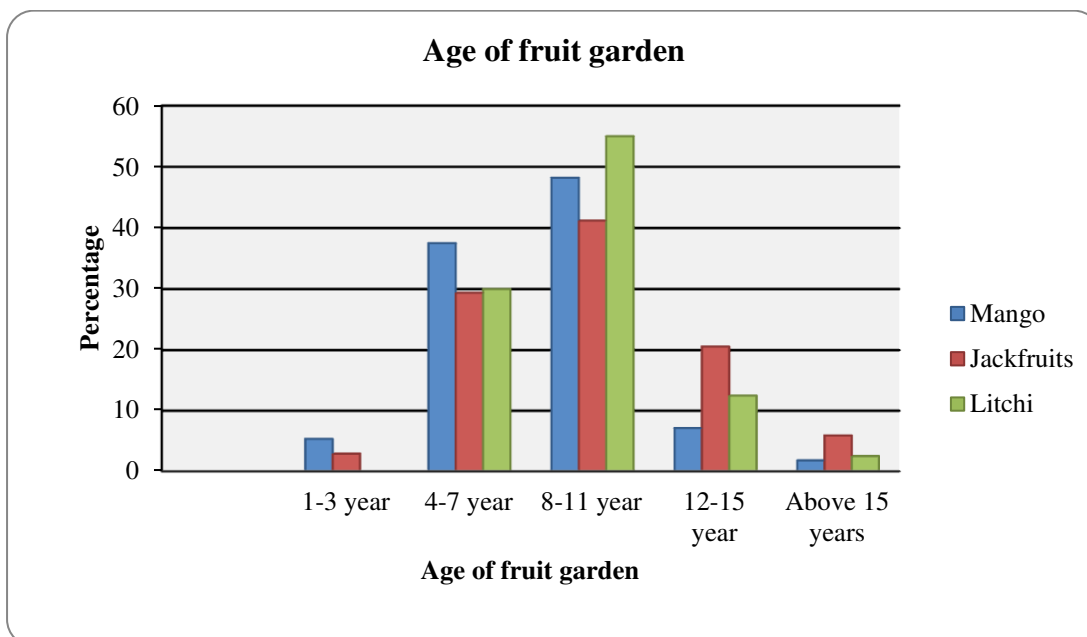


Figure 4.2: Age of fruits garden.

4.3.1.3. Experience on marketing

A decade ago fruit growers in hill tracts have less awareness about fruits marketing. They only produce fruits for home consumption. Few of them were sold fruits. It was also common that, Bepari or wholesaler collected fruits like mango; jackfruits etc from home to home and they sell it from the both local and outside the district market. But the situation has been changed. Fruit growers personally sold fruits both local market and other district. Some of them were personally rented small shop in town market and sold their own grown fruits which had high demand in district now. According to the result, a good number of the growers have 4-7 years experience in fruits marketing, which was 46 to 55 percent (Table 4.5).

Table 4.5: Contextual information of fruit growers

Particulars	Fruit Growers		
	Mango (n=56)	Jackfruits (n=34)	Litchi (n=40)
1. Experience on marketing			
1-3 years	17 (30.36)	5 (14.7)	7 (17.5)
4-7 years	26 (46.43)	17 (50)	22 (55)
8-11 years	12 (21.43)	10 (29.4)	10 (25)
12-15 years	1 (1.79)	2 (5.9)	1 (2.5)
2. Source of Finance			
Own	56 (100)	34 (100)	40 (100)
Bank	9 (16.07)	3 (8.8)	6 (15)
Relatives	6 (10.71)	4 (11.8)	2 (5)
NGO	0	0	0
3. Type of trading			
In cash	53 (94.64)	32 (94.1)	37 (92.5)
On credit	5 (8.93)	4 (11.8)	4 (10)
In advance	2 (3.57)	1 (2.9)	2 (5)
By contract	18 (32.14)	6 (17.6)	8 (20)

Note: Figures in the parentheses indicate percentages of total.
Source: Field survey, 2014.

4.3.1.4. Source of finance

Source of finance is a vital factor for fruit production and marketing. The major source of finance was own finance. About 9 percent to 16 percent fruit growers all said that they borrowed money from bank (Table 4.5). Financial institutions like Sonali bank, Janata bank, Islamic bank etc were lending money to fruit growers in the study area. About 5 percent to 12 percent growers reported that they borrowed money from their relatives.

4.3.1.5. Trading type

Above 92 percent trade occurred on cash during fruits marketing (Table 4.5). This was a good sign that fruit growers got the profit instantly and could use or invest the cash on another purpose. Trade on credit was happened around 9 percent to 12 percent. Contact trade accounted 17 percent to 32 percent in the study area.

4.3.1.6 Sources of input

Agricultural inputs are essential elements for production. Direct inputs include water, fertilizers and pesticides. Indirect inputs include equipment and fuel. Majority of respondents reported that, there was scarcity of irrigation facilities. The percentage of input purchased by growers was highest from town market. Around 70- 79 percent input were purchased from town market. Around 60 percent inputs were purchased from local market or local small bazar, rest 20-25 percent used their own inputs because of lack of financial (Figure 4.3).

4.3.1.7.1 Selling point (Location)

Majority of the growers sold their fruits (mango, jackfruit and litchi) in local and town market. The range was 85-91 percent. Next major portion had sold to Chittagong market (23-25 percent). Growers sold fruits especially mango to Chittagong market by personal contact with Chittagong Aratder market (Firinggi bazaar, Folmandi etc). 5-18 percent growers sell their fruits on personal rented shop. From three fruits mango sold a big portion in personal rented shop, it was 18 percent. Some growers sold other district (Rangamati, Dhaka and Fenny). (Figure 4.4)

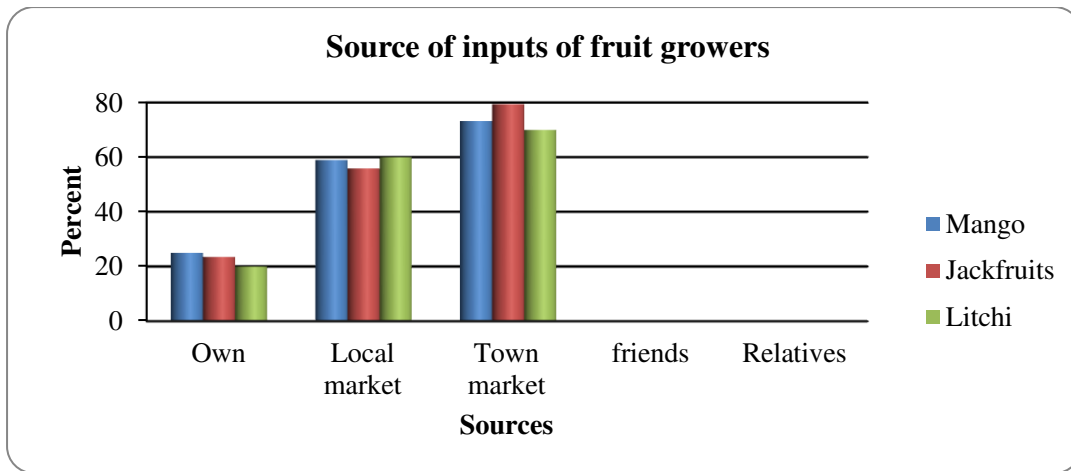


Figure 4.3: Sources of inputs.

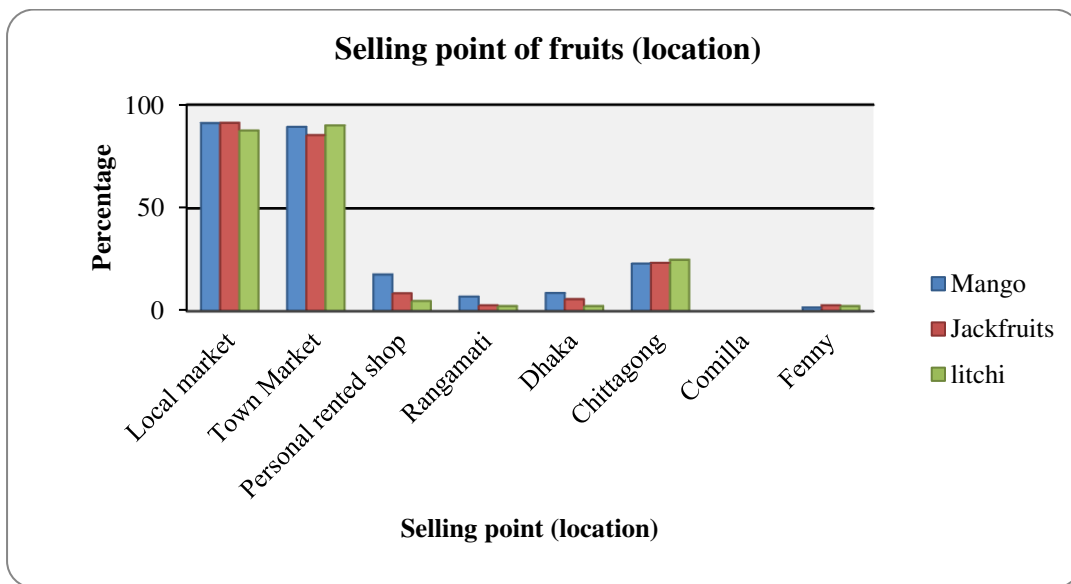


Figure 4.4: Selling point (location).

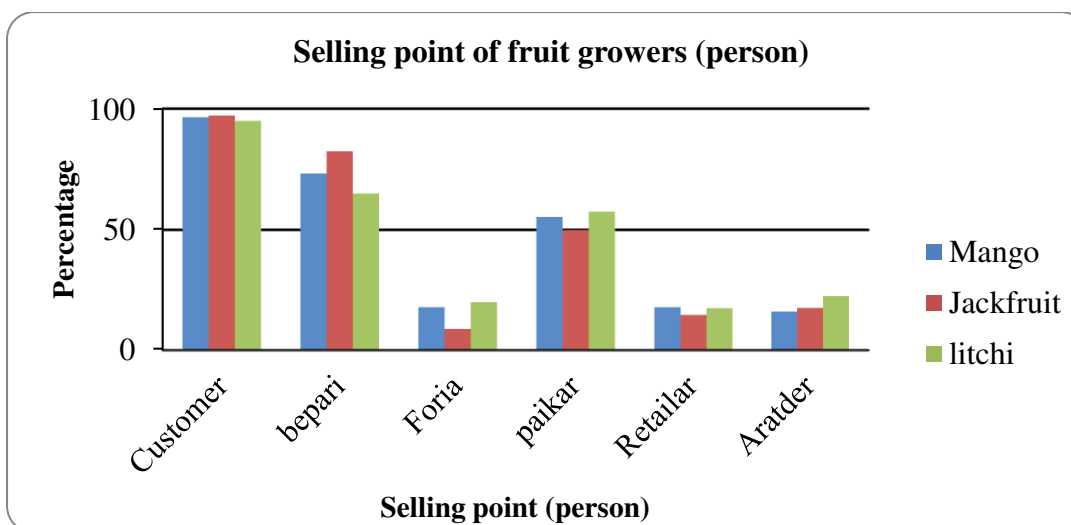


Figure 4.5: Selling point of fruit growers (person).

4.3.1.7.2. Selling point (person)

Fruit growers sold fruits more or less to all categories of intermediaries. Above 95 percent fruit grower sold fruits direct to the consumer. Bepari collected fruits around 65-73 percent from garden and sold both in town market and other district market. The percentage of growers sold fruits to wholesaler was around 50 to 58 percent. Fruits growers also sold their fruits to retailer and Aratder more or less 14 to 23 percent (Figure 4.5).

4.3.1.8 Source of information

Source of information about fruits marketing and fruits price is crucial because growers need to know about the marketing situation, selling place, fruit price, location of trading etc. All three fruits (mango, jackfruit and litchi) above 97 percent information were gathered from friends (Figure 4.6). Information collected from r around 62 percent to 77 percent. Information was collected from 17 percent to 30 percent passed by business community.

4.3.1.9 Training on fruit production and marketing

Skilled manpower is essential for ensuring greater food security at household level. Training helps to develop skill about technological knowhow and improve farmers' skill regarding production practices and related aspects. It was observed that both Government institution and NGOs provide training facilities to the fruit growers. Result showed that about 70 and 75 percent mango and litchi growers had fundamental training experience (Figure 4.7). The percentage was relatively lower in jackfruits growers, only 23.5 percent.

4.3.1.10 Institutional services

Both Government institutions like DAE and international organizations like UNDP, FAO, HELLEN KALER provides facilities to growers by providing sapling, agricultural equipment, machineries etc. Results show that 50 percent and 52.5 percent mango and litchi growers getting help from different institution respectively (Figure 4.8). The situation was different in jackfruits production, only 29 percent growers getting helps from above mentioned institutions.

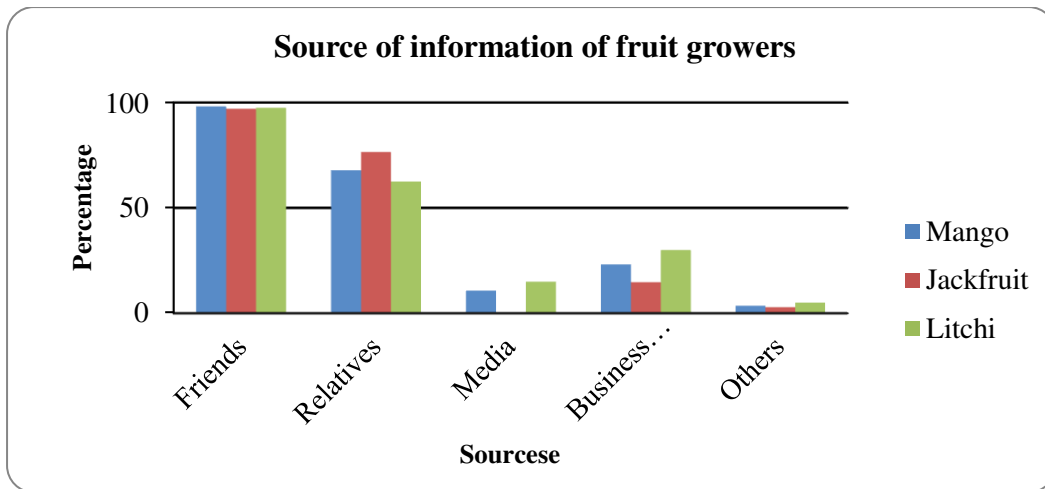


Figure 4.6: Source of information of fruit growers

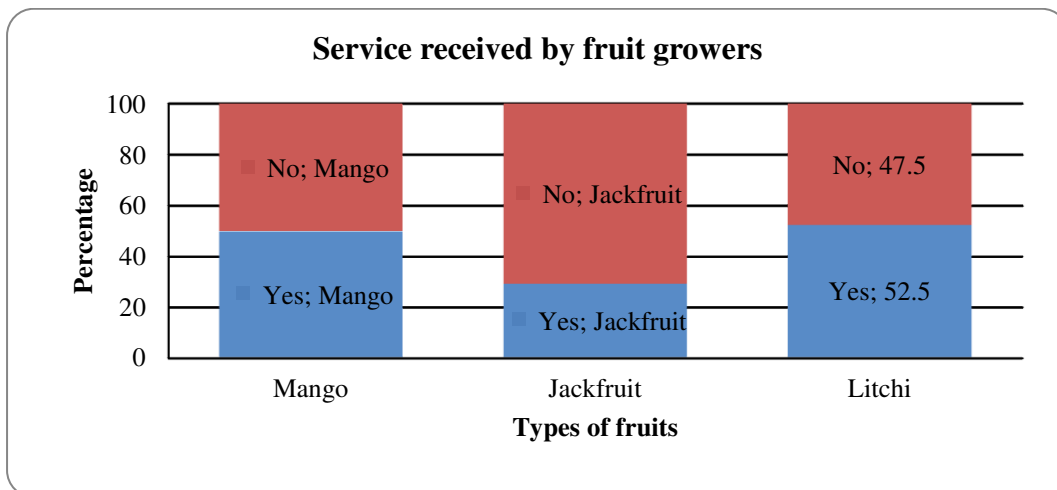


Figure 4.7: Training received by fruits growers

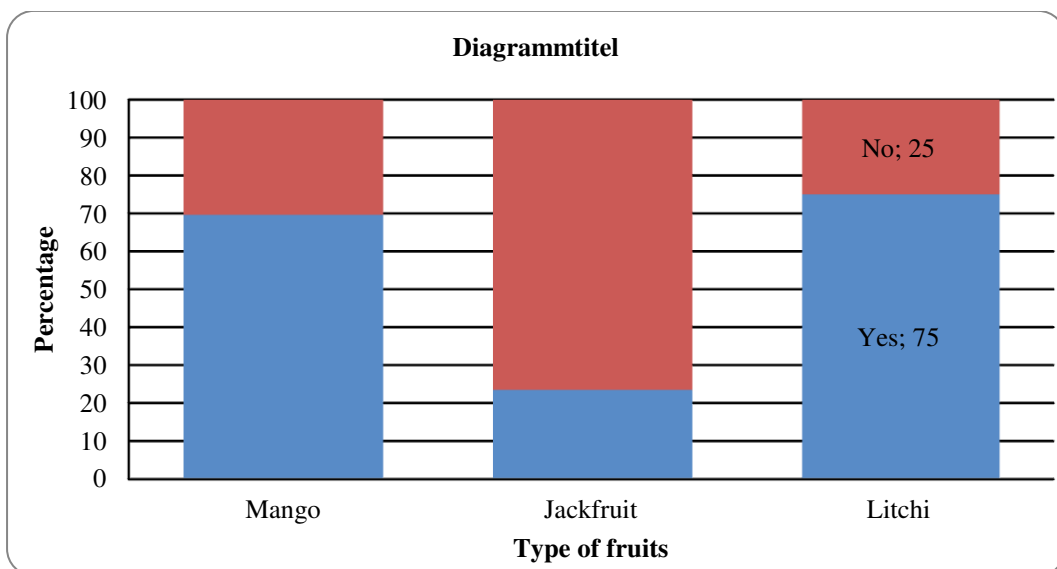


Figure 4.8: Service received from different institutions

4.3.2. Contextual information of market intermediaries

4.3.2.1 Year of establishment

In the study area, mainly four types of market intermediaries were active in fruits marketing; Faria, wholesaler, retailer and Bepari. The respondent reported that large number of Faria started their business from the year of 2000 (Figure 4.9). Majority of wholesaler, retailer and Bepari started their business from 1995 to 1999.

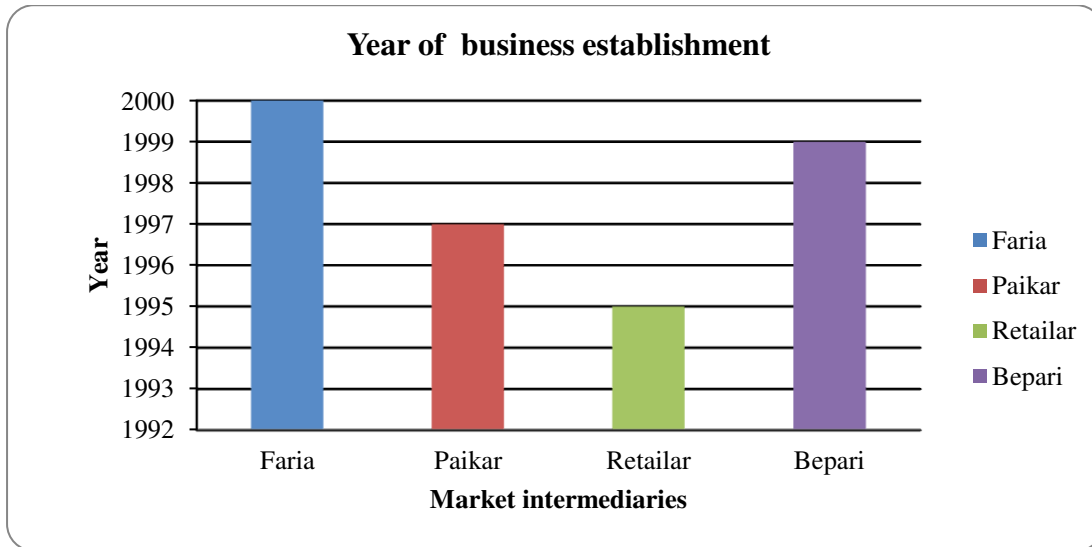


Figure 4.9: Year of business started of market intermediaries

4.3.2.2 Business type

In the study area intermediaries run their business as a contract business for a season or a year. Result showed that Faria run 21 percent contract business, rest 79 percent run sole business. Wholesaler and retailer run 81 and 19 percent sole business and partnership business respectively. In the study area 100 percent Bepari run their sole business (Table 4.6).

4.3.2.3. Experience of business

The percentage of respondents indicates that only Faria (47 percent) and Bepari (13percent) had above fifteen years business experience. According to the research Maximum retailers had (63 percent) responded that they had eight to eleven year of experiences and minimum (38 percent) had twelve to fifteen years experience (Table 4.6).

Table 4.6: Patterns of business of market intermediaries

Particulars	Market Intermediaries			
	Faria (n=20)	Wholesaler (n=16)	Retailer (n=16)	Bepari (n=32)
1. Business type				
Sole Business	15 (79)	13 (81.3)	13 (81.3)	32 (100)
Partnership Business	0	3 (19)	3 (19)	0
Contract Business	5 (21)	0	0	0
2. Experience on business				
1-3 years	0	0	0	1 (3.13)
4-7 Years	5 (27)	3 (18.8)	0	4 (13)
8-11 Years	5 (27)	3 (18.8)	10 (63)	3 (9.38)
12-15 Years	0	10 (63)	6 (38)	20 (62.5)
Above 15 years	9 (47)	0	0	4 (12.5)
3. Trading type				
Cash	18 (95)	16 (100)	16 (100)	32 (100)
On credit	1 (5)	3 (19)	6 (38)	0
advance	0	3 (19)	3 (19)	0
Contract	11 (58)	0	0	4 (13)

Note: Parentheses indicate the percentages of total.

Source: Field survey, 2014.

4.3.2.4 Trading type

From the result it was observed that, Faria had done their transaction in cash (95 percent), on credit (5 percent) and contract business (58 percent). Wholesaler and retailer practiced all types of transaction except contract transaction (Table 4.6). All Bepari practiced in cash (100 percent) transaction, some also practiced contact business and the percentage was 13 percent.

4.3.2.5 Source of finance

Above 95 percent intermediaries source of finance was own finance. Only 5 to 19 percent responses that they borrowed money from financial institution like bank. From the respondents 18 to 25 percent wholesaler and retailer borrowed money from their relatives (Figure 4.10).

4.3.2.6 Fruits collection point

Collection point of fruits is obligatory factor for intermediaries because this is related to cost. If intermediaries collect fruits from garden the fruits cost are lower than markets but it requires more transport cost, packaging cost, handing cost etc. Though these costs are unavoidable majority of intermediaries prefer fruits garden as a main source of fruits collection.

According to the result, 100 percent of Faria and wholesaler collected fruits from fruit garden, retailer and Bepari collected fruits from garden more or less 50 to 56 percent (Figure 4.11). The second major source of fruits collection point was local bazar, 100 percent of wholesaler and Bepari collected fruits from local bazaar and about 95 and 63 percent Faria and retailer collected fruits from local bazar respectively. All four types of intermediaries collected fruits from town market and the percentage was Faria 26 percent, wholesaler 38 percent, retailer 56 percent and Bepari 25 percent. Faria collected fruits from relatives about 42 percent. And some retailer who had own or rented shop in local or town market they collected other regions fruits from Chittagong Aratder market and sold it to this region. It was worth to mention that all types of intermediaries collected fruits from various sources due to the availability of fruits, pricing variation etc.

4.3.2.7 Selling point (location)

Selling point is a very important consideration for intermediaries, because of competition among intermediaries. Intermediaries also consider their marketing cost and profit when they sold their fruits. According to the graph, intermediaries preferred town market most to sell their fruits (Figure 4.12). From the research result, all four group of intermediaries only Faria sold fruits on personal rented shop. Only Bepari sold fruits to Rangamati, Hathajari, Comilla and Fenny. All groups of intermediaries sold fruits to Chaittagong market.

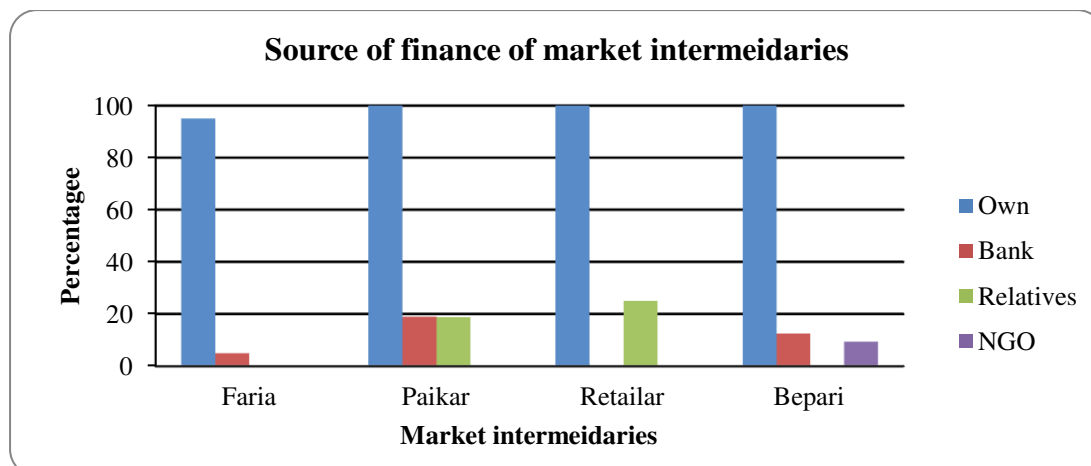


Figure 4.10: Source of finance of market intermediaries

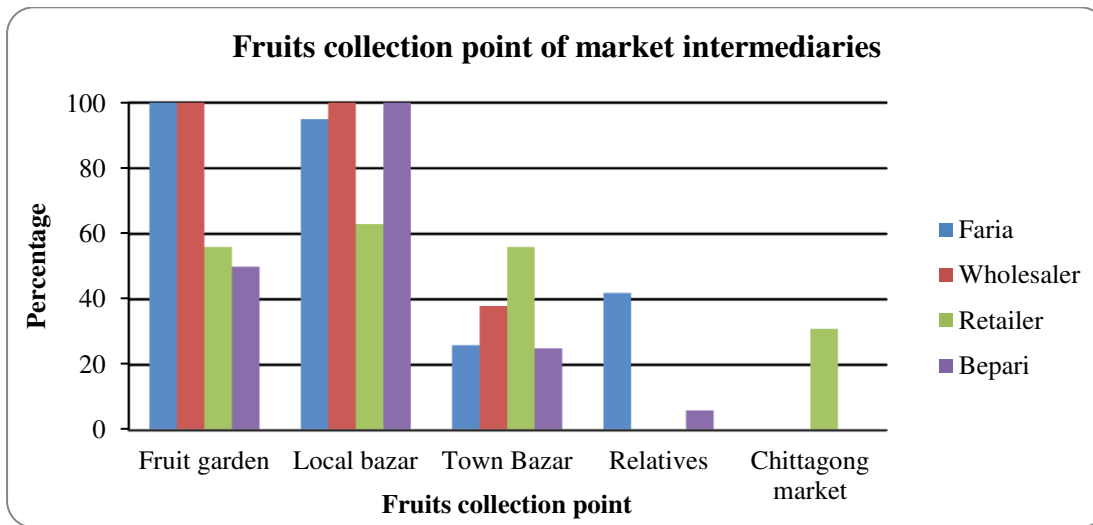


Figure 4.11: Fruits collection point of market intermediaries

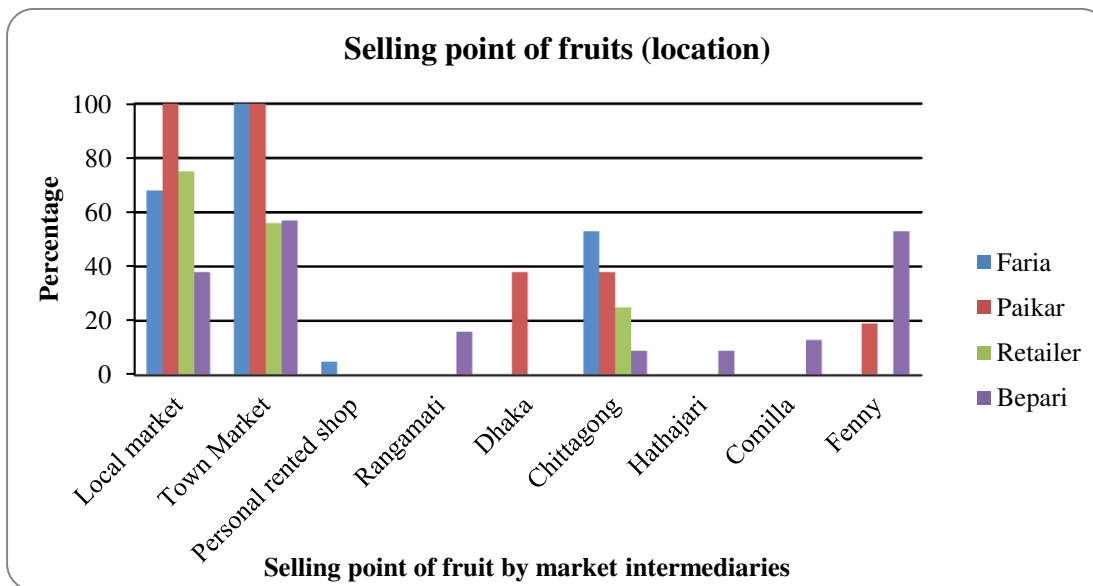
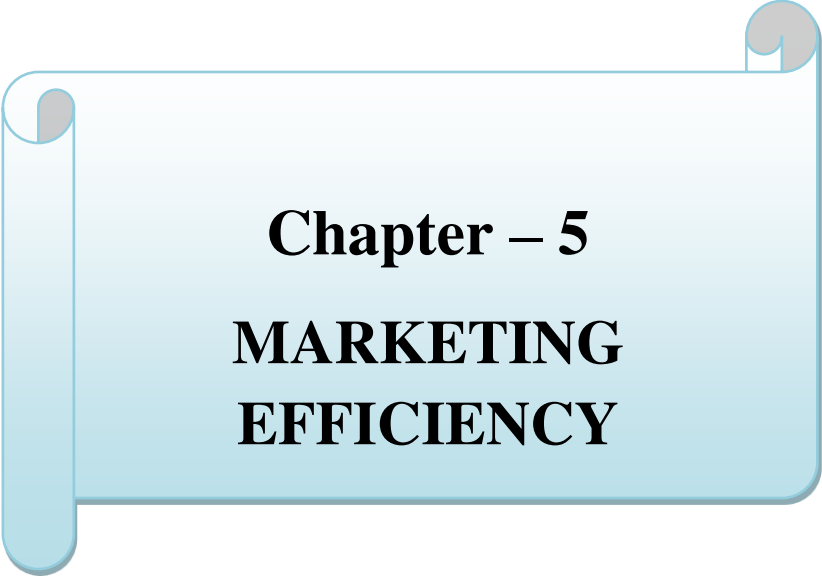


Figure 4.12: Selling point of fruits (Location)



Chapter – 5
MARKETING
EFFICIENCY

Chapter 5

MARKETING EFFICIENCY

The main objective of this chapter is to present total cost of fruit growers, profitability of growers and market intermediaries, marketing margin and marketing efficiency of intermediaries. Profitability of fruit growers and market intermediaries has been measured in terms of gross margin, net return etc.

5.1 Total Cost of Fruit Growers

The total cost of fruit growers included all kinds of variable costs such as equipment cost, fertilizer cost, pesticide cost, labour cost, transportation cost etc. According to result, in the study area total average cost of mango was Tk. 6722 per ton, jackfruit was Tk. 1064 per 100 pieces and litchi was Tk. 779 per 1000 pieces in a year (Table 5.1). Here all fixed cost e.g. land rent was ignored because majority of fruit grower's land was own land and rest was leased in from Government and the leased rent was so less that it was ignorable here. Here, the main cost was fertilizer cost. All growers need to purchase their own fertilizer to increase their production. The second most important cost was transportation cost. Because of the hilly region, here required more labour to carry fruits from garden to road or to market this required more labour cost and loding/unloding cost. For jackfruit production, the cost required at initial stage of garden. At fruiting stage there required only equipment cost, labour cost, transport cost etc. For litchi production equipment cost and fertilizer cost was higher than other cost.

5.2 Gross Return and Gross Margin of Fruit Growers

Gross return was calculated by multiplying price of product per unit by the total and quantity of product. According to research result, here gross return of mango was Tk. 1337310, Tk. 29920 for jackfruit and Tk. 51393.5 for litchi during the survey period. But the actual situation was different from the calculated value. Because, here all calculated data was average data and the actual big grower get maximum return against his cost but small scale

grower get lower and sometimes does not bear all cost which ultimately lower his production as well as lower his return.

Gross margin was calculated by, deducting variable cost from total cost. Here, gross margin of mango grower was Tk. 12,49312 , for jackfruit grower the amount was Tk. 25631 and for litchi Tk. 44,684 during the survey period.

Table 5.1: Total cost of fruit growers of selected fruits.

Sl. No.	Cost Item	Fruit grower		
		Mango (Tk./ton)	Jackfruit (Tk./'00piece)	Litchi (Tk./'000piece)
1	Equipment	846	23	223
2	Fertilizer	1230	0	152
3	Weeding	432	0	26
4	Insecticide	850	0	23
5	Irrigation	260	0	35
6	Labor	865	165	120
7	Electricity	264	0	0
8	Toll	250	160	50
9	Loading/unloading	765	263	75
10	Transportation	960	453	75
	Total Average cost	6722	1064	779

Source: Field survey, 2014.

5.3 Profitability of Fruit Grower

By calculating profitability of fruit grower the research result showed that, mango grower got highest profit when he/she sold his/her fruits to town market and it was Tk. 67388 per hector, but when grower sold his fruit on the garden it required no transport cost. Jackfruit grower got maximum profit by selling big jackfruit to market. Same case happens, when litchi grower sold his fruit (China 3) to town market and it was Tk. 6201 per thousand pieces.

Table 5.2: Profitability of fruit growers

Sl. No.	Selling place	Profitability of fruit growers					
		Mango (Tk./Ton)	Jackfruits Tk. /100 piece			Litchi Tk. /1'000 piece	
			Small <4 kg	Medium 4-8 kg	Big >8 kg	China 3	China 2
1	Garden	48098	676	2362	2892	2181	1211
2	Local market	56218	847	2933	4966	2331	1361
3	Town market	67388	1082	3539	6201	2511	1571

Source: Field survey, 2014.

5.4 Marketing Performance

5.4.1. Marketing cost of market intermediaries

Table 5.3, 5.4 and 5.5 indicates different types of marketing cost related to the transaction of mango, jackfruit and litchi by Faria, wholesaler, retailer, and Bepari. The arrangement of marketing cost (mango marketing per ton) of all intermediaries, rent cost was higher than other cost for Faria, wholesaler and Bepari, for retailer charges cost was higher than other cost (Table 5.3). Total cost of jackfruit marketing per 100 pieces was not same as mango marketing because most of the time intermediaries were only collected jackfruits and supply to market or other region. That why electricity cost, packaging cost, current bill, generator, commission cost, other cost etc were not happened. The highest cost was seen in case of transportation for all intermediaries (Table 5.4). As like jackfruit marketing some cost like current bill, generator cost, commission etc were not found in litchi marketing. Here, for total cost of litchi marketing was calculated in taka per 1000 pieces (Table 5.5).

Sl. No.	Cost item	Market intermediaries			
		Faria	Wholesaler	Retailer	Bepari
1	Labor	1684.21	1035.5	950	1520.75
2	Electricity	505.26	412.5	450	337.5
3	Loading/unloading	1473.68	1520.75	1500	1050.75
4	Transportation	3494.74	4263	900	4937.5
5	Charges by different parties	631.58	75	3000	-
6	Toll(Bazar fund)	1105.26	556.25	865.5	325
7	Toll(Jila porisod)	505.26	531.25	-	465.62
8	Toll(up)	63.16	2500	225	-
9	Rent	5078.94	5625	281.25	3000
10	Packaging	2526.31	2565	3500	984.37
11	Current bill	2400	3000.75	2835.0	356.25
12	Generator	789.47	243.75	450.5	281.25
13	Commission	68.42	225	2493.75	-
14	Other cost	78.95	-	1151.25	1677.42
	Total Cost	20405.24	22553.75	18601.75	19052.41

Table 5.3: Total cost of mango marketing of different market intermediaries (Tk./ton)

Source: Field survey, 2014.

Table 5.4: Total cost of jackfruit marketing of different market intermediaries (Tk./100 piece)

Sl. No.	Cost item	Market intermediaries			
		Faria	Wholesaler	Retailer	Bepari
1	Labor	452.63	-	-	493.75
2	Electricity	-	-	85.3	-
3	Loading/unloading	-	-	-	143.75
4	Transportation	700.4	850	-	785.5
5	Charges by different parties	315.789	-	230	487.5
6	Toll(Bazar fund)	257.89	-	320	343.75
7	Toll(Jila porisod)	220	300	125	268.75
8	Toll(up)	-	-	250	-
	Total cost	1946.3	1150	1010.3	1779.25

Source: Field survey, 2014.

Table 5.5: Total cost of litchi marketing of different market intermediaries (Tk./1000 piece)

Sl. No.	Cost item	Market intermediaries			
		Faria	Wholesaler	Retailer	Bepari
1	Labor	284.21	175	-	250
2	Loading/unloading	-	275	-	-
3	Transportation	107.89	215	-	170
4	Charges by different parties	-	-	300	-
5	Toll(Bazar fund)	-	-	275	268.75
6	Toll(Jila porisod)	231.58	225	-	268.75
7	Toll(up)	-	-	-	-
8	Rent	-	-	137.5	-
9	Packaging	30	45	40	42
10	Current bill	-	-	85	-
11	Other cost	-	-	-	146.87
	Total cost	653	935	837.5	877.62

Source: Field survey, 2014.

5.4.2 Marketing margin of market intermediaries

In this study, gross marketing margin of each trader was estimated by deducting the purchase price of fruits (mango, jackfruit and litchi) from the sale price, while the net margin/profit component was estimated by deducting the marketing cost from the gross marketing margin. Table 5.6 presents the mango marketing margin of intermediaries per ton of mango were Tk. 30000, Tk. 30000, Tk. 30000 and Tk. 25000 for Faria, wholesaler, retailer and Bepari respectively. The highest net margin of Tk. 21398 per ton mango was received by retailers as well as their profits were better than others. It may be mentioned here that total volume handled by the Faria, wholesaler and Bepari will be much higher than retailers and thus total net margin will be higher for these three types of trades.

For estimating marketing margin of jackfruit market intermediaries, same method was followed as like mango intermediaries. Here marketing margin of Faria was higher than other intermediaries when they supply big jackfruit (Table 5.7) and the amount was Tk 3053 per 100 pieces.

Table 5.6: Marketing margin of different mango intermediaries

Sl. No.	Particulars	Market intermediaries			
		Faria	Wholesaler	Retailer	Bepari
a.	Purchase price	50000	45000	50000	55000
b.	Sale price	80000	75000	80000	80000
c.	Gross margin(b-a)	30000	30000	30000	25000
d.	Marketing cost	20405.24	22553.75	18601.75	19052.41
e.	Net margin (c-d)	9594.76	7446.25	11398..25	5947.59

Source:
Field
survey,
2014.
Table

5.7: Marketing margin of different jackfruit intermediaries

Market intermediaries	Size of jackfruit	a.Purchase price(100 piece)	b. Sales price (100 piece)	c.Gross margin(b-a)	d.Marketing cost	e.Net margin (c-d)
Faria	Small <4 kg	2000	5000	2500	1546.3	953.7
	Medium 4-8 kg	4000	7000	3000	1846.3	1153.7
	Big >8 kg	5000	10000	5000	1946.3	3053.7
Wholesaler	Small <4 kg	-	-	-	-	-
	Medium 4-8 kg	3000	6000	3000	1150	1850
	Big >8 kg	5000	8000	3000	1050	1950
Retailer	Small <4 kg	1800	4000	2200	1010.3	1189.7
	Medium 4-8 kg	4000	7000	3000	1210.3	1789.7
	Big >8 kg	5500	8500	3000	1010.3	1989.7
Bepari	Small <4 kg	2000	5000	3000	1579.25	1420.75
	Medium 4-8 kg	4000	7000	3000	1979.25	1220.75
	Big >8 kg	6000	10000	4000	1779.25	2220.75

Source: Field survey, 2014.

Same thing happened on litchi intermediaries. There was few difference of marketing margin between litchi intermediaries. According to the result, highest margin was received by retailer (Table 5.8). But the actual situation was different, because intermediaries handle different volume of fruits and after that actual difference in marketing margin will be happen.

Table 5.8: Marketing margin of different litchi intermediaries

Sl. No.	Market intermediaries	Litchi variety	a.Purchase price('000 piece)	b.Sales price('000 piece)	c. Gross margin (b-a)	d. Marketing cost	e.Net margin (c-d)
1	Faria	China 3	2000	3500	1500	653	847
		China 2	1500	2500	1000	653	347
2	Wholesaler	China 3	2000	3500	1500	935	565
		China 2	1200	2500	1300	935	365
3	Retailer	China 3	2000	3800	1800	837.5	962.5
		China 2	1500	2500	1000	837.5	162.5
4	Bepari	China 3	2500	4200	1700	877.62	822.38
		China 2	1500	3000	1500	877.62	622.38

Source: Field survey, 2014.

5.5 Marketing Efficiency

5.5.1. Price spread

For measuring marketing efficiency price spread is an important measure. According to the research result, the price spread was highest when mango was transfer by the channel Fruit Grower–Bepari (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong market) – Consumer (Chittagong district) and the amount was TK. 32400. To make comparisons among different channels, the price spread of all other possible channels were calculated and presented in Annex 1.1. For jackfruit marketing, price spread was highest in Fruit grower–Wholesaler (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong district) – Consumer (Chittagong district) channel (Tk 7000 per 100 pieces). For litchi marketing, the highest price spread was seen in Grower–Bepari (local)–Aratder (Chittagong district market)– Retailer (Chittagong market) – Consumer (Chittagong district) channel which was Tk 2500 per 1000 pieces.

5.5.2. Grower's share

Growers share is another important measure of marketing efficiency. Results showed that grower's share was highest in Fruit grower–Aratder (Chittagong market) -Bepari (Chittagong market)-Consumer (Chittagong district) channel during mango marketing (68.75 %) (Annex 1.2). The reason may be that, when fruit growers sold their fruits at highest price in Chittagong aratder market. It was observed that, in all channel mango fruit growers share was around 60 to 70 %. During jackfruit supply, fruit growers share was highest in Grower – Bepari (local)– Consumer (local) channel which was 60.00 percent. And litchi growers got largest share in Grower – Bepari (local)– Consumer (local) channel (59.52 %). in the channel litchi grower (china 3) – Faria- consumer was higher (85 percent) than other channel (Annex 1.2).

5.5.3. Acharya's method for estimating marketing efficiency

The performance of marketing was assessed based on the Acharya's formula of marketing efficiency. Results showed that for mango marketing the most efficient marketing channel was Fruit grower – Bepari (local)– Consumer (local) (1.77) (Annex 1.3). For jackfruit marketing the efficient channel was Grower – Bepari (local)– Consumer (local) (1.37) and for litchi marketing the efficient channel was Grower – Bepari (local)– Consumer (local) (1.47). There was a noticeable result for all channels that when fruits (mango, jackfruit and litchi) were supplied through Bepari the channel was more efficient than other channel. This is possibly due to lower marketing cost of Bepari, i.e. lower marketing cost corresponding higher marketing efficiency.

Chapter – 6

EXISTING SUPPLY CHAIN AND VALUE CHAIN DEVELOPMENT OF SELECTED FRUITS

Chapter 6

EXISTING SUPPLY CHAIN AND VALUE CHAIN DEVELOPMENT OF SELECTED FRUITS

6.1 Supply Chain

The analysis of Supply chains is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumer). For identifying supply chain of fruits it is important to identify both raw material supplier and market intermediaries. For all three types of fruits (mango, jackfruit and Itchi), fruit growers collected sapling from HARS, horticultural center and local nursery. Fertilizer, pesticide and other irrigational materials were purchased from both local bazaar and town bazaar (shapla chattar bazaar). The mango, jackfruit and litchi market channels, depicted in Figures 6.1, 6.2 and 6.3, were constructed based on the data collected in one main town markets, three local markets and two aratder markets in Chittagong. The result revealed that there are 9, 6 and 6 major supply chains for mango, jackfruit and litchi respectively which obtained from intermediaries' survey. The estimated total volume of supplied fruits was counted as 100 percent for estimating percentage of fruit supplied of each growers and intermediaries. Each followed their own channels, they are treated separately, and the result obtained was the following.

6.1.1 Mango supply chain

Nine supply chains were identified for mango of which three have gone out of the region. The channel comparison was made based on percentage of volume that passed through each channel. Accordingly, the fruit grower-local consumer the shortest channel carried the largest percentage 34.83 of the total supply.

- 1. Grower – Consumer (local) channel:** This channel represented 34.83 percent of total mango supplied to the market during the survey period. The channel was found to be the first important supply chain in terms of importance.
- 2. Grower – Bepari (local) – Consumer (local):** According to survey, this channel accounted for 13.95 percent of total mango supplied to the market. The channel was found to be third most important mango supply chain in the study area.
- 3. Grower – Faria(local) – Retailer – Consumer (local) :** Represented 3.30 percent of total mango supplied to market and found to be eight mango Supply chain in the survey area.
- 4. Grower–Faria (local)-Consumer (local):** This channel represented 3.15 percent of total mango supplied to the consumer and found to be ninth most important mango channel.

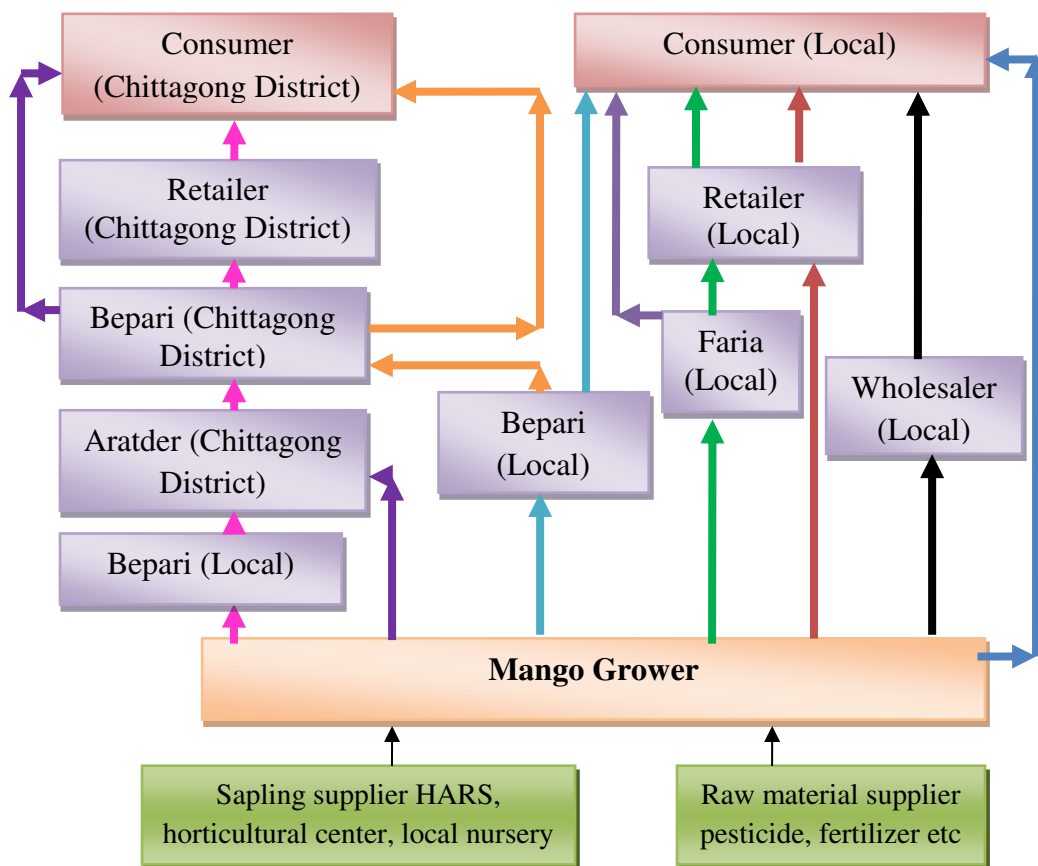


Figure 6.1: Supply chain of mango in the study area.

- 5. Grower–Bepari (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong market) – Consumer:** It accounted 10.25 percent

of total mango supplied to Chittagong market and placed fourth most important channel in the district.

6. **Grower–Bepari (local)–Bepari (Chittagong district)–Consumer:** The channel accounted 6.25 percent of mango supplied and found fifth most important mango channel.
7. **Grower–Aratder (Chittagong market)-Bepari (Chittagong market)-Consumer:** This channel placed seventh most important supply chain of mango and supplied 5.81 percent of total supplied.
8. **Grower - Retailer (local) – Consumer (local):** This channel accounted 6.45 percent of total mango supply during the survey period and it found to be sixth important mango supply chain in Khagrachhari District.
9. **Grower-Wholesaler (local)--Consumer (local):** This channel represented 20 percent mango supplied in the Survey area and it placed second most important mango supply chain in the study area.

6.1.2 Jackfruit supply chain

Six supply chains were identified for jackfruit of which two have gone out of the region. The channel comparison was made based on percentage of volume that passed through each channel. Accordingly, the fruit grower-local consumer the shortest channel carried the largest percentage (35.83 percent) of the total supply.

1. **Grower – Consumer (local) channel:** This channel represented 35.88 percent of total Jackfruit supplied to the market during the survey period. The channel was found to be the first important Supply chain in terms of importance.
2. **Grower – Bepari (local) – Consumer (local):** According to survey, this channel accounted for 15 percent of total jackfruit supplied to the market. The channel was found to be fourth most important jackfruit Supply chain in the study area.
3. **Grower – Faria(local) – Retailer – Consumer (local) :** Represented 8.78 percent of total jackfruit supplied to market and found to be fifth jackfruit Supply chain in the survey area.

4. **Grower–Wholesaler (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong district) – Consumer (Chittagong district):** It accounted 6.50 percent of total jackfruit supplied to other district market and placed fourth most important channel in the district.
5. **Grower–Bepari(local)–Bepari (Chittagong district)–Retailer (Chittagong district)-Consumer(Chittagong district):** The channel accounted 15.45 percent of jackfruit supplied and found third most important jackfruit Supply chain.
6. **Grower-Bepari- Bepari (Fenny) -Consumer:** This channel represented 18.48 percent jackfruit supplied in the survey area and it placed second most important jackfruit supply chain in the study area.

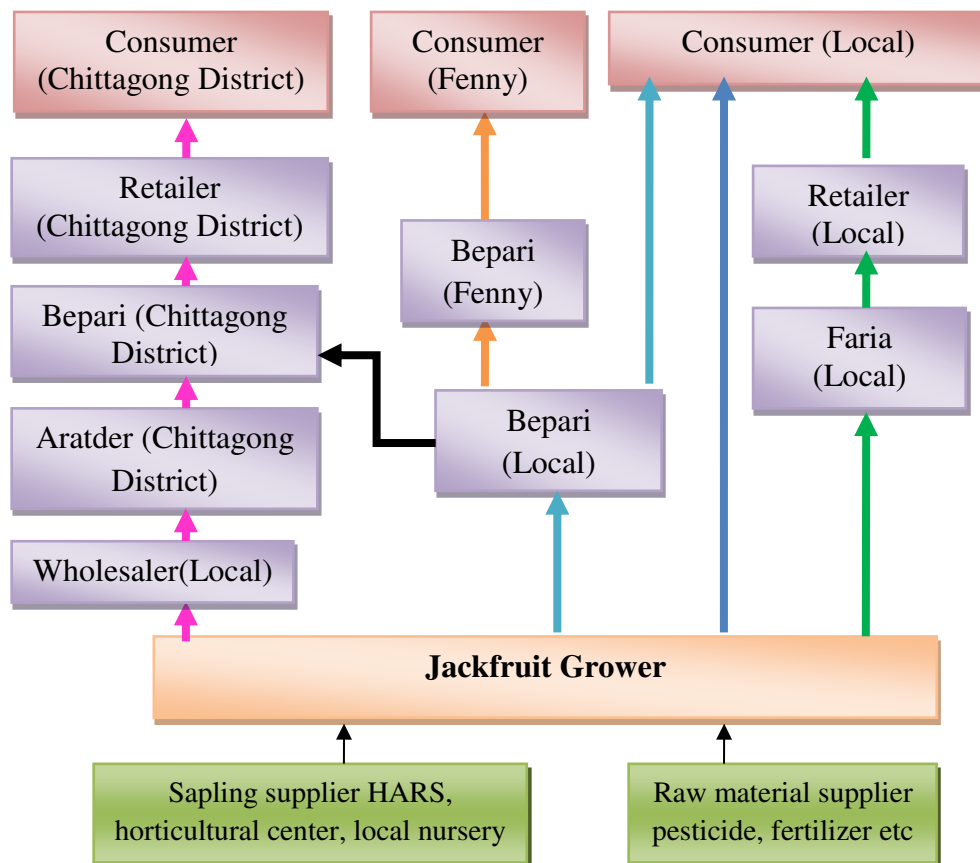


Figure 6.2: Supply chain of jackfruit in the study area.

6.1.3 Litchi supply chain

Six supply chains were exhibited in the study areas where all channels remained in the region except one. The channel comparison was made based on percentage of volume

that passed through each channel. According to the report, the fruit grower-local consumer the shortest channel carried the largest percentage 34.23 percent of the total percentage of litchi supplied.

- 1. Grower – Consumer (local) channel:** This channel represented 34.23 percent of total litchi supplied to the market during the survey period. The channel was found to be the first important supply chain in terms of importance.
- 2. Grower – Bepari (local)– Consumer (local):** According to survey, this channel accounted for 20 percent of total litchi supplied to the market. The channel was found to be second most important litchi supply chain in the study area.

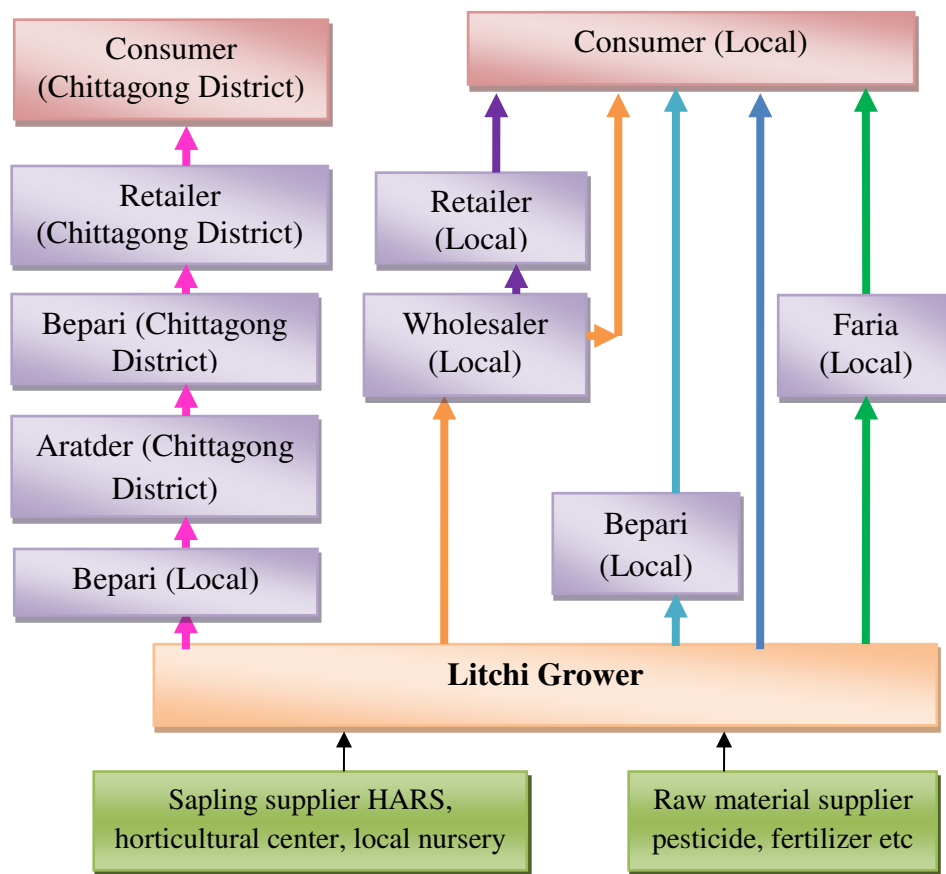


Figure 6.3: Supply chain of litchi in the study area.

- 3. Grower – Faria(local)– Consumer (local) :** Represented 7.21 percent of total litchi supplied to market and found to be sixth most important litchi supply chain in the survey area.

4. **Grower–Wholesaler (local)– Consumer (local):** This channel represented 12.7 percent of total litchi supplied to the consumer and found to be third most important litchi channel.
5. **Grower–Bepari (local)–Aratder (Chittagongdistrict market)– Retailer (Chittagong market) – Consumer(Chittagong district):** It accounted 8.42 percent of total litchi supplied to other district market and placed fifth most important channel in the district.
6. **Grower-Wholesaler (local) -Retailer (local)-Consumer (local):** This channel represented 11.11 percent mango supplied in the Survey area and it placed fourth most important litchi supply chain in the study area.

6.2 Concept of Value Chain

Value chains comprises of two key concepts: value and chain. The term value is synonym to “value added” in the Value Chain Analysis (VCA) as it characterizes the incremental value of a resultant product produced from processing of a product. For agricultural products, value addition can also take place through differentiation of a product based on food safety and food functionality. Price of the resultant product shows its incremental value (Haq, 2012). The term chain refers to a supply chain indicating the process and the actors involved in the life cycle (from conception to disposal) of a product (Hawkes and Ruel, 2011; Haq, 2012). Hence, Kaplinsky and Morris (2001) defines VCA as study of the “full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use”. Sanogo (2010) in addition to the movement of a product from one stage to another and identification of the actors, firms and their services also adds analysis of the institutional support to production at various stages to VCA.

The value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial input-supply stage, through various phases of production, to its final market destination. The production stages entail a combination of physical transformation and the participation of various producers and services, and the chain includes the product’s disposal after use. As opposed to the traditional exclusive focus on

production, the concept stresses the importance of value addition at each stage, thereby treating production as just one of several value-adding components of the chain.

The macroeconomic landscape, policies, laws, regulations, standards and institutional elements such as research and innovation, human resource development and other support services form the environment in which all activities take place and therefore are also important actors and activities in the value chain. According to UNIDO, Vienna, 2009 Figure 6.4 below illustrates these relationships within a generic value chain.

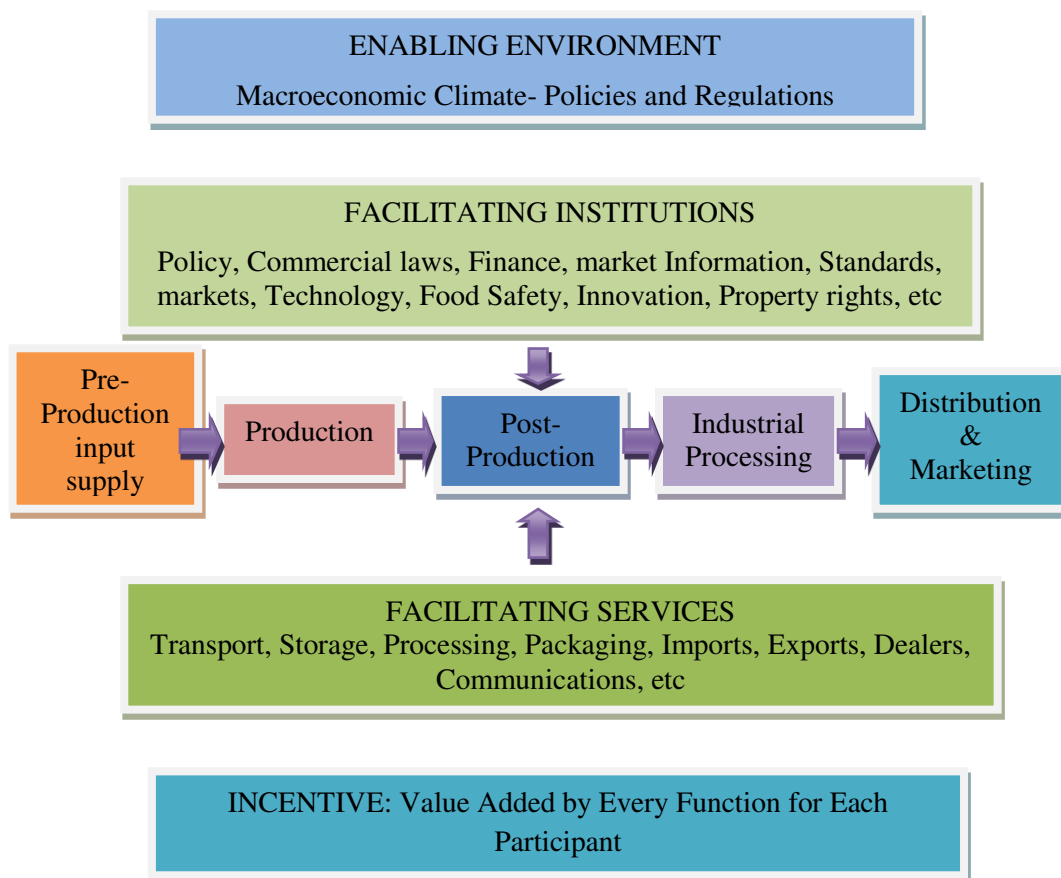


Figure 6.4: A Generic Value Chain

6.3 Why Value Chain Analysis?

Value Chain Development is a tool against poverty. Globalization fills market gaps and brings producers and consumers closer together. It also brings regional and international competition into local markets. Policy-makers focus increasingly on the development of agro-industries with emphasis on promoting effective agro-value chains as a means of further expanding the leading role played by agriculture in economic growth and poverty reduction.

For policy-makers, value chain analysis is a means of identifying corrective measures, investment priorities and development opportunities.

By revealing strengths and weaknesses, value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships which can lead to improvements in chain performance. Value chain analysis also reveals the dynamic flow of economic, organizational and coercive activities involving actors within different sectors. It shows that power relations are crucial to understanding how entry barriers are created, and how gain and risks are distributed. It analyses competitiveness in a global perspective. By revealing strengths and weaknesses, value chain analysis helps participating actors to develop a shared vision of how the chain should perform and to identify collaborative relationships which will allow them to keep improving chain performance. The latter outcome is especially relevant in the case of new manufacturers – including poor producers and poor countries – that are seeking to enter global markets in ways that can ensure sustainable income growth. (UNIDO, Vienna, 2009)

6.4 UNIDO Approach to Agro-Value Chain Analysis

In 2009, UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO) in Vienna established a technical report, “Agro-value chain analysis and development”. On that report UNIDO established some basic steps for value chain analysis so called ‘Basic steps of UNIDO’s approach to agro-value chain analysis and development’. Taking into consideration M4P (2008) ‘s four steps of value chain analysis, UNIDO’s systematic approach to agro-value chain analysis and development focuses on the relevance of agro-value chains for pro-poor growth while bearing in mind pragmatic economic parameters to ensure sustainable development. The Organization’s aim is to focus on those areas which lead to improvements in value chain performance in terms of:

- increasing the quantity and improving the regularity and continuity of production;
- improving the quality and safety of products;
- reducing the time needed to reach the consumer;
- minimizing transactional costs;
- improving chain actors’ capacity to follow/assimilate technology and market developments.

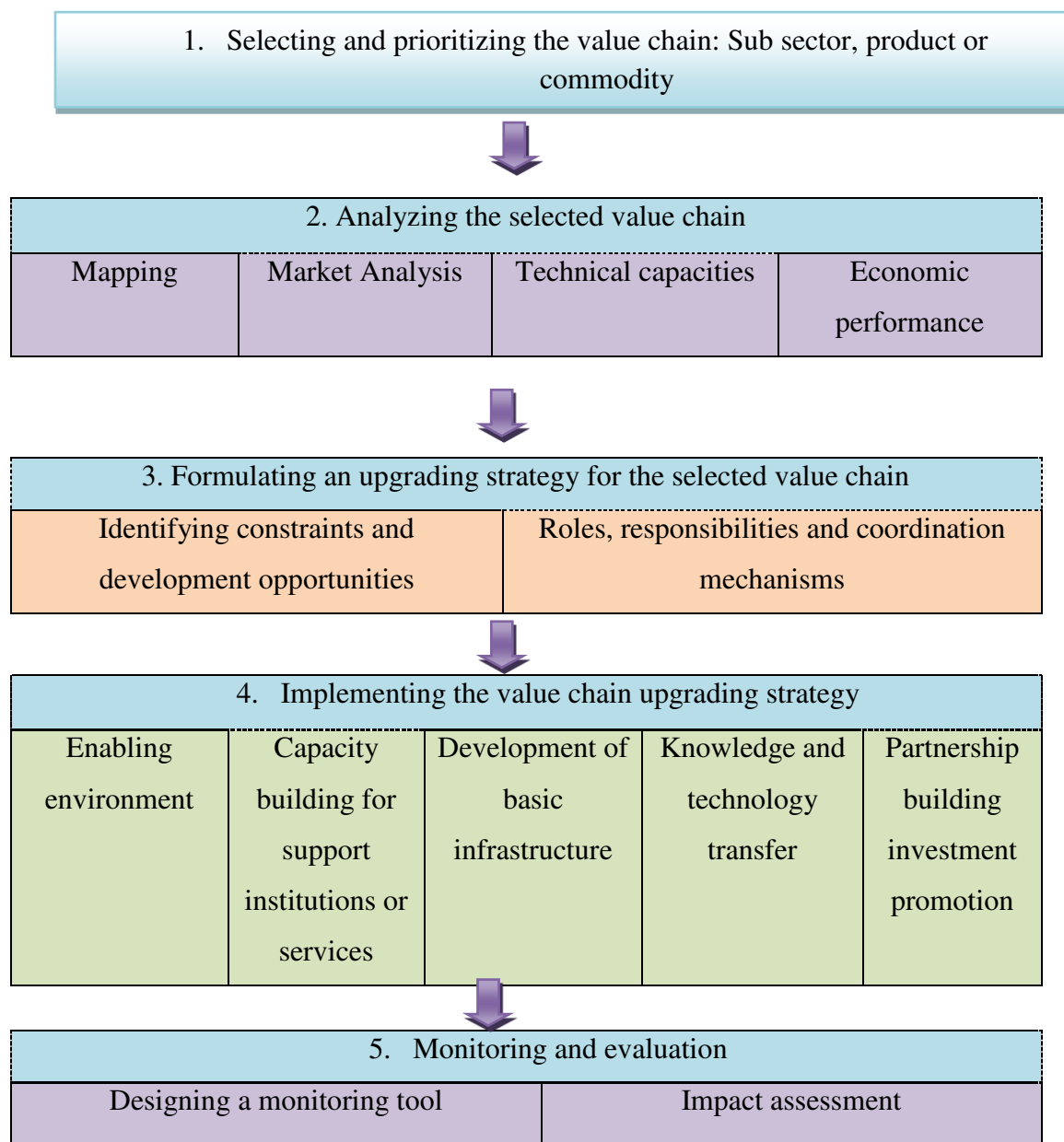


Figure 6.5 Basic steps of UNIDO's approach to agro value chain analysis and development

6.5 UNIDO's Approach to Value Chain analysis of Selected Fruits (Mango, Jackfruit, Litchi) in Khagrachhari District

6.5.1 Selection and prioritization of value chains

The selection and prioritization of value chains was analyzed are the first steps and they certainly entail some of the most important decisions was taken in any value chain development. The selection of sectors, sub-sectors, products or commodities determines to a large extent the prospects for a value chain's impact on socio-economic indicators (UNIDO, 2009).

6.5.2 Mapping the value chain

Mapping a value chain facility a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. In Khagrachari district, for mapping a value chain of fruits, there involve different actors like; financial institutions, Govt. institutions, traders, growers and consumers. In the whole chain flows of fruits, information and knowledge existed. These flows can be both tangible and in tangible, for instance, product, money, information and services. Mango was processed into pickle and one packet (5gm) was sold at Tk. 10. From one kg of raw mango at Tk. 30, 20 packets of pickle can be produced and processor gained Tk. 200. Value was also added in some stages of marketing like grading, cleaning, packaging and transporting (Figure 6.6).

6.5.3 Analyzing value chain technical capacities

This analysis is made in order to assess the value chain production system and tools; evaluate their technical performance; and determine the principal technical actions that need to be carried out to upgrade individual enterprises within the chain and to enhance their competitiveness.

Three aspects of production are to be assessed:

1. Utilization of inputs (raw materials and supplies, labour, water and energy, production materials, equipment etc.) In Khagrachari district fruit growers were purchase their input materials from town market. Most of respondents reported that they purchased their own inputs from town market.
2. The production system (technology and process). This is compared with systems used in the sector by the main competitors in terms of the utilization of raw materials,

labour, etc; the capacity of the enterprise to provide finished products that meet the needs of consumers in terms of quality, delivery time and cost is also assessed. Respondents reported that, they transfer technology to each other for improving their fruit production. They adopt new technology 'hot water treatment' in where fruits were placed in a hot water drum (50 degree centigrade) for 5 to 10 minutes, this technology helped to store fruits for some days without any preservative chemicals.

3. In the study it was observed that for mango marketing fruit growers was personally involved in mango marketing. They personally carried fruits to market and sold it. Large size mango growers rested small shop personally and sold their fruits. For jackfruit and litchi marketing intermediaries were more involved in fruits marketing then fruit growers.

6.5.4 Analyzing the value chain economic performance

This analysis entails the measuring of economic factors (production cost, margins, added value etc). In the study area, majority of respondents reported that from all of production cost; fertilizer cost, pesticide cost was so much high. Small fruit growers did not used fertilizer timely because of lower capital. Also irrigation facilities were lower in the study area. But most of respondent reported that the production of fruits was better than last decade, it's because of value chain performance. Most of fruit growers were practiced grading, packaging etc which increased their profit.

6.5 .5 Formulating an upgrading strategy for the selected value chain

At this stage, upgrading plans are drawn up which describe the interventions required in fruit value chain, including policy and institutional recommendation. Specific interventions at grower's level also happened in the study area. Fruit growers were more concerned about their good quality of fruits. Most of respondents reported that, if Government took any initiatives for fruit production in this area, the production of fruits also increased. Some action taken by Local Government like formalin usages restriction, free distribution of sapling to fruit growers etc helped to maintain the good quality of fruits in the study area.

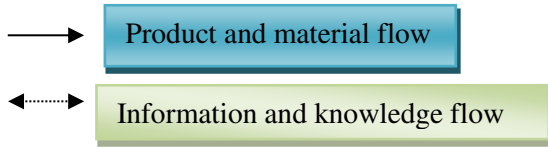
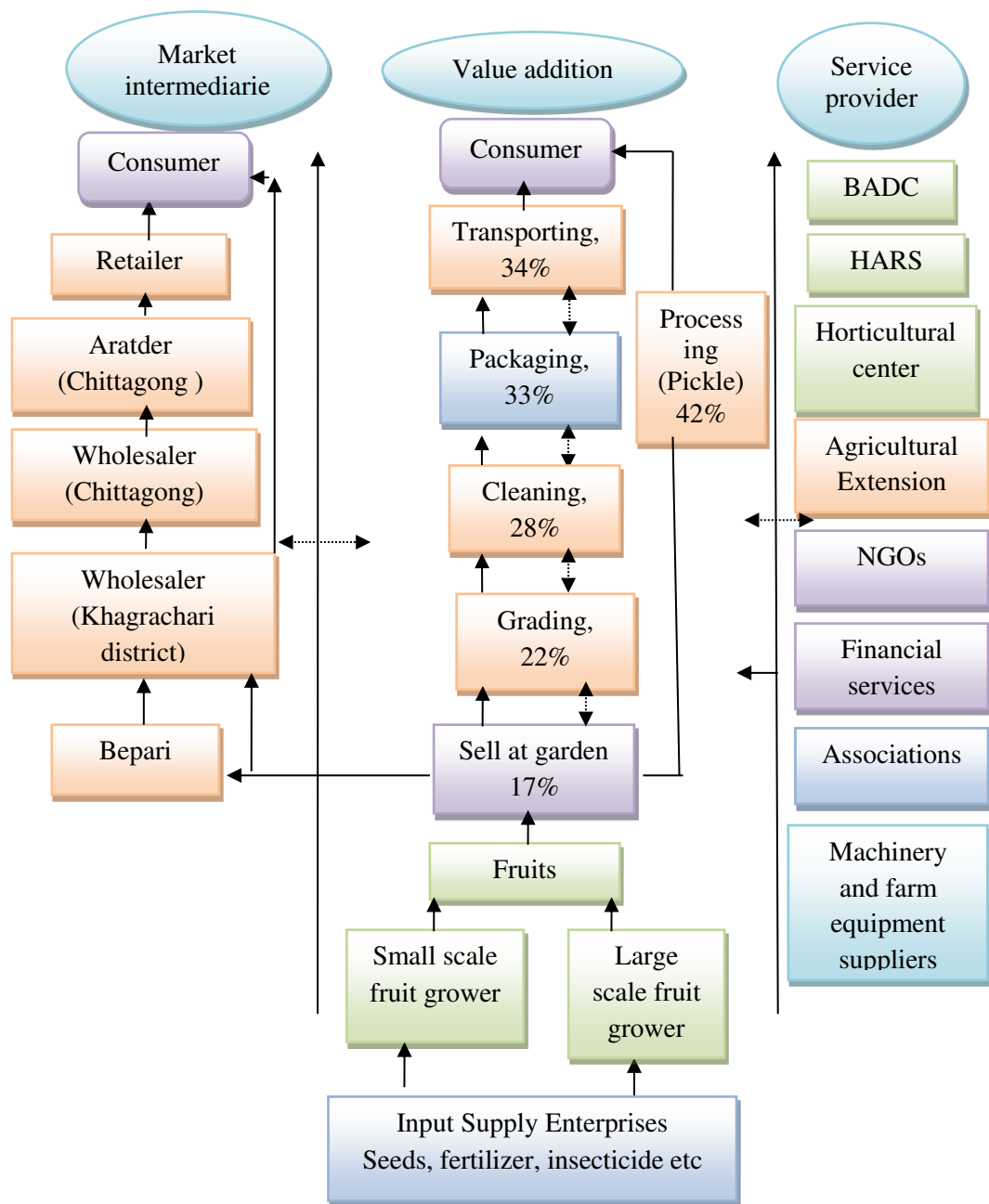


Figure 6.6: Mapping of mango value chain in Khagrachhari District.

6.5.6 Implementing the upgrading, monitoring and impact assessment

After formulating policy recommendation, all market actors need to implement those policies. Government body should be monitoring the whole value chain process.

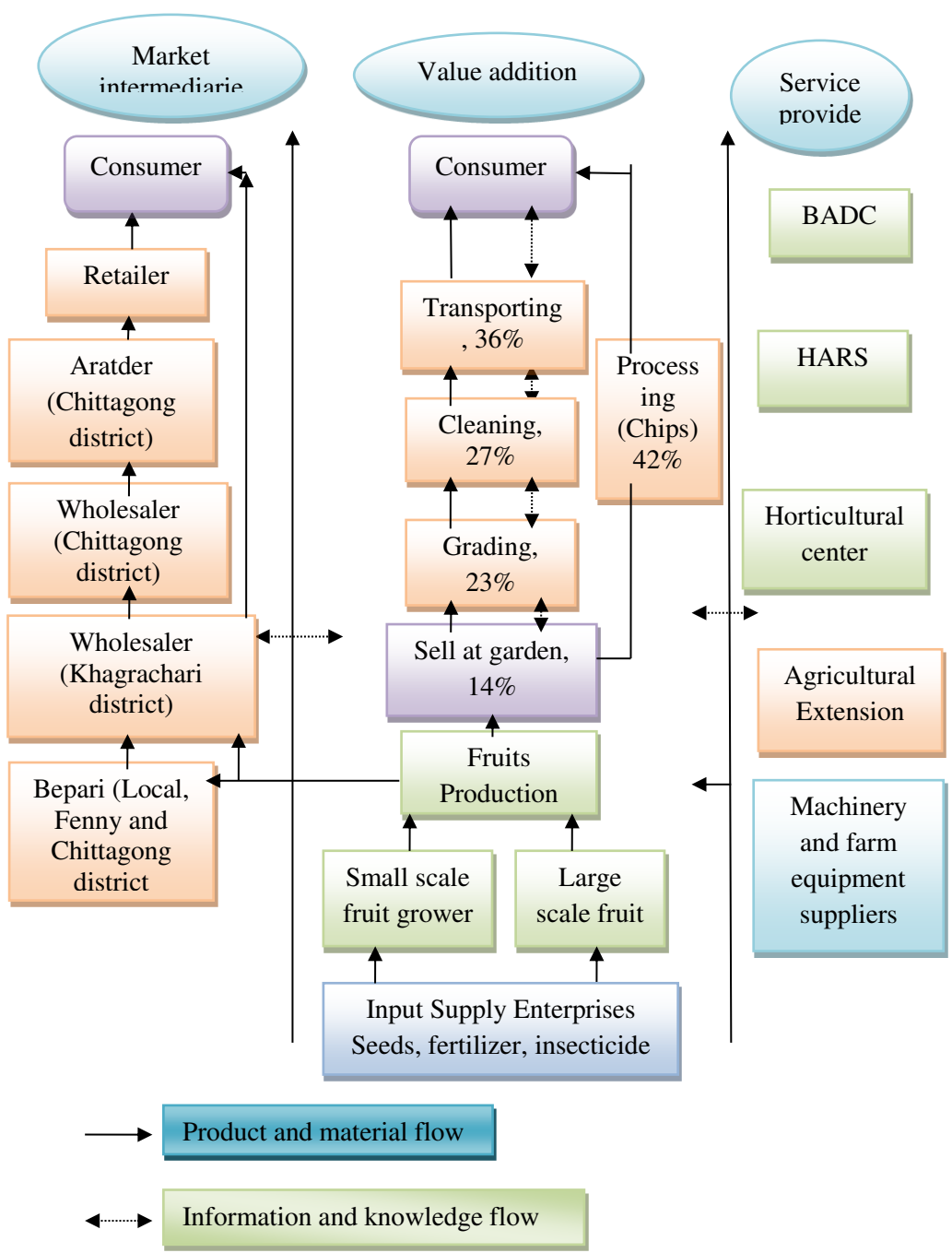


Figure 6.7: Mapping of jackfruit value chain in Khagrachhari District

In the study area, jackfruit was processed in only one form chips. When it was processed the price was raised 42 percent from its fruit price. Value was added in some stages like grading, cleaning, transporting.

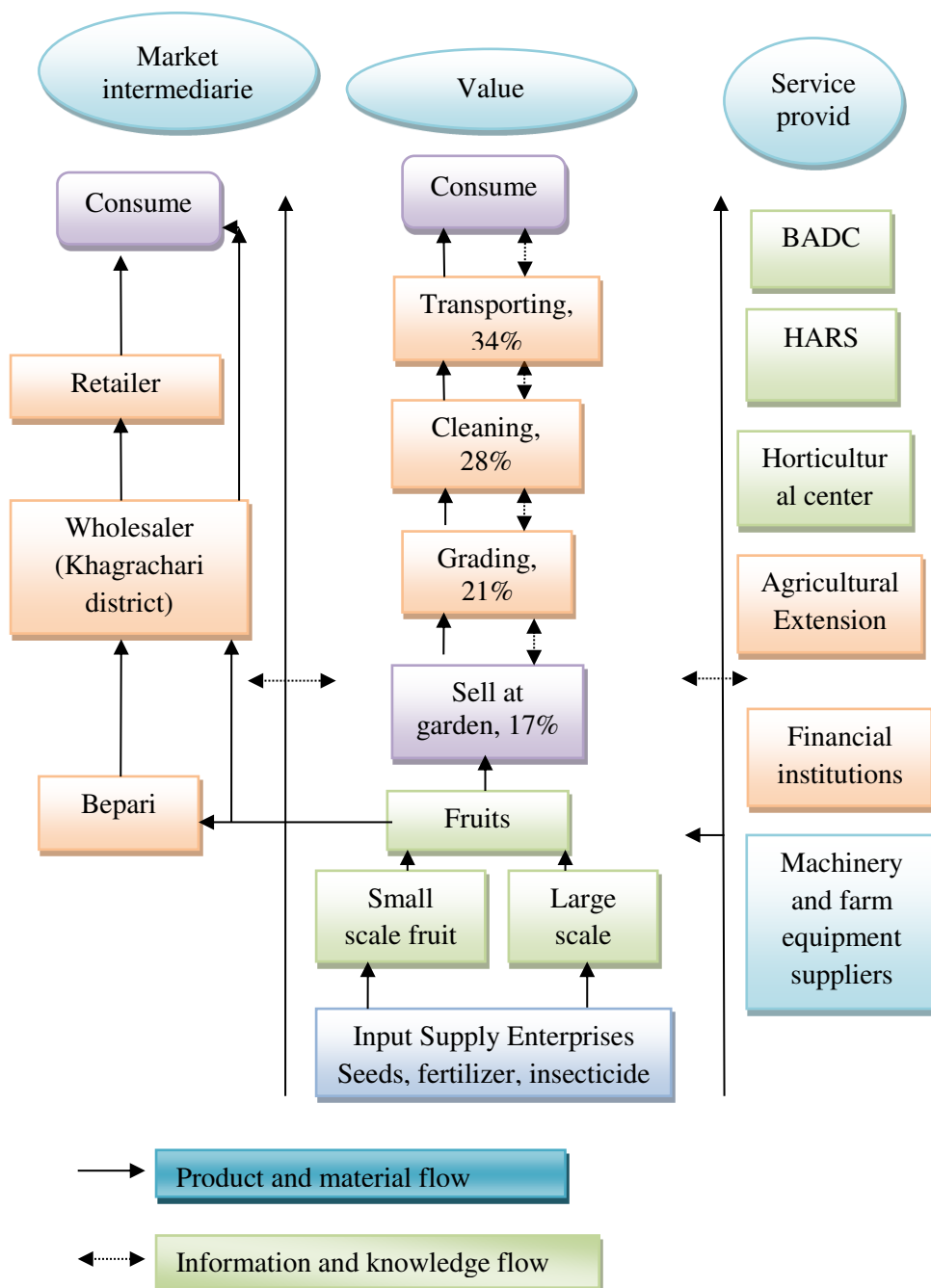


Figure 6.8: Mapping of litchi value chain in Khagrachhari Districts

In the study area, litchi was not processed in any form. Value was added in different stages when litchi was sold in garden the price was Tk. 3000 per 1000 piece and when it was graded the price was increased 21 percent and after cleaning the price was increased 28 percent. Finally when litchi was transported the price raised at Tk. 5000 per 1000 piece.

6.6 Value Addition Practice in Khagrachhari District

In the study area, value was added in some stages of fruits value chain. These stages are grading, cleaning, washing, packaging, leveling, storing, transport, processing, advertising and hot water treatment. Majority (85.6-100 percent) of market actors were graded their fruits during marketing, 57percent mango growers were cleaning their fruits whereas 100 percent of wholesaler do that stage (Figure and table 6.1). Washing was not done by intermediaries but all three types of fruit grower (mango, jackfruit and litchi) wash their fruits. Packaging of fruits was practiced by all growers and intermediaries except retailer. Growers do not label their fruits but all intermediaries label their fruits during transport. Transportation was done by all market actors and during transport especially mango and litchi were packaged to overcome losses. Some of fruit growers advertised their fruits or business on internet, news paper etc., and intermediaries also advertised their fruit business. Hot water treatment was a special technology adopted by 16.07 percent fruit growers to overcome postharvest loss as well as to store mango for 2 to 3 weeks without any preservatives.

Table 6.1: Value Added process adapted by the growers and market intermediaries

Sl. No.	Value added process	Adapted by the respondents (percent)						
		Fruit Growers			Market Intermediaries			
		Mango	Jackfruits	Litchi	Bepari	Faria	Retailer	Wholesaler
1	Grading	96.43	85.3	95	100	100	100	93.75
2	Cleaning	57.14	61.8	72.5	75	89	83	100
3	Washing	14.29	8.8	5	0	0	0	0
4	Packaging	44.64	20.6	45	25	42	0	18.75
5	Leveling	0	0	0	31.25	47	57	18.75
6	Storing	53.57	55.9	55	9.38	21	31.3	25
7	Transport	37.5	29.4	40	100	95	12.5	100
8	Processing	0	0	0	0	0	18.8	0
9	Advertising	19.64	0	0	12	23	83	33
10	Hot Water Treatment	16.07	0	0	0	0	0	0

Source: Field Survey 2014

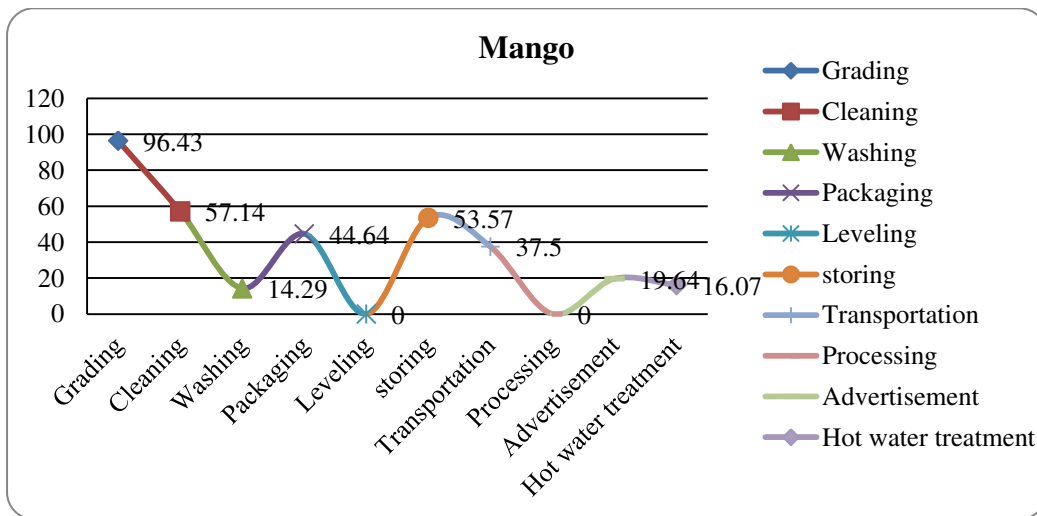


Figure 6.9.1 : Mango value added process practiced in the study area

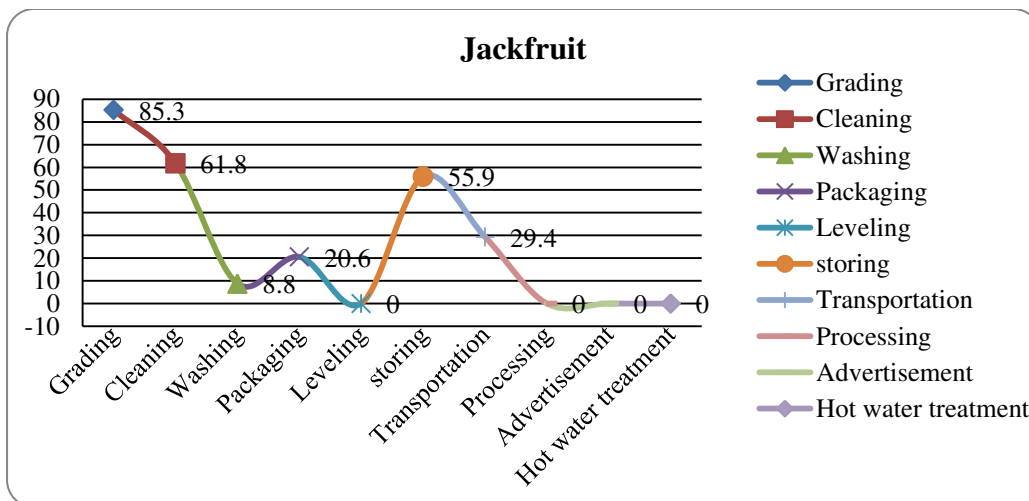


Figure 6.9.2 : Jackfruit value added process practiced in the study area.

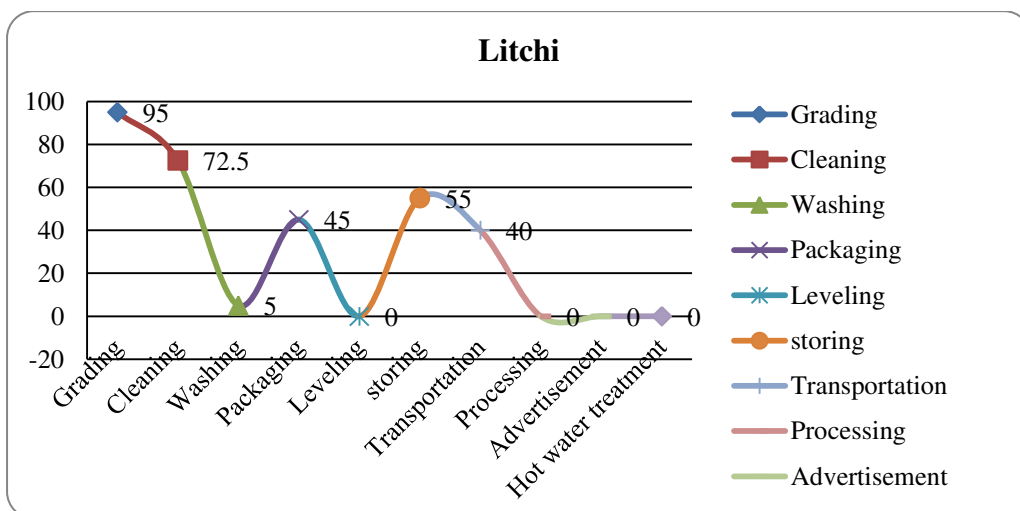












Figure 6.9.3 : Litchi value added process practiced in the study area.

6.7 Opportunities for Value Addition of Selected Fruits for Value Chain Development

Tropical fruits of Bangladesh are perishables and cannot keep fresh for long. A significant amount of fruit produced is lost or wasted due to poor post-harvest management. Therefore, processing fruits into value-added products is one of the strategies to reduce post-harvest losses and promote consumption of fruits. Value can be added at different stages; by harvesting at proper stage, by cleaning, grading, packing, by processing of fruits, by prolonging shelf life and in processing waste. In the study area value addition happens only at first two stages. Processing of fruits industry was absent in the study area. Fruits processing like mango pickle, jackfruit chips etc made at home level. There is a huge scope for fruit juice, jam, jellies, dehydrated and freeze dried & canned products. Respondents were questioned about their preferences of processed product of selected fruits. Tables 6.2, 6.3 and 6.4 contain the preferred process product of selected fruits by respondents.

Table 6.2 : Different uses of mango for value addition in the study area.

Different uses of mango for value addition		Respondents percentage	Different uses of mango for value addition		Respondents percentage
Dried mango		86%	Mango chips		56%
Mango pulp		81%	Mango milk		85%
Juice		75%	Mango biscuits		65%

Mango pickle		92%	Fruit sauce, ketchup		70%
Green Mango juice		81%	Cup mango		60%
Mango yoghurt		64%	Mango Ice cream		74%
Mango leather with strawberry		85%	Fresh Mango roll		78%
Mango bars		55%	Mango candy		42%
Mango chutney		67%	Mango lassi		72%
Mango pie		68%	Canning fresh mango		78%
Mango pudding		68%	Mango muffins		58%
Mango cakes		81%	Mango chocolate cakes		78%














Mango jam		83%	Mango jelly		72%
Mango Nectar		63%	Mango papad		67%
Murabba		88%	Mango cream roll		71%
Mango kaju katli		83%	Mango burfi		86%
Creamy Mango Smoothie		78%	Mango mask		65%

Table 6.3 : Different uses of jackfruit for value addition in the study area.

Different uses of jackfruit for value addition		Respondents percentage	Different uses of jackfruit for value addition		Respondents percentage
Jackfruit candy		76%	Dried jackfruit		58%
Jackfruit chips in plastic poly bags		63%	Jackfruit chips in plastic big pots		69%
Jackfruit muffins		82%	Jackfruit cokies		58%
Processed jackfruit Seed flour		73%	Dehydrated jackfruit with suger		76%
Frozen ripe jackfruit		79%	Frozen Green jackfruit		83%
Jackfruit juice		75%	Jackfruit honey		78%

Jackfruit jelly		82%	Jackfruit jam		80%
Processed Jackfruit in syrup		85%	Canned jackfruit		75%
Jackfruit pappadam		62%	Packed jackfruit		73%
Jackfruit pitha		81%	Jackfruit biscuits		63%
Jackfruit icecream		78%	Jackfruit dessert		65%

Table 6.4: Different uses of litchi for value addition in the study area.

Litchi juice		85%	Litchi juice with aloevera		83%
Canned litchi		92%	Litchi honey		90%

Dehydrated litchi		85%			65%
Litchi sorbit		68%	Litchi cake		70%
Dried litchi		64%	Dried litchi		70%
Litchi capsule		50%	Litchi face wash		52%
Litchi diet fruit extract		75%	Litchi fairness lotion		45%

6.8 Problem Faced by Fruit Grower for Developing Value Chain

For upgrading value chain or value chain development in Khagrachhari District, there were some problems faced by fruit growers. These problems were divided into two main types; production related problem and marketing related problem. Production related problem means problem occurred due to fruits production which causes lower production rate as well as lower profit. These problems were lack of knowledge, lack of sapling, insect/pest problem, disease problem, lack of fertilizer, irrigation problem and capital problem. According to research result all these problems were ranked into their severity basis. The sever problem was disease problem, and second severe problem was insect/pest problem, capital problem was then. Lack of technical knowledge and lack of irrigation facilities was fourth and fifth

problem respectively. Sixth problem was lack of quality sapling. Lack of fertilizer was last problem because respondents said that there was availability of fertilizer but small fruit growers could not afford that.

Marketing related problems include post harvest loss, lack of communication, storage problem, lack of processing center, high market price, less number of intermediaries, transportation problem, lack of rules and regulations, high license cost, high labor cost. In the study area, from all of these problems the main problem was storage problem and lack of processing center, the second main problem was post harvest loss (Table 6.5). High packaging cost was third most important problem in this area. Only big fruit growers had afforded modern packaging facilities like plastic crates for transporting mango. Small and poor fruit growers still used plastic bags, bamboo basket (traditionally called lai/turong/halong etc) (Picture 6.1). Lack of rules and regulation was fifth most important problem faced by fruit growers. Rules and regulation regarding price setting, toll, Government facilities etc was faced by fruit growers. Sixth and seventh problem was high labour cost and lack of communication facilities. Less number of fruit intermediaries and high market price of equipment facilities was 8th and 9th problem. The last problem was high licensed cost. Respondents reported that, they would face high license cost if they started processed fruit business. Most of respondents were interested in starting processed fruit business but lack of marketing policy and high license cost discouraged them.

Table 6.5: Problems faced by the growers for developing value chain of selected fruits

Sl No.	Problems	Percent of respondents			Rank
		Fruit Growers			
	Production related problem	Mango	Jackfruit	Litchi	
1	lack of knowledge	91.07	79.4	92.5	4
2	lack of sapling	85.71	67.6	85	6
3	Insect/pest problem	100	79.4	100	2
4	Disease problem	100	88.2	100	1
5	lack of fertilizer	35.71	41.2	47.5	7
6	Irrigation problem	100	70.6	87.5	5
7	Capital problem	80.38	88.2	95	3
	Marketing related problem				
8	Post harvest loss	100	91.2	100	2
9	lack of communication	80.36	55.9	80	7
10	Storage problem	100	97.1	100	1
11	lack of processing center	100	97.1	100	1
12	High market price	21.43	29.4	20	9
13	less number of intermediaries	33.93	41.2	37.5	8
14	Transport problem	80.36	79.4	97.5	5
15	Lack of rules and regulations	89.29	97.1	82.5	4
16	High license cost	5.36	0	0	10
17	packaging cost	92.85	85.3	97.5	3
18	High labor cost	82.14	79.4	77.5	6

Source: Field Survey 2014



Picture 6.1: Use of plastic bag, bamboo basket (locally called lai/ turong/ halloing) for transportation of mango in local bazaar.

6.9 Problem Faced by Market Intermediaries

Intermediaries in study area, they also faced some problems, these are; post harvest loss, lack of communication, storage problem, lack of processing center, high market price, less no. of intermediaries, transportation problem, lack of rules and regulations, high license cost, high labor cost. From all of these problems the main problem was storage problem in the study area, there was no storage facilities for fruits or other horticultural products. This problem turns into severe problem during pick season of fruits. The second main problem was post harvest loss; this was happened during transport, packaging and handling of fruits. The third main problem was lack of processing center; because of this most of intermediaries need to transport fruits to other district which causes high transport cost. Lack of communication facilities and transport problem was 4th and 5th problem in this region. Most of respondents used track for long distance transportation and for short distance they used four wheel car (locally called chander gari), cng and tomtom (electric charging local transport). Lack of rules regulation and high labor cost was 6th and 7th problem. Packaging cost was 8th problem for fruit intermediaries. High market price of marketing equipment, less number of market intermediaries and high license cost was respectively 9th, 10th and 11th problem for fruit intermediaries.

Table 6.6: Problems faced by the market intermediaries for developing value chain of selected fruits

Sl. No	Problems	Percent of respondents				Rank
		Market Intermediaries				
	Marketing related problem	Bepari	Faria	Retailer	Wholesaler	
1	Post harvest loss	100	95	100	100	2
2	lack of communication	90.63	95	81.3	100	4
3	Storage problem	100	100	100	100	1
4	lack of processing center	100	100	81.3	100	3
5	High market price of equipment	59.38	32	100	37.5	9
6	less no of intermediaries	46.88	5	100	37.5	10
7	Transport problem	87.5	74	81.3	100	5
8	Lack of rules and regulations	93.75	58	81.3	100	6
9	High license cost	21.88	32	81.3	18.75	11
10	Packaging cost	59.38	74	62.5	62.5	8
11	High labor cost	100	95	25	81.25	7

Source: Field Survey 2014

6.10 Status of Post Harvest Technology in Khagrachhari District

The performance of marketing greatly depends on post harvest handling. As like other region, in the study area intermediaries also practice post harvest technology. These practices include handling, grading, cleaning, packaging and transportation. Sorting is generally practiced for all three fruits to spoiled items. Grading is seldom practiced other than some limited scale size grading. In Bangladesh, still no grade standard has been developed for horticultural produce. Grading standard is urgently needed for both the domestic and export markets. For example, because of the paucity of grade standard, potential produce like mango, jackfruits could not be exported into the mainstream global markets. The present export is only destined for the ethnic markets in the overseas.

Adequate packaging is also necessary for facilitating handling and marketing of produce. For mango, plastic crates of 22 kg capacity are used for long distance transportation (Picture 6.2). At the retail levels, no improved packages are available except polyethylene/plastic bags. So, there is a great need to improve fruits and vegetable packaging in Bangladesh. There are scopes to introduce plastic packages, plastic net bags, foam wrap, tray-pack, corrugated fiberboard boxes, etc. to reduce wastage, maintain quality and safety, and improvements in marketing. Transportation is an important function in agricultural marketing. There are various modes of transportation in the study area. The modes of local transportation include head load, bi- cycle, van, Votvoti, tractor, trolley, etc. For long-distance transportation, mini and large open trucks of 7 and 10 tons capacities without any cooling facilities are used (Picture 6.3). So, any modifications to the present vehicle or introduction of refrigerated vehicles at least in pilot basis would greatly contribute to enhance marketing. For example, Hortex Foundation recently purchased few REEFER Truck with refrigeration facilities.

Storage is the most important function in agricultural marketing. The excess supplies at the harvest time are stored so that they could be supplied in the off-season. Proper storage is required to protect produce from quantitative and qualitative deterioration (Hassan,2010). In the study area market intermediaries temporarily used shop for storing fruits (Picture 6.7 B)

In the study area, market intermediaries practiced post harvest technique like during harvest, cleaning, packaging, storing and transporting. Highest 42 percent to 63 percent of Faria transport their fruits; mango, jackfruit and litchi. Around 59 percent of Faria reported that they stored jackfruit. Around 26 percent and 42 percent of Faria reported that they packed mango and litchi respectively. Cleaning was down by Faria. Around 11 percent of Faria cleaned their supplied mango and jackfruit and for litchi the percentage was 5 percent. On the economical value, post harvest losses was happen during transportation for all three fruits; for mango Tk. 3157 per ton, for jackfruit Tk. 394 per 100 piece and for litchi Tk. 178 per 1000 piece was lost during transportation. During harvest the loss was Tk. 1316 per ton for mango, Tk. 368 per 100 pieces for jackfruit and for litchi Tk. 126 per 1000 pieces. Post harvest losses also happened during storage. For mango the loss was Tk. 1562 per ton, for jackfruit Tk. 263 per 100 pieces and for litchi Tk. 131 per 1000 pieces (Table 6.7).

Table 6.7: Post harvest loss assessment of selected fruits for developing value chain performance

SL No.	Post harvest technique	Adapted by market intermediaries during fruit supply (%)			Post Harvest losses		
		Mango	Jackfruits	Litchi	Mango (Tk./ton)	Jackfruits (Tk./100 p)	Litchi (Tk./1000 p)
1	During harvest	42	42	5	1316	368	126
2	Handling/Carrying	37	26	11	2632	263	84
3	Grading:	42		37	1157	0	89
	-Small	0	5	0	0	69	0
	-Medium	0	42	0	0	147	0
	-Large	0	58	0	0	165	0
4	Cleaning	11	11	5	1578	0	63
5	Packaging	26	0	42	1157	0	126
6	Storing	0	59	0	1562	263	131
7	Transportation	53	42	63	3157	394	178

Source: Field survey, 2014.



A



B

Picture 6.2: Mango packaging in plastic crates in mango garden (Picture A), Loading mango plastic crates in Jip (locally called chander gari) for transport (Picture B)



A



B

Picture 6.3: Unloading mango plastic crates from CNG (Picture A) and loading mango plastic crates to truck for transport of mango Khagrachari to Chittagong market (Picture B).



A



B

Picture 6.4: Personal rented shop (temporary) in town market (Picture A), Packaging of Mango inside shop (Picture B)



A



B

Picture 6.5 : Permanent shop in town market (Picture A). Storing mango inside shop (Picture B)



A



B

Picture 6.6: Assemble of jackfruit in the market (Picture A) and Jackfruit loading on truck for transportation in the study area (Picture B).

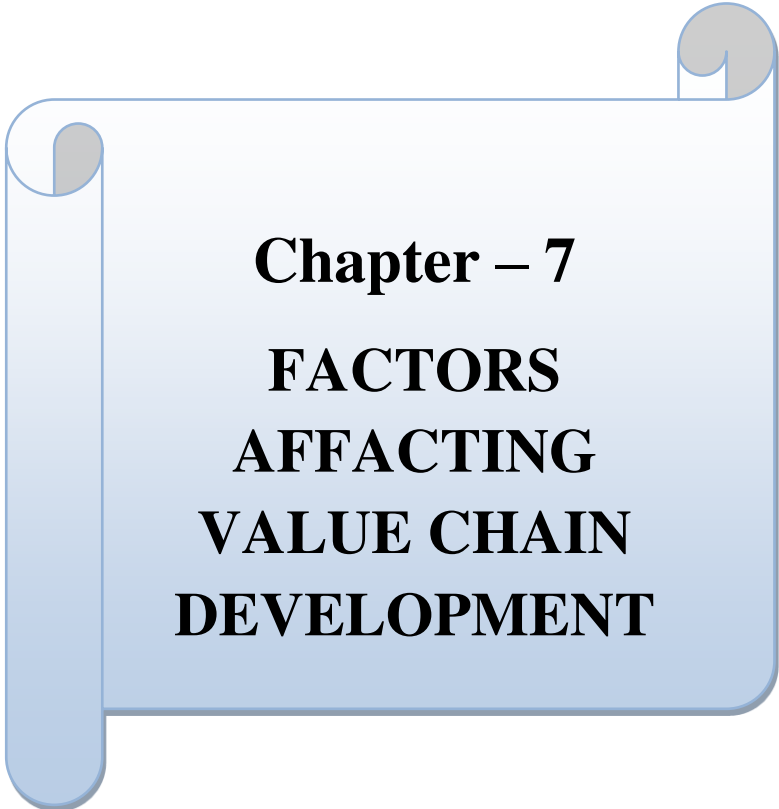


A



B

Picture 6.7: Picture A; Litchi loading in bamboo basket (locally called lai/hallong) and Picture B; retailer sold his litchi in the town market (shapla chatter).



Chapter – 7
FACTORS
AFFECTING
VALUE CHAIN
DEVELOPMENT

Chapter 7

FACTORS AFFECTING VALUE CHAIN DEVELOPMENT

For developing value chain of selected fruits in Khagrachhari District, it was observed that some causes were responsible for the value chain development. This chapter adopted factor analysis to identify the major dimensions of the causes of value chain development.

7.1 Factor Analysis

Factor Analysis is primarily used for data reduction or structure detection. The purpose of data reduction is to remove redundant (highly correlated) variables from the data file, perhaps replacing the entire data file with a smaller number of uncorrelated variables. The purpose of structure detection is to examine the underlying (or latent) relationships between the variables. This analysis that explains most of the variance observed in the much larger number manifest variables by reducing the number of causes to a few factors. The analysis determined causes that affect value chain development of selected fruits in the study area. The analysis used principle component method to extract the factors with varimax rotation technique. Table 7.1 shows the results of the factor analysis of the causes of value chain development. Based on the total variance explained, it was confirmed that, there were nine components that influence the value chain development with 56% since their total loading is more than one. Since from 9 to 32th component were having total Eigen values less than one (Annex 2.2) But because of lower loading factor only four component was selected from the particular variable which included as a factor was made on the basis of whether the correlation value (factor loadings) was high or not.

KMO and Bartlett's Test: The Kaiser-Meyer-Olkin measure of sampling adequacy is a statistic that indicates the proportion of variance in variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. Here, the KMO value was 0.621.

Bartlett's test of sphericity test: The test indicates that variables are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the

significance level indicate that a factor analysis may be useful with data. Here the significance level was 0.00 or 1%.

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

Factor I: Fruit variety, location of market, market structure, marketing policy, consumer choice, consumer number, fruit supply, and number of traders were found on factor I.

Factor II: Poverty, market price, high input price, capital, credit availability, labor wages were found on factor II.

Factor III: Religion, education, family size and culture were found on factor III.

Factor IV: Heavy rainfall, long term summer, fruit disease, climate change and product perishability were found on factor IV.

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

Table 7.1: Factor analysis for the causes that affect value chain development of selected fruits

Causes that affect value chain development	Factor loading				Communalities
F1= Marketing factor					
Fruit variety	.778				.866
Location of market	.732				.778
Market structure	.726				.787
Marketing policy	.707				.736
Consumer choice	.724				.900
Consumer number	.542				.826
Fruit supply	.429				.778
Number of traders	-.585				.864
F2= Economic factor					
Poverty		.660			.856
Market price		-.584			.820
High input price		.621			.729
Capital		.453			.879
Credit availability		.487			.697
Labor wages		-.570			.826
F3= Social factor					
Religion			-.465		.771
Education			-.557		.685
Family size			.692		.792
Culture			-.542		.749
F4= Environmental factor					
Heavy rainfall				-.218	.782
Long term summer				.314	.914
Fruit disease				.631	.836
Climate change				.771	.875
Product perishability				.362	.717
Eigen value: F1= 6.534, F2= 4.466, F3= 3.880, F4= 2.963					
Percent of variation: F1= 20.419, F2= 13.955, F3= 12.123, F4= 9.258					
Cumulative percent of variation: F1= 20.419, f2= 34.375, f3= 46.495, F4= 55.756					
KMO= 0.621 and only factor loading $\geq .56$ has been shown in the table, P-value=0.00					

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

Source: Field Survey, 2014.

The result suggested that these factors were mainly responsible for affecting value chain development in the study area. Therefore, to identify these factors coefficient value and significance level here multiple logistic regression model was done. In this model factors were terms as variable. This model was also helpful to find out the relation between dependent variable and independent variable. Here, dependent variable was fruit supplied (mango, jackfruit and litchi) by fruit growers and

independent variables were heavy rainfall, long term summer, fruit disease, climate change, product perishability, religion, education, family size, culture, poverty, market price, high input price, capital, credit availability, labor wages, fruit variety, location of market, market structure, marketing policy, consumer choice, consumer number, fruit supply and number of traders.

7.2 SWOT Analysis

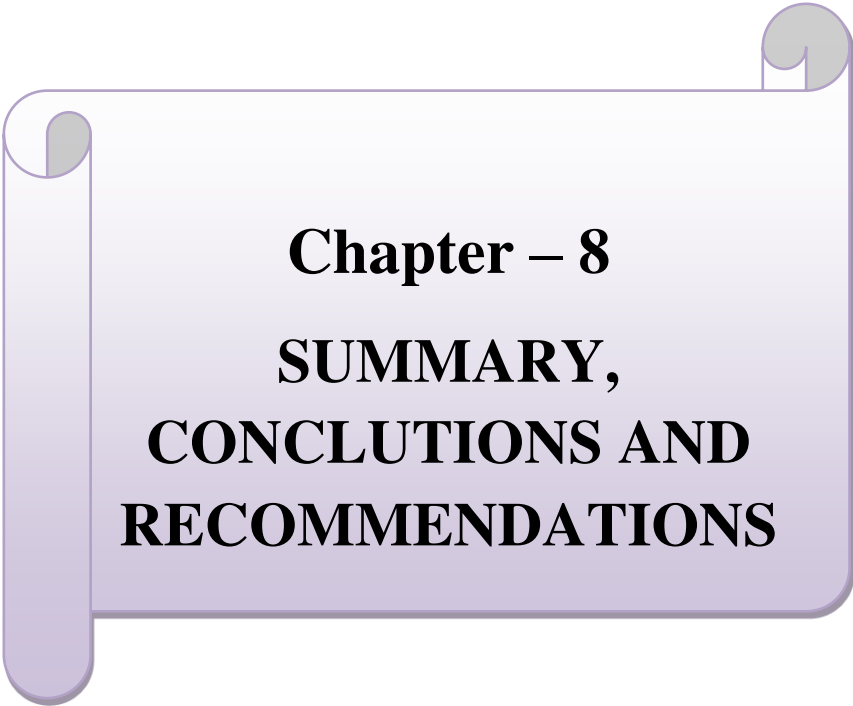
In light of the stakeholder analysis, mixed focus group discussions are executed with fruit growers and intermediaries to draw points of interventions and to address constraints by promoting the strength of the chain. For this purpose, internal weakness and strengths of actors and external opportunities and threats are analyzed under categories of economic, social, technological, demographic and institutional themes. The main results of the SWOT analysis are listed under (Table 7.2).

Table: 7.2. : SWOT analysis matrix

Strengths	Weaknesses
<p>Resources:</p> <ul style="list-style-type: none"> • Potential for growth production • Increasing telecom service • Accumulated traditional knowledge • Organic input utilization • Self preparation of seedlings <p>Marketing:</p> <ul style="list-style-type: none"> • High supply (import substitution) • Multiple consumers • Payments received at delivery • Employment 	<p>Production:</p> <ul style="list-style-type: none"> • Absence or poor Post harvest Technology Shortage of agronomic management practices • Lack of credit access • Lack of financial institution than other region in the country • Lack of institutional training of fruit growers • Lack of natural sources of irrigation water • Insufficiency of high quality of sapling • Insufficient source of high quality of fertilizer • Poor value • Lack of technical support from Government. • Low road access <p>Marketing:</p> <ul style="list-style-type: none"> • Due to hilly region supply of fruits garden to market is causes hamper • Needed high labour cost due to hilly

	<p>region.</p> <ul style="list-style-type: none"> • Inability to join in groups for marketing • Lack of organized information catering • Absent of Aratder market • Competition is higher due to increasing number of intermediaries
Opportunities	Threats
<p>Production:</p> <ul style="list-style-type: none"> • Potential to increase area and productivity • Scope for processing industries (Juice pharmaceuticals, cosmetics, food, etc) • Cooperatives can organize input supply <p>Business Environment:</p> <ul style="list-style-type: none"> • High value crop • High opportunity to establish contract farming as like as northern region's mango garden • High prospect of establishing cold storage • High opportunity to develop agro industry which helps employment opportunity • Prospect to provide assistance in technology and market information • Transformation and development plan <p>Market:</p> <ul style="list-style-type: none"> • Scope of value added Niche product • Big scope for import substitution • Opportunity to supply fruits all over the country • Opportunity to export of fruits than northern region because of lower distance of Khagrachhari to Chittagong port. 	<p>Production:</p> <ul style="list-style-type: none"> • Lack of appropriate varieties. • Increased supply of avocado and mango • Fruit growers not satisfied with the price they receive. • Epidemic fungal disease • High supply driven channel • Wild animals • Prevalence of heavy rainfall at maturity <p>Marketing:</p> <ul style="list-style-type: none"> • Adversarial, with hiding of information • Punitive i.e. no credit extended • Delays in price payments • Low price <p>Institutional:</p> <ul style="list-style-type: none"> • Resource and capacity Constraints • Lack of coordination • Excessive local lending rate (10percent per month). • Poor Technology generation & dissemination • Lack of reliable statistics on production • Weak extension support service

Source: Survey result, 2014.



Chapter – 8
SUMMARY,
CONCLUTIONS AND
RECOMMENDATIONS

Chapter 8

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 Summary

Given the large potential for fruit production in the country, their contribution to the total GDP has been extremely low for many reasons. The most cited reasons include lack of market oriented production which is too traditional and poorly supported by scientific recommendations, excessive margin mainly due to inefficient and costly transport, absence of fruit market information, inadequate government interventions and absence of market regulations and legislations and its marketing activity is principally attributed to poor actors skill. As a result, fruit marketing needs due attention in any on-going or future fruit development plan.

Although comparative rewards such as: suitable agro-ecology, proximity to national market and cheap provision of labor are opportunities, but declining prices, occurrence of deadly fungal disease, poor market integration, absence of improved technologies and provision of extension packages are major factors that hindered production-marketing task of mango, jackfruit and litchi. With existing prominent organic production the product is not yet certified in the study area.

Constraints hindering the development of mango, jackfruit and litchi are found in all the stages of the chain. At the farm-level, lack of quality sapling has compelled fruit growers to use inferior and low yielding materials. Storage facilities and absence of collective bargaining power has also forced individual fruit growers to accept unfavorable deals.

Even though most payments are made instantly, in some areas payment in small part are some of the marketing malpractices reported in the study area. Small scaling deduction, quoting of lower prices and lack of market information are also common market malpractices in the study area. Simultaneously, deficiency in capital and credit availability is also reported as major problems that badly compelled fruit growers to sell their produce at whatever price given by intermediaries who have borrowed them earlier.

Absence of organized institution and system group marketing has made intermediaries in a better position to dominate the roost in pricing. The research result also indicated the existence of nine mango, six jackfruit and six litchi Supply chains in Khagrachhari District. Producers-Consumer channel was important to producers and consumers to get acceptable prices; while Producers-Bepari(local)-District market-Consumer (local) channel and Producer- Wholesaler-Retailer-Consumer channel was the most important channels in terms of total volume marketed for mango, litchi and jackfruit respectively.

Despite closeness of four governmental and private commercial banks and one (micro finance) non-banking institution, denial to formal credit is prevalent. Thus informal credit system is customary feature in the study area. Similarly large proportion of mango, jackfruit and litchi are consigned to town market; while the remaining portion and all mangos which are procured to the market is consumed at local markets on rock bottom price.

8.2 Conclusions

The commercialization of fruits in the study area and development of agro processing industry in its infancy. Most producers lack of marketing knowledge. Most relations between actors are adhoc. Hence, there is a risk that production increases faster than the corresponding markets. Therefore, a number of actions need to be undertaken in order to promote the development of mango, jackfruit and litchi value chain. This particularly includes, capacity building, technological applications, improved extension and plant breeding activities. Infrastructural development is also a key to support the sub-sector. In this arena, emphasis should be given to improved storage and transportation system and offering credit and other services to improve effective production and marketing of the crops. Creating new low cost systems/tools (e.g., basket, containers) to collect and transport fruits from farm to postharvest centers will enable farmers to partially reduce post-harvest losses during transportation. Further, training facilities to farmers and middlemen on good postharvest practices (e.g., the use of trays and containers suitable to handle mango and prevent fruits piling) will help to decrease current losses in the field. Lower skill level in fruits postharvest

management reduces the volume available for export. Technical support is still insufficient to build skills in some associations or productive clusters, as well as a general lack of financial resources to access and improve infrastructure. The technical support available is not sufficient for producers to manage their plots according to local conditions. This is due to a lack of resources for this service, low availability of human resources and high dispersion of fruits producing farms. Government should give emphasis on this sector to improve the present situation of fruits production and marketing in this area as well as this could help value chain development of fruits.

8.3 Policy Implications and Recommendations

On the basis of the foregoing discussion, the following recommendations are suggested for the policy makers.

Storage facility: As post harvest losses of fruits was a major problem in the study area, storage facilities could be a solution of this problems. Storage facilities should be established by Government or private organization.

Establish agro processing industry: Establishment of agro processing industry can help to prevent post harvest losses and also encourage fruit growers to more fruit production. This can be helpful for employment generation as well as development of agribusiness sector in this area.

Provide credit facilities: Government may provide credit facilities to market actors and processors to encourage in developing value chain of fruits. This initiative can help to provide job opportunities to people as well as to grow entrepreneurship in this area.

Technology dissemination: Both Government and NGOs can help to value chain development by disseminate technical information for improvement of fruits production and marketing in this area.

Strengthening research on marketing: Continuous research is crucial to identify mitigate constrains in value chain development. It can also helps in identifying the potential entrepreneurs and processors who was already involved in this profession. Capacity strengthening in terms research on postharvest management and marketing of the important research organizations including universities (BAU, SAU and BSMRAU) and research organizations (BARI and BINA) is needed.

Training facilities: Different Government and NGOs can provide training facilities to both market actors and processors including harvesting, grading, sorting, packaging, transportation, storage (conventional and modern), processing (small and large-scale) and nutrition is required. All the market actors in the value chain should be given adequate training. Different Government NGOs and Agricultural Universities provide advice and help to assess the demand for human resources, and assist in improving the capacity building and training facilities.

Transfer of technology: Development of appropriate technology by experts and conduction of training by appropriate trainers on different aspects of postharvest management. Agricultural University like BAU, SAU, BSMRAU etc. may play a leading role in collaboration with BARC, DAE, BARI and BSTI can help to transfer technology in this area.

Promoting packaging system: Packaging sector for perishables has not been developed in the study area. For long-distance transportation, still voluminous package made of bamboo baskets and gunny sacks are predominantly used, which result in high spoilage due to impact, vibration and heat generation. Recently, mango intermediaries adopted plastic crates in transportation which has created positive impacts in minimizing loss and maintain quality.

Quality and grading standard: In the study area lacks of standardized quality assurance systems for fruits. Therefore, proper arrangement should be made to develop quality management system to train, and ultimately to accredit, growers and intermediaries in the major international certification such as HACCP, ISO etc.

Establishment of permanent shop for market intermediaries: Permanent shop for market intermediaries like retailer, wholesaler etc. was necessary for security of their products in the market. In the study area, there were only few permanent shops of fruits market intermediaries and there was no specific place for fruits market. Local Government can help to improve the situation.

Establishment of Wholesale market and Aratder market: In the study area, there was a need of wholesale and Aratder market for fruit marketing. This would be helpful for both fruit growers and market intermediaries also fruit growers came from long distance to town market for selling their fruits, they could easily sold their fruits

to wholesale and Aratder market. This step could be also helpful for employment generation and encourage more fruits production and marketing.

Adoption of modern marketing facilities is required: Adoption of modern facilities in fruits production and marketing is important in the study area. However, there is a debate on this issue whether modernization can curtail jobs.

Strengthening public-private partnership: Public private partnership is urgent to introduce new and modern postharvest technologies like refrigerated transport vehicle, low temperature storage and ethylene-induced ripening chamber for the improvement of marketing system of perishables.

Motivating the private sector to invest and mobilize resources for investment: Market development plans should take a long-term perspective and should include village markets, primary wholesale markets, secondary wholesale markets, city markets and mega markets. While formulating and implementing such plans, the need to link primary rural markets with secondary wholesale markets and terminal markets should be kept in view. Further, an enabling environment needs to be created to attract private sector investment in the development of a hierarchy of markets.

Mobilizing resources and implementation: A considerable quantity of agricultural products is lost in the marketing chain because of a lack of infrastructure such as transport facilities, roads, storage structures, cold stores and grading and packaging facilities. Government can formulate guidelines for market infrastructure planning that can be used to develop national and provincial level market infrastructure projects for mobilizing resources and implementation.

Value addition of agro-produce: The present status of value addition in the study area is still negligible. Adequate number of small and large-scale processing plants should be established. However, to access the mainstream export markets the food enterprises must comply with the application of good manufacturing practices (GMP), good hygienic practices and Hazard Analysis and Critical Control Point (HACCP) systems. These quality assurance (QA) systems are lacking in Bangladesh and should be developed immediately.

Strengthening and improving market information systems: This could ensure better use of market information by the growers, intermediaries, researchers, extension workers, and ultimately the policy makers. Also access to right information on market price and trend in market price is very important. Nowadays,

information about prices is published in newspaper announced in radio and television regularly. The fruit grower must be familiar with the prevailing prices and trend of the prices. Even though, Upazilla Information Centre is established but getting daily prices from the internet is still difficult. In this regard, board may be used to display daily prices of agricultural commodities in the market. Also DAM can send price information of important agricultural commodities to the fruit growers by SMS.

Minimize malpractice in marketing: Though there are government departments to watch and observe the activities in the markets, there are some malpractice in fruit marketing is happen in the study area Certain compulsions of the fruit growers and lack of power retention, they are being exploited by the middlemen through their malpractices. The government should also strengthen their assistance to fruit growers to reduce the added costs of informal tolls levied against fruits as it is carried from farm-gate to the market.

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Annex 1.1 Price spread in marketing channel of fruits (mango, jackfruit and litchi)

Marketing channel	Price received by fruit growers	Price paid by consumers	Price spread
Mango per ton			
Grower – Faria(local) – Retailer – Consumer	50000	80000	30000
Grower – Bepari (local) – Consumer (local)	55000	80000	25000
Grower–Faria (local) -Consumer (local)	60250	90430	30180
Grower–Bepari (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong market) – Consumer (Chittagong district)	70250	102650	32400
Grower– Bepari (local)– Bepari (other district)–Consumer (Chittagong district)	70250	91256	21006
Grower–Aratder (Chittagong market) - Bepari (Chittagong market)-Consumer (Chittagong district)	65326	95020	29694
Grower - Retailer (local)– Consumer (local)	50000	80000	30000
Grower-Wholesaler (local)-Consumer (local)	45000	75000	30000
Jackfruit per 100 pieces			
Grower – Bepari (local)– Consumer (local)	6000	10000	4000
Grower – Faria(local) – Retailer – Consumer (local)	5000	10000	5000
Grower–Wholesaler (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong district) – Consumer (Chittagong district)	5000	12000	7000
Grower–Bepari(local)–Bepari (Chittagong district)–Retailer (Chittagong district)-Consumer(Chittagong district)	5500	12000	6500
Grower-Bepari- Bepari (Fenny) -Consumer	6000	12000	6000
Litchi per 1000 pieces			
Grower – Bepari (local)– Consumer (local)	2500	4200	1700
Grower – Faria(local)– Consumer (local)	2000	3500	1500

Grower–Wholesaler (local) – Consumer (local)	2000	3500	1500
Grower–Bepari (local)–Aratder (Chittagong district market)– Retailer (Chittagong market) – Consumer (Chittagong district)	2000	4500	2500
Grower-Wholesaler (local) -Retailer (local) - Consumer (local)	2000	3500	1500

Annex 1.2 Growers share (%) in marketing channel of fruits (mango, jackfruit and litchi)

Marketing channel	Price received by fruit growers	Price paid by consumers	Growers share (%)
Mango per ton			
Grower – Faria(local) – Retailer – Consumer	50000	80000	62.50
Grower – Bepari (local) – Consumer (local)	55000	80000	68.75
Grower–Faria (local) -Consumer (local)	60250	90430	66.62
Grower–Bepari (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong market) – Consumer (Chittagong district)	70250	102650	68.43
Grower– Bepari (local)– Bepari (Chittagong district)–Consumer (Chittagong district)	70250	91256	68.43
Grower–Aratder (Chittagong market) -Bepari (Chittagong market)-Consumer (Chittagong district)	65326	95020	68.75
Grower - Retailer (local) – Consumer (local)	50000	80000	62.50
Grower-Wholesaler (local)--Consumer (local)	45000	75000	60.00
Jackfruit per 100 pieces			
Grower – Bepari (local) – Consumer (local)	6000	10000	60.00
Grower – Faria(local) – Retailer – Consumer (local)	5000	10000	50.00
Grower–Wholesaler (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong district) – Consumer (Chittagong district)	5000	12000	41.67
Grower–Bepari(local)–Bepari (Chittagong district)–Retailer (Chittagong district)-Consumer(Chittagong district)	5500	12000	45.83
Grower-Bepari- Bepari (Fenny) -Consumer	6000	12000	50.00
Litchi per 1000 pieces			
Grower – Bepari (local)– Consumer (local)	2500	4200	59.52
Grower – Faria(local) – Consumer (local)	2000	3500	57.14
Grower–Wholesaler (local)- District market – Consumer (local)	2000	3500	57.14
Grower–Bepari (local)–Aratder (Chittagong district market)– Retailer (Chittagong market) – Consumer (Chittagong district)	2000	4500	44.44
Grower-Wholesaler (local) -Retailer (local) - Consumer (local)	2000	3500	57.14

Annex 1.3 Acharya's marketing efficiency of various channels in fruits (mango, jackfruit and litchi) marketing

Marketing channel	Price received by fruit growers	Marketing efficiency
Mango per ton		
Grower – Faria(local) – Retailer – Consumer	50000	1.26
Grower – Bepari (local)– Consumer (local)	55000	1.77
Grower–Faria (local) -Consumer (local)	60250	1.26
Grower–Bepari (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong market) – Consumer (Chittagong district)	70250	1.75
Grower– Bepari (local)– Bepari (other district)– Consumer (Chittagong district)	70250	1.20
Grower–Aratder (Chittagong market) -Bepari (Chittagong market)-Consumer (Chittagong district)	65326	1.15
Grower - Retailer (local)– Consumer (local)	50000	1.33
Grower-Wholesaler (local)-Consumer (local)	45000	1.20
Jackfruit per 100 pieces		
Grower – Bepari (local)– Consumer (local)	6000	1.37
Grower – Faria(local) – Retailer – Consumer (local)	5000	1.00
Grower–Wholesaler (local)–Aratder (Chittagong market)–Bepari (Chittagong market) – Retailer (Chittagong district) – Consumer (Chittagong district)	5000	1.00
Grower–Bepari(local)–Bepari (Chittagong district)–Retailer (Chittagong district)-Consumer(Chittagong district)	5500	1.20
Grower-Bepari- Bepari (Fenny) -Consumer	6000	1.30
Litchi per 1000 pieces		
Grower – Bepari (local)– Consumer (local)	2500	1.47
Grower – Faria(local) – Consumer (local)	2000	1.33
Grower–Wholesaler (local)– Consumer (local)	2000	1.33
Grower–Bepari (local)–Aratder (Chittagong district market)– Retailer (Chittagong market) – Consumer (Chittagong district)	2000	1.37
Grower-Wholesaler (local) -Retailer (local) - Consumer (local)	2000	1.40

Annex 2.1: Factor analysis result (communalities)

Communalities		
	Initial	Extraction
Havvy_rainfall	1.000	.782
Long_term_summer	1.000	.914
High_temperature	1.000	.829
Fruit_disease	1.000	.836
Climate_change	1.000	.875
Product_perisibility	1.000	.717
Religion	1.000	.771
Education	1.000	.685
Family_size	1.000	.792
Ehnicity	1.000	.803
Culture	1.000	.749
Political_system	1.000	.846
Family_member	1.000	.854
Inflation_rate	1.000	.805
Poverty	1.000	.856
Money_supply	1.000	.818
Insurance	1.000	.835
Market_price	1.000	.820
Lower_product_pric e	1.000	.787
high_input_price capital	1.000	.729
credit_avilability	1.000	.873
labor_wages	1.000	.697
Market_structure	1.000	.826
consumer_choice	1.000	.787
fruit_supply	1.000	.900
fruit_demand	1.000	.778
fruit_variety	1.000	.816
location_of_market	1.000	.866
no_of_trader	1.000	.778
mkting_policy	1.000	.864
	1.000	.736

Extraction Method: Principal Component Analysis.

Annex 2.2: Factor analysis result (total variance explained)
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.534	20.419	20.419	6.534	20.419	20.419	4.748	14.839	14.839
2	4.466	13.955	34.375	4.466	13.955	34.375	3.622	11.320	26.159
3	3.880	12.123	46.498	3.880	12.123	46.498	3.410	10.657	36.816
4	2.963	9.258	55.756	2.963	9.258	55.756	3.242	10.130	46.946
5	2.195	6.858	62.615	2.195	6.858	62.615	2.896	9.049	55.995
6	2.128	6.651	69.265	2.128	6.651	69.265	2.180	6.814	62.809
7	1.528	4.774	74.040	1.528	4.774	74.040	1.999	6.247	69.056
8	1.107	3.460	77.500	1.107	3.460	77.500	1.986	6.206	75.263
9	1.051	3.285	80.784	1.051	3.285	80.784	1.767	5.522	80.784
10	.887	2.772	83.556						
11	.797	2.490	86.046						
12	.658	2.058	88.104						
13	.609	1.904	90.008						
14	.490	1.532	91.540						
15	.396	1.239	92.779						
16	.341	1.065	93.844						
17	.324	1.013	94.858						
18	.284	.886	95.744						
19	.250	.783	96.527						
20	.219	.685	97.212						
21	.195	.609	97.821						
22	.143	.447	98.268						
23	.135	.422	98.689						
24	.105	.327	99.016						
25	.076	.239	99.255						
26	.060	.189	99.444						
27	.048	.151	99.595						
28	.044	.137	99.732						
29	.031	.097	99.829						
30	.026	.081	99.910						
31	.016	.049	99.959						
32	.013	.041	100.000						

Extraction Method: Principal Component Analysis.

Annex 2.3: Factor analysis result (component matrix)

Component Matrix^a

	Component								
	1	2	3	4	5	6	7	8	9
Long_term_summer	.806	.313	-.046	.314	.027	-.153	.195	.046	.039
fruit_variety	.778	-.172	-.367	-.193	-.123	.132	-.071	.145	.020
location_of_market	.732	-.416	-.089	.103	-.092	-.070	.099	.166	-.021
Market_structure	.726	.050	.075	.285	.250	-.188	.157	.213	.058
consumer_choice	.724	.241	-.057	-.330	.135	.390	-.085	.142	.092
Education	.659	-.232	.557	-.026	.178	-.073	-.275	-.098	.092
labor_wages	.658	-.570	.057	.489	.055	-.198	-.270	-.158	.080
Family_size	-.604	-.423	.692	-.348	.161	.206	-.129	.178	.030
High_temperature	.600	-.230	-.252	.117	-.141	.259	.307	.152	-.367
consumer_no	.542	.099	.500	-.079	-.269	.188	-.113	.318	.209
Product_perisibility	-.500	.131	-.283	.362	.030	-.319	-.354	.061	.082
Poverty	.031	.660	.388	.180	-.227	.057	.296	.305	-.032
fruit_supply	.429	-.660	.249	.064	.379	.215	-.065	.214	-.145
fruit_demand	.552	-.646	.516	-.119	-.017	.260	-.070	-.145	-.035
Religion	.223	-.608	.464	-.341	-.326	-.154	-.032	-.256	.187
Havvy_rainfall	.039	.553	-.350	-.218	.329	.330	.154	-.087	.237
mkting_policy	.707	.536	.415	-.316	-.045	-.148	-.175	-.163	-.036
credit_avilability	.417	.487	-.027	.267	-.400	.115	-.025	-.199	.035
no_of_trader	-.585	.189	-.789	-.223	-.319	-.019	.062	.048	.120
Insurance	-.422	-.248	.693	-.120	-.192	-.132	-.017	.197	.088
Family_member	-.261	.240	.615	.309	.293	.393	-.063	.002	-.095
Market_price	-.533	-.584	-.539	.203	.154	.054	.377	.152	.070
Political_system	-.177	-.020	.514	.330	-.208	-.257	.396	.247	.336
Lower_product_price	-.374	-.266	.444	-.297	.187	-.295	.383	-.151	-.017
capital	.356	.453	-.233	.647	-.172	.081	.117	-.082	.103
high_input_price	-.117	.621	.269	.580	-.152	.147	.198	-.215	-.273
Ehnicity	.136	.498	.193	-.515	.176	-.420	.106	.085	.093
Money_supply	-.119	.110	-.113	.503	.435	.007	-.332	.208	.427
Climate_change	.304	.480	.100	.771	.684	-.024	.053	-.171	-.188
Fruit_disease	-.172	.240	.232	.631	-.312	.597	.037	-.322	.369
Inflation_rate	.404	-.295	-.068	.187	.229	-.469	.319	-.312	.208
Culture	-.054	.346	-.542	.129	-.384	-.457	-.399	.127	-.279

Extraction Method: Principal Component Analysis.

Annex 2.3: Factor analysis result (component matrix)

Component Matrix^a

	Component								
	1	2	3	4	5	6	7	8	9
Long_term_summer	.806	.313	-.046	.314	.027	-.153	.195	.046	.039
fruit_variety	.778	-.172	-.367	-.193	-.123	.132	-.071	.145	.020
location_of_market	.732	-.416	-.089	.103	-.092	-.070	.099	.166	-.021
Market_structure	.726	.050	.075	.285	.250	-.188	.157	.213	.058
consumer_choice	.724	.241	-.057	-.330	.135	.390	-.085	.142	.092
Education	.659	-.232	.557	-.026	.178	-.073	-.275	-.098	.092
labor_wages	.658	-.570	.057	.489	.055	-.198	-.270	-.158	.080
Family_size	-.604	-.423	.692	-.348	.161	.206	-.129	.178	.030
High_temperature	.600	-.230	-.252	.117	-.141	.259	.307	.152	-.367
consumer_no	.542	.099	.500	-.079	-.269	.188	-.113	.318	.209
Product_perisibility	-.500	.131	-.283	.362	.030	-.319	-.354	.061	.082
Poverty	.031	.660	.388	.180	-.227	.057	.296	.305	-.032
fruit_supply	.429	-.660	.249	.064	.379	.215	-.065	.214	-.145
fruit_demand	.552	-.646	.516	-.119	-.017	.260	-.070	-.145	-.035
Religion	.223	-.608	.464	-.341	-.326	-.154	-.032	-.256	.187
Havvy_rainfall	.039	.553	-.350	-.218	.329	.330	.154	-.087	.237
mkting_policy	.707	.536	.415	-.316	-.045	-.148	-.175	-.163	-.036
credit_avilability	.417	.487	-.027	.267	-.400	.115	-.025	-.199	.035
no_of_trader	-.585	.189	-.789	-.223	-.319	-.019	.062	.048	.120
Insurance	-.422	-.248	.693	-.120	-.192	-.132	-.017	.197	.088
Family_member	-.261	.240	.615	.309	.293	.393	-.063	.002	-.095
Market_price	-.533	-.584	-.539	.203	.154	.054	.377	.152	.070
Political_system	-.177	-.020	.514	.330	-.208	-.257	.396	.247	.336
Lower_product_price	-.374	-.266	.444	-.297	.187	-.295	.383	-.151	-.017
capital	.356	.453	-.233	.647	-.172	.081	.117	-.082	.103
high_input_price	-.117	.621	.269	.580	-.152	.147	.198	-.215	-.273
Ehnicity	.136	.498	.193	-.515	.176	-.420	.106	.085	.093
Money_supply	-.119	.110	-.113	.503	.435	.007	-.332	.208	.427
Climate_change	.304	.480	.100	.771	.684	-.024	.053	-.171	-.188
Fruit_disease	-.172	.240	.232	.631	-.312	.597	.037	-.322	.369
Inflation_rate	.404	-.295	-.068	.187	.229	-.469	.319	-.312	.208
Culture	-.054	.346	-.542	.129	-.384	-.457	-.399	.127	-.279

Extraction Method: Principal Component Analysis.

a. 9 components extracted.

Annex3.1
Identifying Entrepreneurs and Value Chain Development of Some Selected Fruits in
Chittagong Hill Tracts
Questionnaire of Fruit Growers 2014

Sample no:

1. Personal information of respondents

Respondent's Name: Mobile Number :
 Village/Para : Union:.....
 Upazila:..... District (Please tik):

Community Name (Please tik)

Bangali	Chakma	Marma	Tripura	Tanchanga	Mro	Bawm
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Religion (Please tik):

Islam	Buddhist	Hindu	Christian
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2. Socioeconomic information

Gender	Age	Marital Status	Family member	Effective member in Family	Land Ownership	Land Holdings(acre)	Education	Occupation	
								Main	Secondary

Code: Gender: Male = 1, Female = 2, Marital Status: Unmarried = 1, Married = 2, Family Member: 1-3 member=1, 3-5member=2, 5-8 member=3, above 8=4, Land ownership: Landlord (renting out land) = 1, Owner cultivator = 2, Share Cropper = 3, Tenant (renting land) = 4, Landless = 5, land holdings: <1 acre = 1, 2-5 acre =2, 6-10 acre = 3, 11-15acre = 4, 16-20 acre = 5, 21-30 acre=6, 31-50 acre=7, 51 – 70 acre=8, above 70=9, Education: Class 1-5=1, class 6-10=2, Class 11-12 =3, Graduate & above=4, Cannot read & write/ illiterate =5, Occupation: Only Agriculture = 1, Agri + Poultry = 6, Agri + business = 2, Agri + Timber cutter = 7, Agri + Service = 3, Agri + Weaving = 8, Agri + Rickshaw/Van = 4, Agri + Pig Rearing = 9, Day Labour = 5, Agri + Nursery = 10

3. Contextual Information

a) Year of establishment	
b) Garden type	Sole =1 , Mixed = 2
c) Source of input	Own=1, local bazaar=2, Town bazaar=3, Friends=4, relatives=5, Others=6
d) Experience in Farming (actual years) =	1-3 years=1, 3-5 years=2, 5-8 years=3, 8-10 years=4, 10-13 years=5, 13-15 years=6, Above15=7
e) Experience in fruits marketing =	1-3 years=1, 3-5 years=2, 5-8 years=3, 8-10 years=4, 10-13 years=5, 13-15 years=6, Above15=7
f) Source of finance=	Own=1, Bank loan=2, Neighbor =3, Friends=4, NGO=5, Others (Specify)=6

If source of finance is bank, how much the interest rate?		
g) Selling point=		[Place] Local market=1, District market=2, Dhaka=3, Chittagong=4, Pahartoli = 5, Sholoshahar=6, Hathazari=7, Fenny=8, Rangamati =9, Others (Specify)=10
		[Person] End consumer=1, Bepari=2, Faria=3, Whs=4, Aratdar=5, Others(Specify)=6
h) Payment system of products		On Cash=1, On Credit=2, Advance payment before harvest=3, Payment after harvest=4, Both=5, Others(specify)=6.
i) Source of information (Product marketing)		Friends=1, Relatives=2, Media (TV, Radio, Newspaper)=3, Business Community=4, NGO=5, Others(Specify)=6.
j) Source of information (product price)		Local market price list=1, Business community=2, Friends=3, Others(specify)=4
k) Do you have any training experience on agriculture?		Yes = 1 No = 0
l) Do you get any training for value added process of fruits from any organization? If yes, from where?		Yes = 1 No = 0
m) Do you get proper help from DAE/HARS/NGO's?		Yes = 1 No = 0

4. Information about Fruits Garden

Items	No of total Garden	Total no of Tree	Total no of fruiting tree	Age of fruiting tree (Min - max)	Income from last 3 yrs (Tk.)			Selling Price(Tk ./kg)	Price per seedling	Seedlings use in per ha
					2011	2012	2013			
Mango										
Jackfruit										
Litchi										

5. Information about fruits production and marketing

Item	Production per ha	Total production	Family Consumption	No. of total quantity	Total Return
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		per ha		sold	
Mango (per kg)					
Jackfruit (per 00 pcs)					
Litchi (per 1000 pcs)					

6. Cost of garden management (last 1 year)

Sl. No.	Item	Amount(Tk.)		
		Mango	Jackfruit	Litchi
1.	Land rent			
2.	Land preparation			
3.	Equipment cost			
4.	Fertilizer cost			
5.	Weeding cost			
6.	Pesticide cost			
7.	Irrigation cost			
8.	Labor cost			
9.	Electricity			
10.	Toll			
11.	Loading/unloading cost			
12.	Transportation cost			
13.	Other cost			
	Total cost			

7. Information on respondents family income and expenditure (last 1 year)

Source of income	Amount(Tk.)	Expenditure item	Amount(Tk.)
i. Income from fruits garden		i. Food	
ii. Income from any business		ii. Cloths	
iii. Day labor		iii. Education cost	
iv. Salary income		iv. Treatment cost	
v. Jhum		v. House repairing cost	
vi. Farming		vi. Land rent	
vii. others		vii. Festival	
		viii. Electricity	
		ix. Others	

8. Price of fruits:

	Farm gate price	Market price		Profit (average)
		Primary market(local bazaar)	Secondary market (town market)	
Mango (per kg)				
Litchi (per 100)	China 3			

	China 2				
Jackfruit (Per piece)	Small<4kg				
	Medium 4-8 kg				
	Big>8kg				

15. Channel and route related information

Sl. No.	Channels using by fruit growers	Route using by fruit growers	Distance

Bepari to consumer =1, Bepari to Faria =2,Bepari to Faria to whs =3,Bepari to Faria to whs to Aratder= 4,Bepari to Bepari=5,Faria to consumer=6,Faria to whs=7,Faria to whs to Aratder=8,Faria to whs to Aratder to consumer=9,whs to Aratder=10,whs to Aratder to consumer=11,others =12Production area to main town (Khagrachari/Bandarban/Rangamati)= 1,Collection area to main town = 2,Collection area to main town to dhaka=3,Collection area to main town to Chittagong= 4,Collection area to main town to fenny=5,Collection area to other city =6

9. Do you practice any type of value added process? Yes = 1 No = 0
If yes, what type of value added process you practice in your business?

Grading=1	Washing=2	Cleaning=3	Packaging=4	Labeling=5
Storing=6	Transporting=7	Processing=8	Advertising=9	Hot Water Treatment = 10
Others (Specify)=11				

10. Problems in fruits production

		Yes =1 No = 0	Ranking of problems
a.	Poor knowledge about modern fruits production technology		
b.	Lack of quality sapling		
c.	Acute problem in insect/pest infestation .		
d.	Acute problem in disease.		
e.	Non availability of good quality of fertilizers and insecticides.		
f.	Lack of irrigation water.		
g.	Cash money for initial establishment of fruit garden.		
h.	Lack of supervision at field level by research and extension personnel.		

11. Problems in fruits marketing

		Yes = 1 No = 0
i.	Post harvest loss/spoilage is high	

ii.	Lack of transport facilities	
iii.	Lack of storage facilities	
iv.	Lack of agro processing industries	
v.	High market toll	
vi.	Less no of traders	
vii.	Poor regulatory marketing system (Specific place/poor management)	
viii.	High license cost	
ix.	High packaging cost	
x.	High labor cost for transport fruits due to hilly area	
xi.	Poor communication	

Solution of problems:

Production side	Marketing side

16.Factors influencing in entrepreneurs growth and value chain performance

	Environmental factors Do you think that entrepreneurial growth and value chain Development influence by	Highly disagree 1	Disagree 2	Either agree or disagree 3	Agree 4	Highly agree 5
1	Heavy rainfall					
2	Long time summer					
3	High temperature					
4	Fruit disease					
5	Climate change					
6.	Product perishability					
	Social Factors:					
7.	Religion					
8.	Education					
9.	Family size					
10.	Ethnicity					
11.	Culture					
12	Political system					
.	Economic Factors:					
13.	Family member					
14	Inflation rate					
15	Poverty					
16	Money supply					
17	Insurance					
18	Market price					

19	Lower product price					
20	High input price					
21	Capital					
22	Credit availability					
23	Labor wages					
24	Market structure					
	Marketing Factors					
25	Cumber of consumer					
26	Consumer choice					
27	Supply of product					
28	Demand of product					
29	Product variety					
30	Availability of product in market (input, materials etc)					
31	Number of competitor in the market					
32	Location of the market					
33	Number of traders					
34	Different marketing policy (licensing, packaging, etc)					
35	High product price					

16. What would be the recommendations for value chain development which could help to influence entrepreneurship and reduce poverty in CHT

Interviewer

.....Date:.....

Checked by:

Supervisor:.....

Date.....

Annex3.2
Identifying Entrepreneurs and Value Chain Development of Some Selected
Fruits in Chittagong Hill Tracts
Questionnaire for Market Intermédiaires 2014

Sample no :

Respondent Type: **Foria** **Bepari** **Wholesale** **Aratder** **Retailer**

1. Personal information of respondents

Respondent's Name: _____ Mobile Number: _____

Village: _____

Name of Upazila: _____

Name of District: _____

Own district: _____

Religion Islam Buddhist Hindu Christian (Please tik):

Community Name Bangali Chakma Marma Tripura Tanchanga Mro Bawm (Please tik)

2. Socioeconomic Information Respondent:

Gender	Age	Marital Status	Family member	Effective family member	Family size	Education	Occupation	
							Main	Secondary

Code: Gender: Male = 1, Female = 2, Marital Status: Unmarried = 1, Married = 2, Family Member: 1-3 member=1, 3-5 member=2, 5-8 member=3, above 8=4, Education: Class 1-5=1, class 6-10=2, Class 11-12 =3, Graduate & above=4, Cannot read & write/ illiterate =5, Occupation: Farmer= 1, Fruit trader=2, Vegetable trader=3, Other business=4, Others (specify) =5

3. Contextual Information:

n) Experience on your business (actual years) =	1-3 years=1, 3-5 years=2, 5-8 years=3, 8-10 years=4, 10-13 years=5, 13-15 years=6, Above15=7
o) Business type	Sole business=1, Partnership=2, Contract business=3, Others(specify)=4
p) Mainly what products you deals =	Mango=1, Jackfruit=2, Papaya=3, Litchi=4, Malta=5, Orange=6, Guava=7, Baroi=8, Others (specify)=9
q) Source of finance=	Own=1, Bank loan=2, Neighbor =3, Friends=4, NGO=5, Others (Specify)=6
r) Collection point of fruits=	Farmers=1, Local Market=2, Farmers association=3, Others (specify)=4

s) Collection of fruits by		own=1,labor=2,cooperative=3,others(specify)=4
t) Selling point=		[Place] Local market=1,District market=2, Dhaka=3, Chittagong=4, Hathazari=5, Fenny=6, Others (Specify)=7
		[Person] End consumer=1, Bepari=2, Faria=3, Whs=4, Aratdar=5, Others(Specify)=6
u) Payment system of products		On Cash=1, On Credit=2, Advance payment before harvest=3, Payment after harvest=4, Both=5, Others(specify)=6.
v) What type of transport use during transporting fruits?		Truck=1 Van=2 Bus = 3 Local transport=4 Others(Specify)=5
w) Source of information (Product availability)		Friends=1, Relatives=2, Media (TV, Radio, Newspaper)=3, Business Community=4, NGO=5, Others(Specify)=6.
x) Source of information (product price)		Local market price list=1, Business community=2, Friends=3, Others(specify)=4

4. Transport related information:

	Total transport require for transporting fruits (for 1 season)	Operating capital (for 1 season)	Cost per week	Transport require per week	Total quantity per transport:
Mango					
Jackfruit					
Litchi					

5. Price related information:

		Purchase price		Sales price		Net price receive by traders
		Farmgate price	Local mkt	Local mkt	Other city (Dhaka/Fenny/Comilla/Ctg)	
Mango						
Jackfruit	Small(<4kg)					
	Medium(4-8kg)					
	Big (>8 kg)					
Litchi	China 2					
	China 3					

6. Cost and return from fruits marketing activities in the last one year

Sl No.	Marketing cost	Mango (Tk./kg)	Jackfruits (Tk./00pcs)			Litchi (Tk./00pcs)	
			Small (<4kg)	Medium (4-8kg)	Big (>8 kg)	China2	Caina3
1.	Transportation cost						

2.	Labor cost								
3.	Packaging cost								
4.	Loading and unloading								
5.	Market toll								
	-Bazar fund								
	-Union porishod								
	-Zila porishod								
6.	Rents								
7.	Staff salary								
8.	Electricity bill								
9.	Generator								
10	Business community charges								
11	Other charges								
	Total Marketing cost								

7. Number of total sales to different channels

	Mango (Tk. /kg)		Jackfruit (Tk. /00pcs)						Litchi(Tk. /000pcs)			
	Qt	In Tk.	Small <4 kg		Medium 4-8 kg		Big >8kg		China 2		China 3	
			qt	Tk.	qt	Tk.	qt	Tk.	qt	Tk.	qt	Tk.
Local market												
Bepari												
Faria												
Wholesaler												
Aratdar												
Others (specify)												

8. Problems in fruits marketing

		Yes/no
i.	Post harvest loss/spoilage is high	
ii.	Lack of transport facilities	
iii.	Poor communication	
iv.	Traders unavailability for hilly	
v.	High labor cost for transport fruits due to hilly area	
vi.	High packaging cost	
vii.	High license cost	
viii	Poor regulatory marketing system (Specific place/poor management)	
ix.	High market toll	
x.	Lack of agro processing industries	
xi.	Lack of storage facilities	

9. Channel and route related information

Sl. No.	Channels using by intermediaries	Route using by intermediaries	Distance

Bepari to consumer =1, Bepari to Faria =2,Bepari to Faria to whs =3,Bepari to Faria to whs to Aratder= 4,Bepari to Bepari=5,Faria to consumer=6,Faria to whs=7,Faria to whs to Aratder=8,Faria to whs to Aratder to consumer=9,whs to Aratder=10,whs to Aratder to consumer=11,others =12Production area to main town (Khagrachari/Bandarban/Rangamati)= 1,Collection area to main town = 2,Collection area to main town to dhaka=3,Collection area to main town to Chittagong= 4,Collection area to main town to fenny=5,Collection area to other city =6

10. Do you practice any type of value added process? Yes=1, No=2
If yes, what type of value added process you practice in your business?

Grading=1	Washing=2	Cleaning=3	Packaging=4	Labeling=5
Storing=6	Transporting=7	Processing=8	Advertising=9	Others(specify)=10

8. Factors influencing entrepreneurial growth and value chain development.

	Environmental factors Do you think that entrepreneurial growth and value chain development influence by	Highly disagree 1	Disagree 2	Either agree or disagree 3	Agree 4	Highly agree 5
1	Heavy rainfall					
2	Long time summer					
3	High temperature					
4	Fruit disease					
5	Climate change(Late rain, short winter season etc)					
6.	Product perishability					
	Social Factors :					
7.	Religion					
8.	Education					
9.	Family size					
10.	Ethnicity					
11.	Culture					
12	Political system					
.	Economic Factors :					
13.	Family member					
14	Inflation rate					
15	Poverty					
16	Money supply					
17	Insurance					
18	Market price					
19	Lower product price					
20	Input price					
21	Capital					
22	Credit availability					

23	Labor wages					
24	Market structure					
	Marketing Factors					
25	Number of consumer					
26	Consumer choice					
27	Supply of product					
28	Demand of product					
29	Product variety					
30	Availability of product in market (input, materials etc)					
31	Number of competitor in the market					
32	Location of the market					
33	Number of traders					
34	Different marketing policy (licensing, packaging, etc)					

11. Assess the postharvest loss of selected fruits (Tk./unit)

Postharvest technology	Do you practice it? (Yes/no)	Mango (Tk./kg)		Litchi (Tk./00pcs)		Jackfruit (Tk./000pcs)	
		qt	Tk.	qt	Tk.	qt	Tk.
12. During harvest							
13. Handling/Carrying							
14. Grading:							
-Small							
-Medium							
-Large							
15. Cleaning							
16. Packaging							
17. Storage							
18. Transportation							

14. What would be the recommendations for improving the performance of value chain development of fruits in CHT?

Ans:

InterviewerDate:.....

Checked by:

Supervisor:..... Date.....

Annex 3.3
Identifying Entrepreneurs and Value Chain Development of Some Selected Fruits in Chittagong Hill Tracts Questionnaire of Fruits Processor 2014

Sample no: _____

Respondent's Name:
Village/Para :

Mobile Number :
Union:.....

Upazila:.....
District (Please tik):

Khagrachari	Bandarban	Rangamati
-------------	-----------	-----------

Community Name
(Please tik)

Bangali	Chakma	Marma	Tripura	Tanchanga	Mro	Bawm
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Religion

Islam	Buddhist	Hindu	Christian
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(Please tik):

1. Socioeconomic information

Age of Respondents	Total member in family	Effective member in Family	Family Size	Level of Education	Land Ownership	Land Holdings (acre)	Occupational

Code : Age: <15yr = 1, 15-30 yr = 2, 31-45yr = 3, 46-60 yr = 4, Above 60 = 5, Family Size: Small $\leq 4 = 1$, Medium 5-7 = 2, Large $\geq 8 = 3$, Education: Illiterate= 1, Can sign only = 2, Primary = 3, Secondary = 4, SSC =5, HSC = 6, Graduate =7, Above = 8, Land Ownership: Landlord (renting out land) = 1, Owner cultivator = 2, Share Cropper = 3, Tenant (renting land) = 4, Landless = 5, Land Holdings(acre): <1 acre = 1, 2-5 acre =2, 6-10 acre = 3, 11-115acre = 4, 16-20 acre = 5, 21-30 acre=6, 31-50 acre=7, 51-70 acre=8, above 70=9, Occupational: Only Agriculture = 1, Agri + business = 2, Agri + Service = 3, Agri + Rickshaw/Van = 4, Day Labour = 5, Agri + Poultry = 6, Agri + Timber cutter = 7, Agri + Weaving = 8, Agri + Pig Rearing = 9, Agri + Nursery = 10, Jobless = 11, Only process fruits = 12

2. Contextual Information:

i. Year of establishment		
ii. Experience on your business (actual years)		1-3 years=1, 3-5 years=2, 5-8 years=3, 8-10 years=4, 10-13 years=5, 13-15 years=6, Above 15=7
iii. Distance to market from processing center		
iv. Total household of nearby the processing center		
v. Total number of household involves in this business		
vi. Training experience		Yes = 1, no =2
vii. Processing place		Own home = 1, Others home =2, Processing centre =3, Others = 4
viii. What type of transport use during transporting fruits?		Truck=1, Van=2, Bus = 3, Local transport=4, Others(Specify)=5
ix. Source of finance=		Own=1, Bank loan=2, Neighbor =3, Friends=4, NGO=5, Others (Specify)=6
x. Operating capital		

xi.	Collection point of raw materials=	Farmers=1, Local Market=2, Farmers association=3, Others (specify)=4
xii.	Selling piont	Neighbor=1, Collectors=2, Local Market=3, Wholesaler=4, Bepari=5, Foria=6, Cooperative=7, Others(Specify)=8
xiii.	Payment system of products	On Cash=1, On Credit=2, Advance payment before harvest=3, Payment after harvest=4, Both=5, Others(specify)=6.
xiv.	Source of information (Product availability)	Friends=1, Relatives=2, Media (TV, Radio, Newspaper)=3, Business Community=4, NGO=5, Others(Specify)=6.
xv.	Source of information (product price)	Local market price list=1, Business community=2, Friends=3, Others(specify)=4
xvi.	Amount require for product licensing.	
xvii.	Total days of validity of license.	
viii.	Do you have any training experience on agricultural product processing? If Yes, from where you get training	Yes = 1 No = 0
xix.	Does local Government helps you in production/marketing of process fruits?	Yes=1 No=0
xx.	If yes, what type of helps?	
xxi.	Does BSTI/DAMO(District agricultural marketing officer) helps you in proper licensing of your products?	Yes = 1 No =0
xxii.	IF yes, what types of helps?	

3. Information about products & raw materials

SL No.	Name of processed product	Input used	Source of input	Total quantity of input requires	Input Price

4. Problems in process fruits production:

Do you have a problem in

		Yes =1	No = 0
i.	Poor knowledge about modern process fruits production technology.		
ii.	Fruits perish ability.		
iii.	Non availability of good quality of raw materials.		

iv.	Lack of capital.	
v.	Lack of credit facilities	
vi.	Non availability of raw materials.	
vii.	Lack of processing facilities	

5. Channel and route related information

Sl. No.	Channels using by fruits processors	Route using by fruits processors	Distance

Bepari to consumer =1, Bepari to Faria =2,Bepari to Faria to whs =3,Bepari to Faria to whs to Aratder= 4,Bepari to Bepari=5,Faria to consumer=6,Faria to whs=7,Faria to whs to Aratder=8,Faria to whs to Aratder to consumer=9,whs to Aratder=10,whs to Aratder to consumer=11,others =12Production area to main town (Khagrachari/Bandarban/Rangamati)= 1,Collection area to main town = 2,Collection area to main town to dhaka=3,Collection area to main town to Chittagong= 4,Collection area to main town to fenny=5,Collection area to other city =6

6. Information about process fruits marketing cost and return:

6.a. Marketing cost

Items	Marketing cost							No of transport mood require	Total marketing cost
	Transportation	Wages	Wastage	Market toll	Loading/unloading	Packing	Donation/charges		
	1	2	3	4	5	6	7		

6.b. Return of process fruits:

Sl No	Product Name	Quantity sale in last year	Total Packet Sell	Total quantity per packet	Price per packet	Expiry date of per packet

7. Problems in process fruits marketing

		Yes = 1 No = 0
i.	Post harvest loss/spoilage is high	
ii.	Lack of transport facilities	
iii.	Lack of storage facilities	
iv.	Lack of agro processing industries	

v.	High license cost	
vi.	High packaging cost	

8. Solution of problems:

Production side:	Marketing side:

9. Factors influencing entrepreneurship and value chain development.

	Environmental factors Do you think that entrepreneurial growth and value chain development influence by	Highly disagree	Disagree	Either agree or disagree	Agree	Highly agree
		1	2	3	4	5
1	Heavy rainfall					
2	Long time summer					
3	High temperature					
4	Fruit disease					
5	Climate change					
6.	Product perishability					
	Social Factors:					
7.	Religion					
8.	Education					
9.	Family size					
10.	Ethnicity					
11.	Culture					
12	Political system					
.	Economic Factors:					
13.	Income of family member					
14	Inflation rate					
15	Poverty					
16	Money supply					
17	Insurance					
18	Market price					
19	Lower product price					
20	Input price					
21	Capital					
22	Credit availability					
23	Labor wages					
24	Market structure					
	Marketing Factors					
25	Number of consumer					
26	Consumer choice					
27	Supply of product					
28	Demand of product					

29	Product variety					
30	Availability of product in market (input, materials etc)					
31	Number of competitor in the market					
32	Location of the market					
33	Number of traders					
34	Different marketing policy (licensing, packaging, etc)					

10. Opportunities for value addition of selected fruits for value chain development (please think)

Mango		Jackfruit		Litchi	
Dried mango		Jackfruit candy		Litchi juice	
Mango pulp		Jackfruit chips in plastic poly bags		Canned litchi	
Juice		Jackfruit muffins		Dehydrated litchi	
Mango pickle		Dried jackfruit		Litchi sorbit	
Green Mango juice		Frozen jackfruit		Dried litchi	
Mango yoghurt		Jackfruit juice		Litchi capsule	
Mango leather with strawberry(aamsotto)		Jackfruit jelly		Litchi diet fruit extract	
Mango bars		Jackfruit custard		Litchi juice with aloe vera	
Mango chutney		Jackfruit pappadam		Litchi honey	
Mango pie		Jackfruit pitha			
Mango pudding		Jackfruit icecream		Litchi cake	
Mango cakes		Dried jackfruit		Dried litchi	
Mango jam		Jackfruit chips in plastic big pots		Litchi face wash	
Mango Nectar		Jackfruit cukiies		Litchi fairness lotion	
Murabba		Dehydrated jackfruit			
Mango kaju katli		Frozen Green jackfruit			
Creamy MangoSmoothie		Jackfruit honey			
Mango chips		Jackfruit jam			
Mango milk		Canned jackfruit			
Mango biscuits		Packed jackfruit			
Fruit sauce, ketchup		Jackfruit biscuits			
Cup mango		Jackfruit dessert			
Mango Ice cream					
Fresh Mango roll					
Mango candy					
Mango lassi					
Canning fresh					

mango					
Mango muffins					
Mango chocolate cakes					
Mango jelly					
Mango papad					
Mango cream roll					
Mango burfi					
Mango mask					

11. What would be the recommendations for upgrading existing value chain which could help to influence entrepreneurship and reduce poverty in CHT.

InterviewerDate:.....

Checked by:

Supervisor:..... Date.....