

**A REGIONAL PATTERN OF TEA GARDEN AND TEA
PRODUCTION IN BANGLADESH**



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Declaration

I hereby declare that this Ph.D. thesis entitled “A REGIONAL PATTERN OF TEA GARDEN AND TEA PRODUCTION IN BANGLADESH” is carried out by me for the degree of Doctor of Philosophy in Geography and Environment, University of Dhaka under the guidance and supervision of Professor Dr. Nasreen Ahmad,.

The interpretations put forth are based on my reading and understanding of the original texts and they are not published anywhere in the form of books, monographs or articles. The books, articles and websites which I have used acknowledged at suitable places.

For the present thesis, which I am submitting to the University, no degree or diploma or distinction has been conferred on me before, either in this or in any other University.

(Md. Zakirul Islam)

Certificate

This is to certify that the work incorporated in the thesis on “A REGIONAL PATTERN OF TEA GARDEN AND TEA PRODUCTION IN BANGLADESH” by Md. Zakirul Islam in the Department of Geography and Environment, University of Dhaka, was carried out under my supervision.

Professor Dr. Nasreen Ahmad

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Md. Zakirul Islam

**Dedicated to My Father (Md. Fazlur Rahman) and
My Mother (Late Joynab Begum)**

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Abbreviation

BCS	:	Bangladeshiyo Cha Sangsad
BCSU	:	Bangladesh Cha Sramik Union
BIM	:	Bangladesh Institute of Management
BTA	:	Bangladesh Tea Association
BTB	:	Bangladesh Tea Board
BTESA	:	Bangladesh Tea Estate Staff Association
BTRI	:	Bangladesh Tea Research Institute
MTC	:	Management Training Centre
NTC	:	National Tea Company
TTAB	:	Tea Traders Association of Bangladesh

Abstract

Tea is a popular and easily available beverage in Bangladesh. It has been developed as an agro based industry over the last 160 years. In the past, it was an important cash crop and was an important source of foreign currency. However, since 1990s, tea export has been decreasing gradually, but overall production and per hectore yield has been increasing. However, it has been observed that per hectore yield in Bangladesh is still lower than India, Kenya, Sri Lanka and many other countries. In these circumstances, the study was conducted on tea industry of Bangladesh. The broad objective of the research is to study the tea industry in Bangladesh in its totality. The research finds out that the present scenario of tea industry with factors at garden level put influence on production.

In this research, conceptual framework has been developed on the basis of study goals. The conceptual framework of industry cluster is elaborately described how the industry runs and supply chain described the functioning of the industry cluster. The concept of tea garden described about the structure of tea garden in Bangladesh. The production concept identified production related factors. The regional pattern identified the tea producing region and its physical and social characteristics. There are many variations of physical factors of three tea producing regions. Such as physiography, topography, rainfall, temperature etc. The tea garden of North-east and South-east region is situated in the hilly area. But the tea gardens of North-western region are situated in the plain land which is known as Himalayes piedmont plains. The topography of tea land of North-east and South-east region is tillah, high tillah and low flat. On the other hand, the topography of Northern region is plain but sandy with rocks and rubble underneath. The soil of Northern region is well drained and free from normal flood.

Among the three regions North-east region produced highest quantity of tea. At the same time, per hector yield has been increased in Northern region.

The study reveals that there are differences in the management of the large and small gardens. Such as soil fertility and PH, labourer availability, plant types, size, age, ratio, source, fertilizer and pesticides using status, shading, culture of plucking green leaf.

On the other hand, the labourers who are working in the garden of North-east and South-east region were brought from different States of India. There are also differences between the traditional and new labourer. The study at labourer level focused on their culture, demography, economic life, benefits, working experience, involvement trend in garden, nature of employment, training, awareness about labourer law, communication with others and mobile phone using status.

At consumer level, the study shows tea drinking habit and culture of consumers, trend of other beverages drink. The study also shows that the countrywide tea expenditure is about 35 4,040 million taka which plays a significant role in the tea economy.

Chapter-1

General Introduction

1.1 The Problem

Tea is a popular and available beverage in Bangladesh. It has been developed as an agro-based, labour intensive and export-oriented industry over the last 160 years. Once upon a time, it was an important cash crop in Bangladesh and earned a lot of foreign currency. In 1980s, tea was in the second position in the export of Bangladesh (Boonerjee, 1986). But from 1990 to 2014 tea exports more or less decreased gradually. In 1990, Bangladesh exported tea worth 1565.7 million taka which in 2014 only 133 million taka. On the other hand, Bangladesh started importing tea to fill up the internal consumption demand. In the year 2014, tea production was 63.86 million Kg from 59,609 hectares tea area which was 23.84 million Kg from 43,205 hectares tea area in 1972. In 1972, per hectare yield was 552 Kg which increased up to 1239 Kg in 2014. In our country per hectare yield increases but still now it is lower than India, Kenya, Sri Lanka, Argentina, Vietnam, Indonesia and many other countries. So, this is the general problem that tea plantation expansion and production increases gradually but our export ratio is decreasing day by day. Decline in export is most likely due to inability to compete with other tea producing countries, lack of adequate high yielding varieties, quality of tea and also home consumption. At the same time, large consumption market of the country is broadly responsible for declined export. There is also technical and management problem of tea industry. Now, Bangladesh is importing tea from different countries more than export. Day by day our import quantity is increasing and for this purpose a lot of foreign currency is expended every year.

Tea industry in Bangladesh has been facing many problems besides its important role to the internal consumption, export market and economic significance. Many industries like

fertilizer, pesticides, machinery and spare parts, packaging, transport are related to the tea industry. There is hardly specific and systematic relation between tea industry and its supporting industry.

Old tea bushes, lacking of ensure quality at the processing level, re-plantation less than mandatory expansion, insufficient of production both land and labourer; lack of high yield varieties, shortage of skilled hands; old machinery and technology, insufficiency of factories, unplanned use of chemical fertilizer and pesticides, lack of quality pesticides, shade tree vacancies, inadequate planting materials, misuse of tea plantation land, dissatisfaction of labourer, imbalanced distribution of labourer, various disease of tea plants, poor transport system of link roads, marketing system; lack of training in both management and labourer level; poor management, political unrest, climate change are the important factors facing tea industry. Besides these, large consumption market is also an important challenge for tea industry.

It is felt that, if number of gardens, production and quality of made tea cannot be increased the country tea industry will be not able to perform in the global competitive market. And there will be an increasing import quantity, to meet the demand of internal consumption. In this situation tea industry needs to make more concentrated efforts to increase production through proper use of planting method and demand oriented policy. It is very much important to investigate the management pattern of tea gardens and the labour at the garden level and tea drinking behavior of consumers who are directly involve the industry. In such circumstance, it is essential to know the present status of tea industry in Bangladesh and take initiatives according to the necessities.

1.2 Objectives of the Research

The objective of this research is to study the tea industry in Bangladesh in its totality. There are many factors involved in the overall production system. This study intends to identify the evolution and history of tea industry, historical background of traditional and new tea garden, influencing physical factors, regional pattern and spatio-temporal pattern of tea industry, clusters of tea industry, past and present condition of management pattern, labourer working environment and living condition, tea drinking behaviour of consumer, problems and predicted the future possibility.

Broad Objective of the Study

Broad objective of this study is to identify **A Regional Pattern of Tea Garden and Tea Production in Bangladesh.**

Specific Objectives

Along with the above broad objective, following five specific objectives that have been selected in order to identify the real scenario of tea industry in Bangladesh. These are-

1. To briefly describe the evolution and history of tea plantation in Bangladesh.
2. To identify the key factors that influence tea plantation and productivity in the different regions of Bangladesh.
3. To analyse a temporal variation in the growth and production of tea in Bangladesh.
4. To explain the cluster characteristics of tea industry in Bangladesh.
5. To explore the problems in the growth and production of tea through an analysis of a supply chain.

1.3 Justification of the Study

The traditional tea garden of Sylhet and Chittagong hilly region date back more than one and half century. On the contrary, after a long time, the tea plantation of Panchagarh started only sixteen years ago. Beyond the traditional tea garden of north-east region and just after south-east region, Panchagarh is the largest tea growing district of northern region in Bangladesh and tea industry here is fast gaining importance. Tea plantation in Panchagarh started in plain land which is new a concept in Bangladesh. There is another characteristic that a large number of small growers and holders here who planted tea like an agricultural product with small scale. But there has been no contemporary research of tea industry in Bangladesh that shows the present status of tea industry and encompasses the three regions and predicts the future prospect. There are many differences among the three tea producing region, physiographically the tea growing areas are different, difference also exist in management practices and in the socio-cultural practices of the involved people here. Besides these, it is also important to know the tea drinking behavior of consumers and its economic significance.

On the other hand, tea is one of the largest industries in Bangladesh. Previously it was a dominant export industry like jute. But day by day this industry is not being capable to compete with the international market. Even after 160 years of tea plantation, we do not have our own brand of traditional tea to export in the international market. We blend our made tea with other countries' tea and export as their brand. But it is a welcoming news for tea industry that new organic tea garden of Panchagarh district introduced a new brand named "Tentulia" which export a small scale in different countries like-United States of America, United Kingdom, Malaysia, Russia, Japan and Germany. Organic tea is show the ways to other tea industries. If the quality of our traditional made tea can be ensured and if we can try to make a brand the export scenario of the industry will be changed.

Our production area has increased, a new region which is situated in the North-western part of the country has been included as tea producing area and the total production has been gradually increased with setbacks due to natural or management causes. At the same time, internal consumption has also increased on a large scale. According to BTB, every year a minimum of 10 lakh people of the country is added to the tea drinking community. More than 1.33 lakh labourer directly working in this industry and most of them are women. And above 4.15 lakh people depend on this industry.

Tea industry has many problems that need to be addressed and overcome if we want to make it overcome nationally and globally. The main justification for selecting tea industry was its large production area, large employer field, poverty alleviation and women empowerment, wide consumption and export market, related supporting industry, economic importance and prospective industry. This study has laid emphasis on the changes that have taken place in the tea industry over the years.

1.4 Conceptual Framework

Conceptual framework is a theoretical structure of assumptions, principles and rules that holds together the ideas comprising a broad concept. It is an analytical tool with several variations and contexts which used to make conceptual distinctions and organize ideas. It explains either graphically or in narrative form, the main things to be studied, the key factors, concepts or variables and the presumed relationship among them (Miles and Huberman, 1994). Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply. The conceptual framework of this study developed accordingly.

1.4.1 Concept of Tea Industry Structure and Cluster

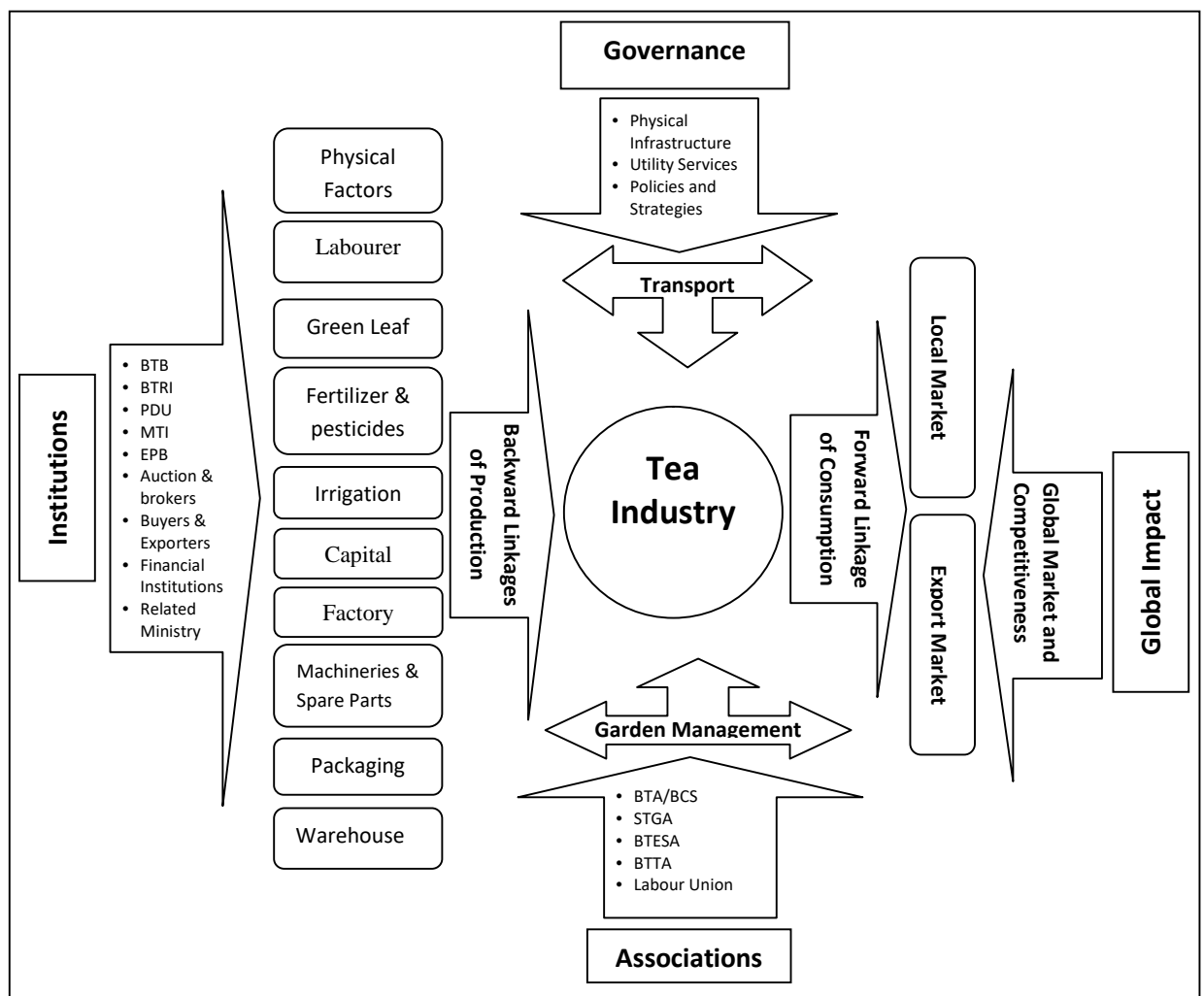
There are six major tea producing districts in Bangladesh. These are five traditional tea producing district of Maulvibazar, Sylhet, Habiganj, Chittagong and Rangamati and one new tea producing district Panchagarh. Besides these, three other districts; Thakurgaon, Lalmonirhat and Bandar Ban started tea plantations and from the beginning of 21st century tea plantation in small land blocks became increasingly popular leading to the development of tea sector in the country. At present, comparatively large tea gardens exist in three regions while small growers and holders are dominant in North-western region of the country. Small growers and holders is an important feature of tea plantation in Bangladesh. Unlike the large garden of North-east and South-east region, farmers in small plots took up planting tea here. This has far reaching poverty alleviation implications with positive distributional consequences.

Figure 1.1 shows a conceptual map of tea industry in Bangladesh, which includes various factors directly related to tea industry. Without these factoral conditions the nature of tea industry cannot be understood properly. The facts such as institutional and governance issues, markets local and global; and essentially the backward and forward linkages, the dynamics of tea industry will not be understood.

Clusters are geographic concentrations of interconnected companies and institutions in a particular field. It is encompass an array of linked industries and other institutional and market entities important to market competition. They include suppliers of specialized inputs such as components, machinery, and services and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, clusters include governmental and other institutions.

Industry cluster model recently developed by Asian Development Bank. The tea industry cluster model prepared on the basis of this model. Tea industry cluster model shows how the industry runs its activities from production to consumption. This model depicted the backward and forward linkage, activities of related institutions, garden management system, significance of transport and governance. In tea industry the backward linkages of production are physical factors, green leaf, fertilizer, pesticides, irrigation, capital, factory, machineries, spare parts, packaging and warehouse etc. labourer are the most important backward linkage of tea industry cluster. Every sphere of production at garden level and in factory, labourers play a significant role. The productivity of the labourer

Figure 1.1: Cluster of Tea Industry in Bangladesh



factory, machineries, spare parts, packaging and warehouse etc. labourer are the most important backward linkage of tea industry cluster. Every sphere of production at garden level and in factory, labourers play a significant role. The productivity of the labourer

has an impact on production. So, in this study, field survey conducted on labourers to know their living standard, working environment and other related issues.

On the other hand, performance of tea industry depends on the activities of few related institutions. Bangladesh tea board is the mother organization of tea industry. Auctioneers, brokers, buyers and exporters have significant role on tea market. They control the tea market. In tea industry in cluster, BCS and BCSU are the dominant association. They also look after their own interest which influences on production. The functions of the related institutions detailed discussed in this study. At the same time, tea industry needed proper transportation system for carrying green leaves with other materials.

The performance of a garden also depends on the proper management of garden. At garden level, mostly manager plays significant role and they known as planter. They directly work in tea garden and look after the plantation. For this, field study conducted on management level that is directly involved in production performance. Governance has also significant role in tea industry. The government has introduced politics to develop tea industry. There are also various types of infrastructure, research activities and utility services needed to property work the industry.

The success of the industry depends on forward linkage of consumption market both national and global competitiveness. The success of all linkages depends on competitiveness of forward linkage. Tea industry has local and global consumption market which work as forward linkage. As Bangladesh have a large internal consumption market, the study also explorer the consumers tea drinking behaviours and economic significance.

1.4.2 Concept of Tea Garden

Tea garden means where planted tea produce green leaf for consumption as beverage. Tea production depends on some specific physical factors which influence distribution of tea

garden and production. According to BTB, there are three types of tea garden on the basis of tea plantation area. These are estate or garden, small holder and small grower. According to the definition of BTB, those who planted up to 2.02 hectares land is called small grower. Again those who planted between 2.03 to 8.1 hectares land is called small holder. And where plantation is more than 8.2 hectares land, it is known as estate or large garden.

Large gardens are mainly situated in the hilly area of Sylhet, Maulvibazar and Habiganj district in North-east region, Chittagong and Rangamati district in South-east region and recently included are plain lands of Panchagarh district in North-western region. A large garden is situated in Brahmanbaria district (to the North-east) which is not functioning. On the other hand, besides the traditional concept of large garden, small scale plantation started in Panchagarh and geographically concentrated at Tetulia, Atowary and Panchagarh sadar upazilla. The general farmers involved in small scale plantation have no pre experience.

The large garden owners have an association known as Bangladesh Cha Sangsad and work for increasing their internal cooperation, development and negotiation with related organization. BCS have categorized tea gardens for various purposes. The main purpose of categorization is to ascertain the provision of the agreement between BCS and BCSU. The members of BCS pay the wages to employee and labourer on the basis of garden category. According to the agreement, tea garden under BCS has been categorized into three types. These are A, B and C This category varies on tea producing region. The tea gardens are categorized on the basis of average production of the preceding three years. In South-east region Category 'A' - produces an average of 180,000 kg or more tea per annum; Category 'B' - produces an average of 108,000 kg of tea or more but less than 180,000 kg per annum and Category 'C' - produces an average of 27,000 kg or more but

less than 108,000 kg per annum. In North-east region Category 'A' - produces an average of 113,000 kg or more tea per annum; Category 'B' - produces an average of 45,000 kg or more but less than 113,000 kg per annum and Category 'C' - produces an average of less than 45,000 kg per annum. It is also needed to be mentioned that BCS did not categorize the large garden of North-western region have been due to non-member of the organization.

1.4.3 Concept of Tea Production

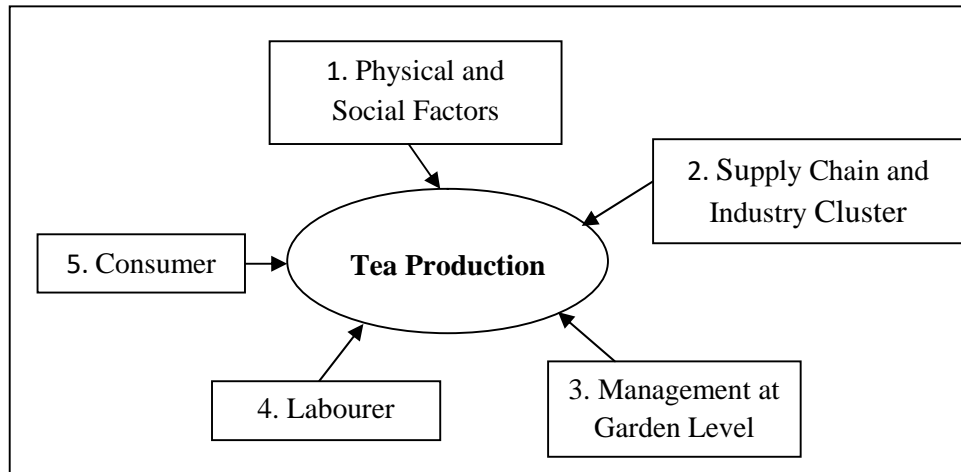
Production is a process of combining various material and immaterial inputs in order to make something for consumption. It is the act of creating output, a good or service which has value and contributes to the utility of individuals (Kotler et al., 2006). There are many factors involved with production system. Factor of production is an economic term that describes the inputs that are used in the production of goods or services in order to make an economic profit. These production factors are also known as Management, Labourer, Machines, Materials and Knowledge has recently been talked about as a potential new factor of production.

Tea production is a process where many physical and social factors are involved. It requires specific physical factors such as physiography, topography, soil, climatic factors. There are a number of backward and forward linkages of production and consumption, governance, utility services involved in tea production. Institution and association also influence tea production. The whole production system of tea industry depends on a smooth supply chain.

The management authority of a garden is directly involved in production. So, the plantation method maintenance capacity, expertise and potentialities at management level

have an important role on tea production. Besides these, labourer plays the significant role in tea production process. Traditional labourer of North-east and South-east region

Figure 1.2: Production and Related Factors



had been brought from different places of India. But in North-western region, the local people are involved in production process. So, between the two, their culture, living standard and working environment pattern is different.

Labour characteristics, their involvement in tea garden, living standard and working environment influences overall production. On the other hand, large internal consumption market in the country has an impact on tea production. At the same time, widening global consumption market where Bangladeshi tea has a potential prospect, is also a factor which influence on production.

1.4.4 Concept of Supply Chain

The term supply chain supply chain management has steadily increased since the 1980s (Lummus and Vokurka, 1999). Where as a supply chain is an entity that exists to fulfill customer demand, supply chain management involves over management efforts by the organizations within the supply chain to achieve results (Mentzer et al., 2001). According to the Council of Supply Chain Management Professionals (2010), the material and

informational interchanges in the logistical process, stretching from acquisition of raw materials to deliver of finished products to the end user. All vendors, service providers and customers are linked in the supply chain. Network of organizations that are involved, through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer (Martin, 1992).

Mapping the tea industry supply chain helps to aid industry's understanding of the production systems operating within the cluster, the value adding elements and the linkages to other supporting industries and services. The tea industry's supply chain shows that the industry cluster has a strong multiplier effect on employment and production. The Raw material was produced in few districts of three regions of the country. Above 99% of green leaves are supplies of the large gardens. On the other hand, small quantities of green leaves are supplied by small growers and holders. But the small growers & holders are gradually increasing their contribution to the overall supply.

1.4.5 Concept of Regional Pattern

Region is an area of a country, especially one that has a particular characteristic or is known for something. A region is any space that is distinct from another area. The term regional pattern uses in the study to explain the tea region and tea garden with production management. There are three tea producing regions in Bangladesh. These regions are North-east, South-east and North-western region. The North-east and South-east region started tea plantation almost at the same time taking advantages of physiographical similarities. The plantation process and management practice of these two regions are also almost same. The labourers of these two regions have been collected in the same way. The land ownership pattern of these two regions is same. According to the

concerned authority, all the garden of North-east and South-east region have been established by taking land leased from the government. We may term the tea gardens of North-east and South-east region as traditional gardens. On the other hand, the gardens of North-western region started in the plain land only 16 years ago. So, we can say the garden of North-western region is new garden or plantation.

Most of the large gardens are concentrated in North-east region and majorities are concentrated in Maulvibazar district. The tea land area and production is uppermost in Maulvibazar district than others. Tea garden is also established in the hilly areas of Sylhet and Habigong district in North-east region. Chittagong is the only major tea producing district of South-east region. There is only one tea garden in Rangamati hilly district. On the other hand, the new plantation of North-western region is dominated by small growers & holders. The general farmers planted this small tea garden. Besides these, there are large gardens established in North-western region. The source of the land for tea is one of the basic differences between traditional and new garden. The traditional tea garden were established by taking land lease from the government. On the other hand, the large gardens of North-western region have been established by purchasing land and small growers & holders, planted their own or purchased or family's land. There is also difference of management pattern between traditional and new garden. Difference exists in tea culture, employment pattern and socio-economic life between the labourer of traditional and new garden. On the other hand, the consumer pattern of different administrative regions represents the tea drinking behavioural scenario of the country and its economic significance.

1.5 Challenges and Limitations of the Study

The main challenge of the study was data collection from primary data. It was a large task to collect data from 35 tea gardens in the hilly and remote area of Sylhet, Maulvibazar, Habiganj, Chittagong and Panchagarh district. Besides these, data has been collected from 58 small growers and small holders of Panchagarh district from different upazilla. There were some problems to obtain permission for research from the management level of several tea gardens. There were also some limitations from the respondents of tea garden management due to their own Company policy. On the other hand, the labourer were very eager to express their opinion but was unwilling to give their interview without the permission of the concerned authority and panchayet leaders. After the permission by the authority and panchayet leader they agreed to give their interview. A modest number of the labourer denied giving their information due to ignorance and in some cases it was difficult to understand their language. At the same time, it is needs to be mentioned that it was also difficult to explore the tea drinking behaviour of consumers in different administrative units of the country.

Besides, there seems to be no contemporary research on the overall tea industry that yielded comparative data of the tea plantation region in Bangladesh.

1.6 Organization of the Thesis

The thesis has been divided into 13 chapters. Chapter 1 contains introduction of the thesis. Chapter 2 presents the review of literature on the theoretical frameworks of tea industry. This chapter gives both the national and global contemporary knowledge about tea industry. Chapter 3 is about the research design and methodology. This chapter discusses in detail the different methods employed in this study. In addition, it also

describes the study areas, criteria of selecting respondents and methodology of analysis. Chapter 4 describes the historical background of tea plantation including dominant tea producing countries. This chapter also elaborately describes the historical background of traditional and new tea plantation of Bangladesh and draws a profile of origin, ethnic background and language, culture of traditional and new labourer of tea producing regions in Bangladesh. Chapter 5 elaborately describes the key influencing factors of tea plantation. There are some physical and other social factors which influences on production. Chapter 6 depicted the world tea scenario. Tea area, production, consumption and export trend of the major countries discussed here. The competitiveness of Bangladesh tea industry in the global context also analysed here. Chapter 7 shows the temporal changes of tea industry in Bangladesh. In this chapter, the changes of tea area and garden, production, consumption, export and import trend elaborately discussed and analysed. Chapter 8 shows the tea industry cluster model and supply chain system of the industry in Bangladesh. This chapter depicted how the tea industry runs and the significance and role of backward and forward linkage, institutions, associations, management and governance. This chapter also shows the necessity and present scenario of utility services and transport system. Chapter 9 deals the garden management system and reveals the acute factors at garden level. This chapter elaborately discussed and analysed the real scenario of management and depicted the acute factors which influences on production and tea quality. Chapter 10 shows the labourers living and working environment. Their household demographic characteristics, focused on household economic life, trend of involvement in tea garden etc. Chapter 11 analysed the consumers' tea drinking behaviour and predicted probable expenditure on tea consumption. Chapter 12 depicted the summary of findings of the study. Finally, Chapter 13 provides the conclusion and policy implication.

Chapter-2

Literature Review

2.1 Factors Affecting Tea Production

Production efficiency is very much important for an industry. Cost effectiveness of a industry depends on production efficiency. But production efficiency may be affected by various co-related factors. The effective functionate of tea industry depends on production efficiency. A number of tea industry related studies has been conducted by researchers at higher educational institutions or other related institutions. Most of the studies mentioned the factors which affect the efficiency of production by their analysis or observation or experiment.

Assaduzzam (1967) conducted a study and found that production efficiency depends on relief, soil, climate, labourer, compulsory extension of tea area, uprooting, replanting, technical personnel and management characteristics. Efficiency reflects the influence of social, economic and historical factors. This study evaluated the historical development of the plantation which had major effects on location, management and other related factors. He showed that there is a strong correlation between labourer and tea yield. Skilled and sufficient labourers have an important influence on production efficiency.

Uddin (1994) conducted a study to investigate physical factors which influence the geographical distribution of tea industry, examined the present situation and assessed the increasing acreage under tea, production and export. Physical factors especially the climatic factors such as rainfall, temperature, humidity, evaporation, droughts are affecting factors of production efficiency. The study also described tea industry related physical and cultural aspects, tea processing, marketing, agro-techniques and trends of the

industry. Uddin also mentioned that the social, economic, political and institutional factors have very significance role in tea industry. Agro techniques of tea plantation controlled the yield of tea. The study showed that the labourer efficiency of tea industry also act as an important dominating factor in total production. There is a strong correlation between labourer and yield. Systematic procedure from seed to harvesting has an important significance for production efficiency. Least square line or trend line method was used in the study to analyse the trends of yield, production and export. The study also investigated the factors which are responsible for variation in performance of inter tea estates, assessed inter tea estates variations, labourer efficiency and capacity or other resources, methods and measures to solve the problems.

Latifi (2009), in his study mentioned the factors which affected tea production efficiency in Bangladesh. He mentioned that production affecting factors are physical factors, management & welfare facilities, role of different organizations, cost analysis, marketing aspects, yearly production performance. Sabbir (2006) conducted a study and mentioned some causes affecting the efficiency of production. Over 50 years age tea bushes is one of the major cause which affects production efficiency.

Majumder (2015) mentioned, over aged tea bush, unfavorable climatic situation and poor fertility are mostly responsible for low productivity. The productivity of tea plantation worker in our country is far less than other tea producing countries in Asia and Africa. These factors affect tea production efficiency of the country. Low production and high production cost are the main characteristics of tea industry in Bangladesh. Both demand and supply factors are responsible for this situation.

The over age of tea plant, environmental (rainfall, temperature, soil carbon, soil Ph etc.) and management factors affected the efficiency of tea production (Datta, 2011). The study

found that tea yield is correlated with rainfall and it has a weak but significant correlation with organic carbon. Plant age had a negative and fertilizer application a positive effect on tea yield. The study analysed tea yields as a function of Genotype, Environment and Management (G×E×M). Statistical modeling and spatial analysis were used for different tea estates to detect the degree of relationship between G×E×M and tea yield. Remote sensing and spatial data have been used to monitor re-plantation at different scale of selected tea estates. Plant age and N, P and K fertilizer application showed that it affects on tea yield. Monthly rainfall had a significant positive effect on monthly yield. A model CUPPA¹ (1998) developed in Tanzania was used for analysis to obtain data from the trial field of the study. Statistical methods and remote sensing can be used as efficient tools for quantifying and monitoring tea re-plantation and to study the quality of tea. Using technology in tea plantation might improve the productivity and optimize plantation input costs. The study mentioned that remote sensing can be used for future monitoring.

A study conducted by Tirkey (2005) in Darjeeling district, investigated the factors which affected tea production efficiency of the study area. He found that over ages of tea plants, productivity stagnation, land degradation, vegetation, forest, land use pattern, land resources, water resources and socio-economic condition of the workers affected the production efficiency. He mentioned that the prime productivity age is 40 to 60 years tea bushes. The older tea bushes do not yield sufficient crops even at the best 'peak seasons'.

As the plants

aged, tea production steadily went down. In the post independence era (After 1947), the Indian planters restored to intense use of chemical fertilizer for increasing the production instead of replanting new plants which affected the production in the long run.

¹ CUPPA-Model: A simulation model describing seasonal yield variation and potential production of tea.

Baffes (2004), conducted a study to examine the performance of Tanzanian tea sector and identifies policy-driven impediments, especially for the smallholder sector. It looks at the cause of its poor performance, evaluating policy reform initiatives and exploring alternatives in the context of the world tea market. In Tanzania, commercial production began in 1926 at Usambaras and Njombe. Tea industry there provided employment of more than 50,000 families of the country. Tanzanian tea is grown under two systems- by smallholders, on plots averaging less than a hectare and on large estates, which often exceed 1,000 hectares.

The studies cited some constrains of tea industry which affect production efficiency. The constrains being low prices and late payments by the tea authority, old and inefficient processing factories, inadequate use of inputs, rundown transport equipment, poorly maintained feeder roads and low yields. Other constraints are complex taxation system, high rates of taxation, import and export bans (increase the burden on tea sector). Tanzania took initiative to revamp production after deterioration of two nationalized estates. The first step was privatization and rehabilitation of the two mentioned tea authority estates, which took place from 1988 to 1993. Rehabilitating the east Usambaras, tea estates of separating regulation and small holder promotion or privatizing tea authority owned factories or reviving research, restructuring the local tea blending and packing industry.

Besides the above mentioned, there are some economic factors affecting tea production in the world. One of the major economic factors that affect tea production is monopoly by the large tea companies. Unless this monopoly is managed properly, the future of tea production will remain unpromising. The tea industry needs to be managed properly to ensure that other stakeholders can venture into the tea market successfully. This way, planters will be able to sell their tea at high prices which will motivate the other economic

factors. Delayed payments and funds mismanagement also affect tea production efficiency.

Fluctuation of tea prices in the market also affects tea production in most countries. This is because when prices fluctuate, planters may get low payments than they expect and this in turn affects their morale to produce more tea.

2.2 Component of Tea Quality

Tea quality is very important in order to compete in the competitive consumption market in home or abroad. Quality is an important factor influencing its prices. There are many companies, institutions or individuals who produce made tea but many of them don't maintain tea quality due to aspiration of high profit, lack of proper knowledge or other causes.

Made tea quality depends on some components of green leaf and maintaining manufacturing process. The quality is determined based on its grading, colour of the leaf, make and style, sorting, feel, colour and quality. Factors like colour, appearance and flavour jointly make up the quality of tea. These factors are influenced by the levels of chemical constituents produced during manufacture (Wood and Roberts, 1964). Caffeine plays a vital role in tea quality characteristics such as briskness and other taste properties (Chowdhury et al., 1991). Caffeine is a white, bitter crystalline alkaloid and is a component that stimulates the nervous system. A cup of tea contains about 40 mg of caffeine. The quality of tea is determined by the composition of tea leaves and the tea processing techniques (Ravichandran and Parthiban, 2000). The processing can be tracked and controlled while the chemical composition of tea leaves is more difficult to monitor (Wright et al., 2000). The traditional way of tea quality testing requires a lot of

professional knowledge. The process is handled by experienced tea experts, who smell, taste and compare tea colour with certain standards (Acland, 1971; Shankar et al., 2003)

A study was conducted by Rong (2009), who analysed on the concentration of tea quality related compounds using reflectance spectroscopy². The study experimented among six varieties of tea in a garden of China. Rong mentioned almost two hundred varieties of Bio-chemical compounds, both volatile and non-volatile present in tea such as caffeine, tea polyphenols, proteins, amino acids, soluble sugar, volatiles, lipids, vitamins and each of these compounds contributed to tea quality. The concentration of amino acids, tea polyphenols and caffeine are considered to be the main factors in determining the quality of tea. The development of reflectance spectroscopy opens the possibility of predicting tea quality in an efficient and non-destructive way, in contrast to the traditional wet-chemistry³ way. Spectra were mean-centre transformed in order to increase the prediction accuracy of Punjab Land Records Society (PLRS) models. The study showed that reflectance spectroscopy is a useful tool to predicted concentration of total tea polyphenols and free amino acids in plant materials which are major indicators of tea quality.

Zsuzsana (2012), experiment the complex analysis of the flavour of teas from the same type. The researcher evaluated the quality of teas with instrumental methods (Sensory method). The comparative examinations were executed in two groups. One was black teas from different geographical origins and other one Chinese tea with different fermentation degrees. The comparison of black teas and Chinese teas with different fermentation degrees was performed based on all constituents and aroma-spectra of the samples. The

² Reflectance spectroscopy has long been applied to retrieve the biochemical composition of vegetation from their optical properties.

³ Wet chemistry is a form of analytical chemistry that uses classical methods such as observation to analyze materials.

result of GC-MS⁴ analysis were compared session profit analysis, Electronic nose NST-3320 and

Electronic tongue Alpha As free 11. The aroma-spectra of the samples resemble each other when compared by the place of cultivation, climatic conditions and different processing method. Correlations were established between identified components' fragrance and the sensory scores of teas. The results of electronic nose device were confirmed with the Results are analytical investigations. The electrochemical sensors were proved suitable for differentiating teas based on flavours.

The quality of made tea depends on chemical constituent present on tea leaves, cultivars use, plucking standard, pruning types and fermentation process (Datta, 2011). The study examined the parameters of green and black tea quality using remote sensing, spectroscopy and statistical models and investigated the relationship between them. The study used normalized difference vegetation index (NDVI), near infrared (NIR) spectroscopy and statistical models.

Relationships were established between green leaf and black tea quality parameters. Statistical analysis shows that liquor brightness is affected by the levels of caffeine content, Theaflavins and Catechins. The study concludes that NDVI and NIR spectroscopy have a large potential to be used for monitoring tea quality in the future and that further attempts should be made by analyzing different clones and deriving their relationships from remote sensing data and linking it to tea production and quality. Under the condition of maximum biomass, concentration of foliar biochemical parameters can be monitored using NDVI.

⁴ Gas Chromatography–Mass Spectrometry (GC-MS) is an analytical method that combines the features of gas-chromatography and mass spectrometry to identify different substances within a test sample.

Shahiduzzaman and Eunus (2010) conducted a study about the plucking round which had an impact on tea quality. Leaf period varies from place to place as well as within the same locality at different times of the year. They mentioned that different plucking rounds starting from 6 to 10 days are in practice in Bangladesh. They found in their study that shorter round (6-7 day) was more suitable for tea. Plucking round have significant effect on yield of tea.

Uddin (1994), mentioned in his study that quality of manufactured tea depends on the type of bush, standard of plucking, handling of leaf, withering, rolling, fermentation, drying and general condition of the factory. Finally, quality of made tea as a finished product is affected by the producing techniques. Fine plucking gives shoots which are physically and chemically most suitable for the production of quality with good liquoring character and favorable character.

2.3 Tea Plantation Labourer

The necessity of tea plantation worker in tea industry is very much important. The workers play a significant role in the development of tea industry. But their socio-economic and cultural life is not similar with other people of the country. Chowdhury (1987) conducted an Anthropological study to explore the life and living condition of plantation workers in Bangladesh. The study was carried out in 1986-87 at Rampura tea estate in greater Sylhet. The study analysed the population, household, residence, location, types of family, ethnic background, marriage system, religion, economic life, nature of work of the selected study area. The workers came from Orissa, Tripura, Assam, West Bengal, Bihar, Madras and other places of India. The workers of Adivasi origin were quite different physically and racially from the rest of others. Normally their face is

thin and long, eyes are brown & medium size, the hair is black and nose is broad and fat. There are few workers who don't know exactly the place from where they migrated.

The above study mentioned that 55% of the labourer are Hindus, 41% Tribals and 4% Muslims of the research area. Nuclear type family is dominant among the plantation workers. Female workers play an important role in plantation. The worker lived in kutcha huts in the labour line and the atmosphere is very unhygienic. There was no sufficient housing, sanitation, tube-well, medical facilities and other fundamental needs. Most of the plantation workers of the study area could not eat two meals a day let alone buy their bare necessities. Due to shortage of food they had become extremely weak. The literacy rate was about 17%. The highest daily wages of permanent labourer was 13.50 taka only and some ration. The study mentioned that all categories of workers are deprived of all basic requirements of life and living. There is no guarantee of their jobs. The job is at the mercy of the management. The relationship between planter and worker is in fact a relation between master and servant and not employer and employee.

Majumder (2015) mentioned that plantation workers are deprived from right to decent work, decent living and health security. This situation causes great deterioration in the labourer standards of tea plantation industry in Bangladesh. The study described how tea plantation workers worked in tea garden and their socio-economic condition. She analysed the demographic condition, aspiration of plantation workers about children's education & future career, health, economics, living status, food item, physical condition and social relationship of the labourer. According to findings, the study recommended that there is need to arrange social dialogue, providing awareness training, social protection, welfare activities through labour union, proper working environment for the development of labourer lifestyle.

Hasan (2014), in an article focused on living condition of female workers of Lackatoorah tea estate in Sylhet sadar. The article explored the social and job environment of female worker. He also mentioned that female workers are being oppressed and suppressed in different stages from family to job area. Women's have no self control over their income, land property ownership, physical harassment, domestic violence, role of taking decision, voting behaviour etc. The study showed the social life of women workers is very different, unorganized and unusual than other people of the country. Women workers of the garden are deprived of education and modernization of life. At the same time, there is no alternative work for women who have been mostly responsible for this deprivation and unorganized life.

Das and Islam (2006), in their article discussed the human rights situation of gardeners. They studied 8 tea gardens out of 18 tea gardens in Sylhet Sadar & Jaintapur upazilla. The study discussed human rights on different aspects. They focused on human rights, knowledge of politics & political parties, awareness of basic rights and way of improving living standard of tea gardeners. They linked up human rights with educational status, school going children, yearly income, recreational activities, basic needs, child labour, women empowerment etc. The study showed the socio-economic and cultural characteristics of tea gardeners. The male, female, adolescent boys and girls work in the garden to earn their livelihood. Most of the male spend their earnings as they wish but female don't have control over their earnings. Housing, sanitation, pure drinking water, wages are main problems of gardeners. The gardeners are unaware of their basic rights. Finally, the study suggested developing human rights and fundamental needs of the gardeners.

Islam (2007) conducted a study in Panchagarh district and mentioned in his study that the local people who are working in tea garden have no experience or never worked in tea

garden. Their socio-economic life is as usual as other local labourer. They are living in their own homes at the locality. They go to the gardens in the morning and come back in the afternoon. The presence of women labourer in both small garden and tea estates is noticeable. It was found that the women are working in tea garden out of necessity besides household work. In some tea gardens, the number of women is more than half. As a result, working opportunity in tea garden opened the door of women empowerment.

2.4 Educational Obstacles at Tea Garden

It is commonly known, education is the backbone of a nation. Bangladesh is trying to increase education rate all over the country. Now-a-days, most of the people are conscious about education and play an important role to spread education. But the tea garden workers are still now deprived of proper education. There are a large number of problems of tea garden workers to get education or continue their education.

Nath, Yasmin and Shahjamal (2005) mentioned in their study, at present one in every five of the 6-15 years old children is out of school and nearly 30% of the enrolled children leave school before completing the full course of primary education. Gender parity, at the aggregate level, has been achieved in access to primary schooling. The tea garden children in the same age group lagged much behind. In tea garden, more than two children in every five were out of school. In some tea gardens over 90% of the children were out of school.

Age of the children was found to be an important determinant of leaving school. The older children of both the study groups were less likely to stay in schools for long. While children's participation in work was common in the study groups, these older children were found extensively involved in work at home or outside. Some of these children earn for their households through working outside of home. A good proportion of the children

were involved in both schooling and work. There is a strong relationship between household socio-economic status and out of schooling. Children of the never schooled parents and with deficit economic condition were more likely to be out of school than their peers living with better economic condition. Gender disparity also occurred in the poorer economic condition.

Poverty came out as the most important reason for dropping out, never enrolment, and gender disparity against girls. They suggested that the households in the study areas need to be brought under poverty reduction programmers with social components such as awareness building for education and gender parity.

Roy and Abdus (2015), in their article discussed the educational status and future expectation regarding education of tea garden workers. They investigated behind the factors of educational barrier and prospects of education. The study focused on salary/wages, roles of Government/NGO's and way of filling the educational needs of the workers. They showed that 63 percent of the respondents want to start study again. But the researcher found that low income, limitation of capacity to bear expenses of education, lack of time, ignorance, age are the main constrains of receiving formal education of the workers. For the constrain of socio-economic factors the worker interested to study open and distance learning's through Bangladesh Open University. So, the researcher suggested that open and distance learning's can be appropriate education system for the tea garden workers.

2.5 Tea Culture

Tea is not only a commodity but also has cultural attributes that could be transported through cultural adaptation (Jolliffe, 2007). There are diverse sub-cultures as the result of

tea culture transformation, such as “art of tea” in China, “the way of tea” in Japan, “afternoon tea” in Great Britain, and “samovar” in Russia.

Chinese scholar Lu Yu (780) defined tea culture as “all the inheritable, continual, sustainable and excellent material and spiritual creations on tea during human beings social practice.

Zhang (2004) viewed classifies tea culture from three dimensions- Firstly, material dimension (including methods of producing and drinking tea and tea sets); Secondly, behaviour dimension (including tea house, tea exhibitions, tea events, and so on); and Thirdly, the spiritual dimension (including esthetic, religious and arts).

In Chinese tea culture, there are a lot of factors in evaluating tea drinking, including tea colour, smell, shape, taste, tea sets, water, time, and temperature (Wu, 2004). As to water, the “Saint of Tea,” Lu Yu suggested the water from mountain spring was the best, water from river was inferior, and water from well was in lower level (Wang, 2001). The most famous tea set is purple clay teapot made in Yixing, China. That kind of teapot not only has elegant appearance, but also can retain original tea flavour and enhance its aroma (Chuan & Lien, 2000).

In British tea culture, “afternoon tea” and “high tea” are very popular. According to Pettigrew (2001), afternoon tea was first invented between 1830s to 1840s by the upper class which was taken between lunch and dinner. It was also called “low tea” because of people sitting in low chairs around low Tables to drink. It was usually served with bread and butter and added sugar, milk and cream. “High tea” was accompanied with various dishes, popular among lower classes and was served with meals, potatoes, cheese, home-made bread and cakes.

According to Yang (2007), tea was first brought to North America from China by the Dutch in mid-17th century. Tea drinking style changed from hot into cold when it was

widely accepted in the US. The tea drinking habits were introduced to America by European immigrants, in two ways of preparation- plain drink and mixed drink. Nowadays, the mixed drink has seemed to become popular, with lemon, sugar and ice. And ice tea is one of the most popular tea drinks in American's life, bottled or caned, which could be sold everywhere in supermarkets and restaurants. Another unique character in American tea culture is the significant invention of tea bag.

Roshan (2010) conducted a study and mentioned, when tea was introduced in India, Indians were unresponsive to tea. Tea was introduced in the 19th century in India. After a long time, slowly and gradually Indians began to adopt tea as a drink. In the beginning, tea culture appeared as a fashion of the upper class following the lifestyle of English people settled in India. Finally tea has turned to be the national beverage of India. There are some factors which helped to popularize tea and become a national drink. The remarkable factors are consequent urbanization, development of communication, administrative development, agro-commercial and industrial developments etc. The contribution of political parties, literature and movies is also remarkable for forming the tea culture in India. Before establishing of tea culture in India, Indians used to take Conji, betel nut to welcome their guests. But from the beginning of the 20th century, such custom was supplanted by tea.

At present there is no formal tea time and Indians take tea when they like. Tea has become a part of life of people irrespective of urban and rural. It is very common scenery of Indian people to take tea after breakfast and in the afternoon with slight snacks. Hot tea is very popular and it is available everywhere in India. Today, India is the largest tea producer country in the world as well as consumer.

Over 162 years ago, Bengali people began to have the habit of drinking tea which was introduced by the British. Nowadays, tea is regarded as one of the basic demands as

beverage in life of Bengali people. In modern days having a minimum cup of hot tea in the morning after breakfast and a cup of tea in the afternoon with light snacks is a common custom all over the country. Tea is always offered immediately to a guest at home. Serving a cup of tea is more than a matter of mere politeness. It is a symbol of showing respect and hospitality to guests. Tea stalls are seen everywhere on pavement, hat-bazar, terminal or station or ferry ghat, in a word everywhere and these tea stalls are a common haunt for all aged people.

2.6 Tea Drinking Behaviour

We know, tea is the second largest drinking beverage in the world after water. But the tea drinking behaviour is different among people of different places in the world.

Zhou (2011) conducted a study to explore how demographic and motivational factors influence tea-drinking behaviours and tea cultural perceptions of the United States, China and Taiwan. The web-based survey was directly emailed to a total number of 1228 faculties in different universities of United States, China, Taiwan and a total of 246 surveys were returned and 88 percent of them were fully completed surveys. Respondents tea drinking behaviour were examined from the perspectives of cold/hot preference, drinking frequency, time and place of tea drinking, favourite tea types, tea packaging preference, channels of tea purchase and reasons for drinking tea.

The demographic information such as gender, age, educational level, personal annual income, and primary self-identified cultural background collected from the respondents. Most of the respondents were from US (61.9%). Due to different sampling frame sizes, female respondents were more prevalent than male respondents. Nearly 40% of respondents were 35 years old or younger, while the number of respondents in age ranges 35 to 45, 46 to 55 and 56 to 65 were almost same (nearly 20%) and more than 2%

respondents older than 65 years. Half of the respondents had doctoral degrees (50%), Master's degree have 33.8% respondents. More than half of the respondents had annual incomes over \$45,000 (50.1%), while 16.5% were below \$20,000. 21.1% of the respondents identified themselves from European backgrounds, 31% considered themselves from North American backgrounds, while 40.8% respondents self-reported Asian cultural backgrounds, which might include both respondents in China and Taiwan. A total of 215 respondents claimed they were tea drinkers. Among the respondents 91.6% drank hot tea and the rest of them drank cold tea. These numbers indicate that hot tea is generally more popular than cold tea in this sample of faculty respondents. Most respondents had tea once a week, while 16 percent of the hot tea drinkers had tea more than once a day.

The major and common tea drinking time was in the afternoon. But hot tea drinkers could have hot tea from early morning to late night, while cold tea drinkers rarely had cold tea in the morning. Loose tea leaves and tea bags were both favored by hot tea drinkers but most cold tea drinkers liked only tea bags. In hot tea drinking, green tea was the most popular one but in cold tea drinking, black tea was the favourite type.

Most respondents had tea at home or at work, however 50.6% hot tea drinker take tea at home, 23% take tea at work place. Near 20 percent of the cold tea drinkers indicated they often had cold tea in restaurants, 18.6% at home. Most respondents bought tea from supermarkets, but more than 20 percent of the respondents also bought tea from tea specialty shops.

The results suggest that hot tea drinkers are drinking tea very often from early morning to late evening, prefer loose tea leaves and green tea, mostly drink at home and usually buy tea from tea specialty shops. That indicates hot tea drinkers are mostly influenced by traditional Eastern tea culture which is featured at hot green tea made from loose tea

leaves and considering tea drinking as an everyday habit. The cold tea drinkers prefer black tea bags, mostly drink once a week or less in restaurants in the afternoon or evening and usually purchase from supermarkets. Those behavioural characters may be affected by modern Western tea culture which is favoring black tea and using tea bags for convenience.

This study finds that the cold tea drinking is very popular in the US while not the same as in China and Taiwan. Yang (2007) suggested cold tea instead of hot tea became the most popular tea drinking style in America after tea culture originally transmitted from China, due to different lifestyles and eating habits. According to the results, respondents of 35 or younger are more likely to drink hot tea for reasons of delaying sleeping time, following cultural traditions, interests in tea culture and family traditions.

The study noted that people drinking tea for the reason of cultural traditions. Consider learning the original tea culture and experiencing traditional tea culture in its origin as the most important elements of tea culture. In addition, this study found that respondents of Asian culture are more likely to have learned tea culture from family heritage, cultural traditions, social communications, influences of friends and book, TV, Internet and other media.

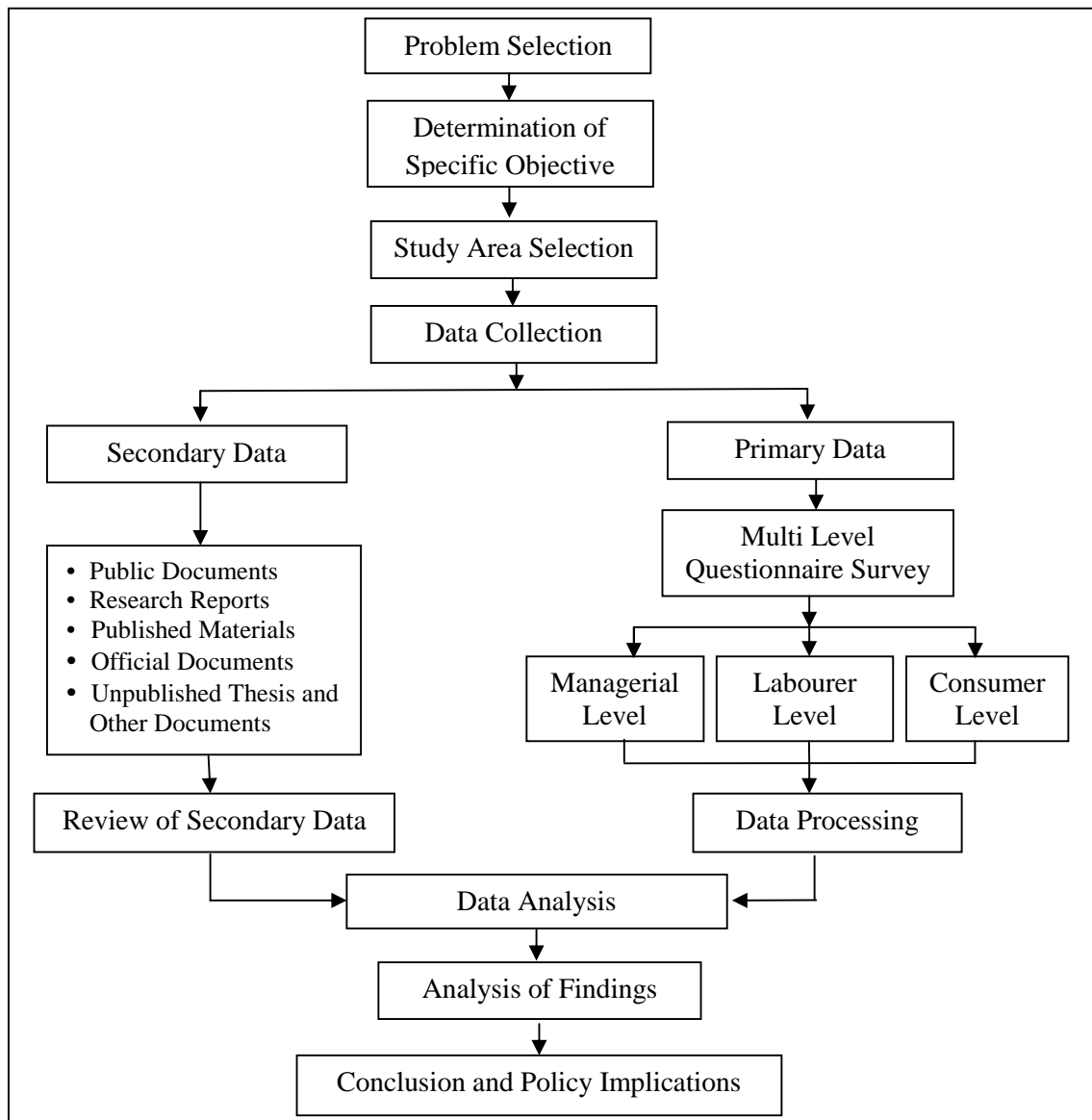
Chapter-3

Methodology

3.1 Research Design and Methodology

Proper research design is very much important whether a research based on qualitative or quantitative by nature. This research focused the tea industry including labourer and management at garden level of three tea producing regions in Bangladesh. Besides these, the study focused on consumer tea drinking behaviour which plays a significant role is

Figure 3.1: Research Design and Methodology



the dynamics of the industry. This study is conducted based on primary data which was collected through multi level questionnaire survey, secondary data was also used. Figure 3.1 shows the research design and methodology.

3.2 Justification of the Methodology

Tea is a dynamic industry in Bangladesh. It has a significant role to meet the internal demand and to be a source of export earnings. Tea industry competitiveness depends on management capacity, labourer condition and consuming market. In tea industry a large number of traditional labourer involved in land preparation till the finished product. Wide consuming market also prevails at national and global level. So, it is very crucial to know the present status of the whole industry. But there is no contemporary study of the whole tea industry and thus there is a lack of knowledge, regarding how the tea industry is run and its significance at national level. The new plantation area in the plain lands of North-western Panchagarh, included after 143 years of the first tea garden planted is an important transition point of tea industry. In this perspective, it is essential that to conduct the present empirical study be done. Empirical studies are the collection and analysis of primary data based on direct observation or experiences in the 'field'.

This study has been conducted to fill up the lack of knowledge regarding tea industry. The purpose of the study is to investigate the status as an industry and present the whole scenario of the industry. This empirical study has been conducted includes management and labourer condition in its analysis at the garden level of three tea producing regions. Beside these, exploration of the tea drinking behaviour at consumer level countrywide tea consuming behaviour and its economic significance at different administrative region of the country was also done.

There are two components of the research. The first part has provided a general overview of the industry and included literature review, historical background, key influencing physical factor, regional pattern of tea garden, temporal changes of tea industry, temporal changes of world tea industry, supply chain, industry clusters, management systems and welfare facilities of labourer who are playing important role to run the industry. To fill up the purposes, secondary data have also been used. Secondary data provides all kinds of literature of the study. The second part has provided more intensive field studies. To serve the purpose, multi- level questionnaire survey has been conducted at the field level. Three category of respondents have been selected for the study who were directly involved in management, production and consumption.

First, The intensive study at management level explored management potentialities, implementation of plantation methods and procedures, sufficiency and availability status of supporting elements. **Secondly,** Investigation conducted on labourer characteristics, living condition, trend of engagement in tea industry, experience, working environment and communication knowledge with others etc. **Thirdly,** Consumer is the main target of any industry. In this regard, consumers were selected as respondents to explore the tea drinking behaviour and evaluate its economic significance. The study has also investigated about the choice of other competitive beverages which are the competitor of tea industry.

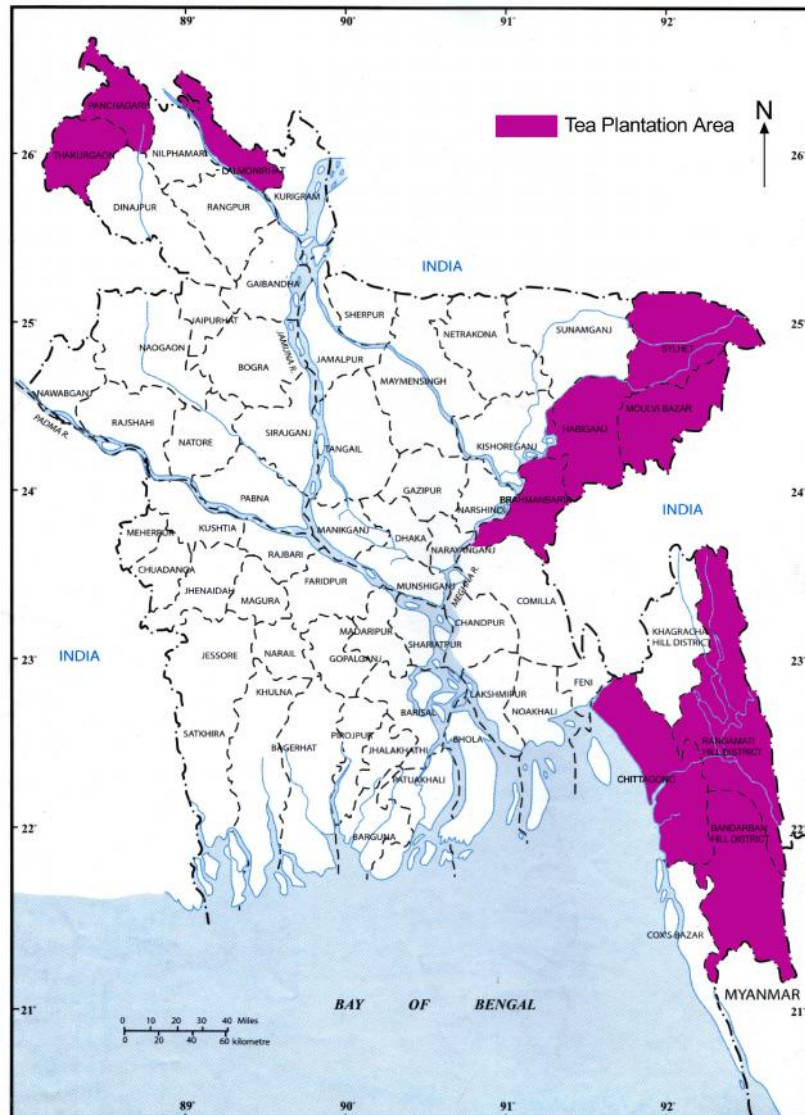
Through this methodology it was possible to identify the present status of tea industry in Bangladesh. The analysis, findings and policy implications may be helpful to concerned authority to take necessary initiatives for further development of the industry.

3.3 Tea Producing Districts of Three Regions

Tea plantation has been established in some specific districts and is situated in three regions of the country. The major tea producing districts are Sylhet, Maulvibazar and

Habiganj in North-east region, Chittagong and Rangamati in South-east region and Panchagarh in North-western region. There is a tea garden in Brahmanbaria of North-east region which is not functioning. Geographical concentration of tea garden in the North-east and South-east is because of hilly areas, suitable soil, climate, cheap and available traditional labourer which have been brought from different States of India. Recently included Thakurgaon, Lalmonirhat and Bandar Ban districts have tea plantations on a small scale. Tea producing districts are situated both on hilly and plain lands. The tea producing districts of the three regions is shown in map 3.1.

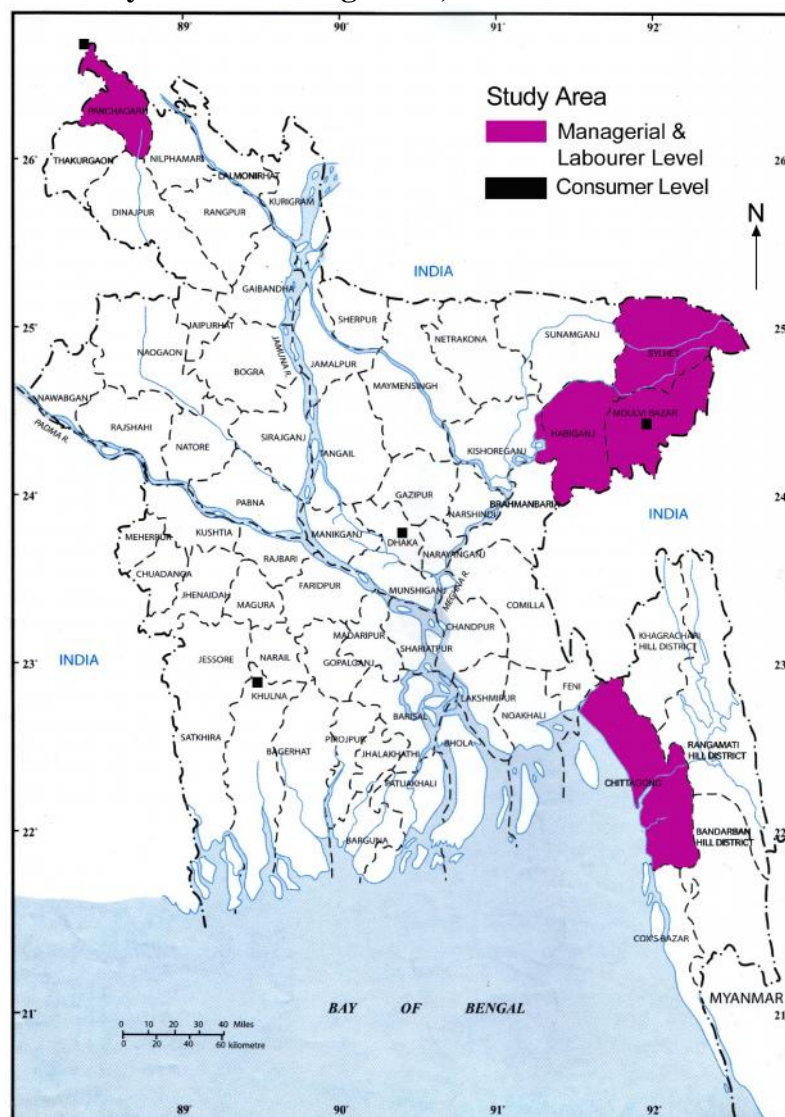
Map-3.1: Tea Producing Districts of Three Regions in Bangladesh



3.4 Study Area

The present study has covered 35 tea garden of Maulvibazar, Sylhet, Habiganj districts of North-east region, Chittagong district of South-east region and Panchagarh district of North-western region. Besides these, data has been collected from 58 small growers and holders of Panchagarh district. The labourer respondents have been selected from the same study area. To investigate the tea drinking behaviour of consumers, the study area was selected in Dhaka as a divisional city, Maulvibazar as a district town, Fultola upazilla of Khulna district as an upazilla town and Banglabandha of Tetulia upazilla under Panchagarh district as a village unit of the country (Map-3.2).

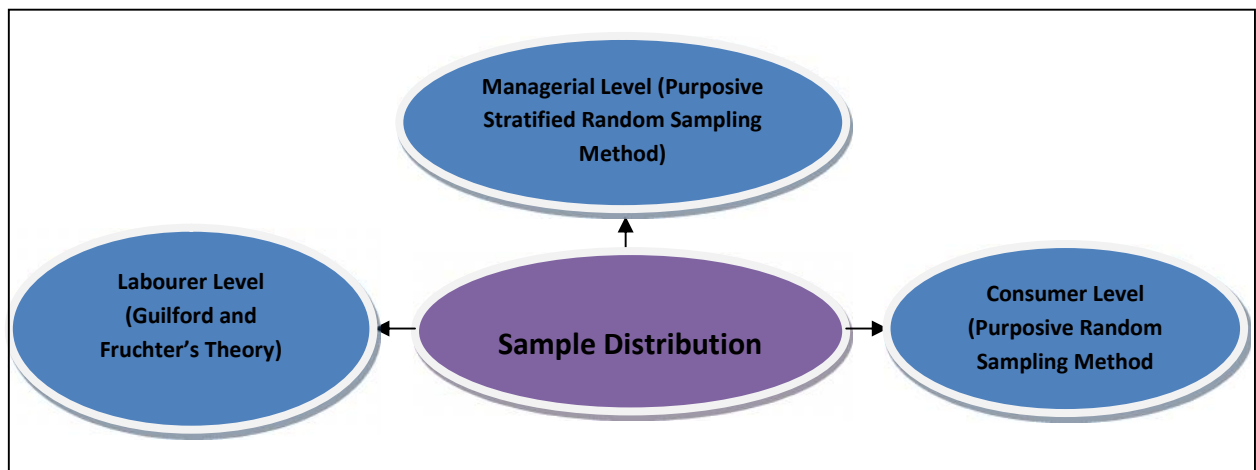
Map-3.2: Study Area at Management, Labourer and Consumer Level



3.5 Respondents and Sample Framework

The survey for the research has covered all who are directly involved in the process of garden management, production and consumption. To fulfill the purposes of the research, sample was selected from three categories respondent. The study covers management level of tea garden and small growers and holders, labourer at garden level and the consumers of different administrative regions of the country. In the research both qualitative and quantitative approaches has been adopted. The sample selection methodology of the research is shown in Figure 3.2.

Figure 3.2: Sample Selection Methodology



3.5.1. Respondents and Sample Size at Management Level

Management respondents were General Managers, Deputy General Managers, Managers, Deputy Managers, Senior Assistant Managers, Assistant Managers, Small Growers and Small Holders. The management level respondents were selected through purposive stratified random sampling method. In Bangladesh, there are 166 tea garden, 276 small growers and 15 small holders. The total number of tea garden, small growers and holders is 457 (BTB, 2014). According to BCS there are three categories of tea garden on the basis of yearly production. These categories are A, B and C. There is also needed to mention that BCS did not categorize North-western region due to being non-member of

the organization. But for the study purpose, the garden of North-western region was categorized as similar to the gardens of greater Sylhet. It is to be mentioned that BTB categorizes small growers and small holders according to the size of tea plantation area (BTB-2015).

The management level sample of the study has been collected both management level of large garden and small growers & holders of small garden. The number of respondents selected as one fifth of the total garden which stands 93. The sample size from the management level of tea garden was 35 which is more than one fifth out of 166 (where A category 21 garden, B category 6 garden and C category 8 garden). On the other hand, the sample size of small growers and holders of small garden was 58 which was around one fifth out of 291.

3.5.2 Respondents and Sample Size at Labourer Level

Tea plantations are known as labour intensive industry of the country. There are various types of work in a tea garden. Who are working in tea gardens as permanent, casual, daily or seasonal considered as labourer. The sample size of labourers was 384. Purposive random sampling method was used for sample size determination. The sample size and frame was developed on Guilford and Fruchter's sample size theory (1973). Guilford and Fruchter's theory is given below:

$$n = \frac{z^2 pq}{d^2}$$

Where, n = sample size, z = 1.96 at 5% level of significance,

p = 0.50 (the exact value of difference is unknown)

q = 1-0.50= 0.50

d = 5%= 0.05 (95% confidence level)

$$\begin{aligned} \text{So, } n &= \frac{1.96^2 * 0.50 * 0.50}{0.05^2} \\ &= 384.16 \\ &= 384 \end{aligned}$$

So, the labourer sample size was 384.

3.5.3 Respondents and Sample Size at Consumer Level

The consumer is the one who pays to consume goods and services produced. Consumers play a vital role in the economic system of an industry. Without consumer demand, producers would lack one of the key motivations to produce and to sell to consumers. The consumer also forms part of the chain of distribution. In the study consumer level respondents were selected from 4 administrative unit of the country. These are- one of divisional city, district town, upazilla town and village unit. The consumer level data has been collected from 300 respondents by using purposive random sampling method.

Table 3.1: Sample Framework

Study Level	Total Size of Population		Sample Taken			Nature of Study
	Large Garden	Small Garden	Large Garden	Small Garden	Total	
Tea Garden	166	291	35	58	93	Management Level indepth Interviews
Tea Labourer	133 thousand	Unknown	350	34	384	Labourer at Garden Level Questionnaire Survey
Consumer	Unknown		V=75, U=75, D=75 Div.= 75*		300	Consumer Level Questionnaire Survey
Total Sample					777	

*V= Village Unit, U= Upazilla Unit, D= District Unit and Div= Divisional City Unit.

3.6 Procedure of Primary Data Collection

Multi level questionnaires have been used for primary data collection which has been mentioned earlier in this chapter. The Questionnaires have been prepared for management level of garden and small growers & holders, tea labourer and tea consumer. At first, draft questionnaires for three types of respondents were prepared considering the objectives of the study. Then the questionnaire was pre-tested in the selected study area among few respondents. The questionnaires were finalized after making necessary modification and correction. Primary data was collected from study area in the following way-

3.6.1. Primary Data at Management Level

Management level data has been collected from Sylhet, Maulvibazar, Habiganj, Chittagong and Panchagarh tea producing districts of three regions. For this, necessary data was collected taking some facts into consideration on the side lines of in depth interview from Management level of tea garden and small gardens. There were both closed test and open ended question in the questionnaire.

3.6.2. Primary Data at Labourer Level

The primary data at labourer level has been collected from the respective large tea gardens and small garden of small growers and holders of the study area. The designation and work type of the labourer were different. There were both close test and open ended question in the questionnaire.

3.6.3 Primary Data at Consumer Level

Consumer level data has been collected from different administrative unit of the country. This study represents the probable scenario of the consumer of the country. This interview was performed in accordance with written structural index in the questionnaire.

3.7 Secondary Data

Secondary data was collected from different sources. Secondary data consisted of existing literature (books, journal articles and thesis) on the issues relating to tea plantations, management, socio-economic condition of the labourer, environmental factors and tea drinking behaviour of different regions. Beside the literature sources, secondary data were also obtained from relevant files, records, maps, photographs and documents related to the research topic from different institutions. Such as- Bangladesh Tea Board, Bangladesh Tea Research Institute, Bangladeshio Cha Sangsad, Export Promotion Bureau, National Dailies, Bangladesh Meteorological Department, SPARRSO, Bangladesh Bureau of

Statistics, Ministry of Forest & Environment, Ministry of Commerce, Ministry of Finance and different research activities, books, journals and websites etc.

Beside these, for non-participant observation, photos of the estates, labourer and tea consumers were taken with the oral permission of the respondents.

3.8 Methods of Analysis

The collected data were arranged in tabular form on the basis of different criteria through proper classification. Qualitative data was converted into quantitative data. The analysis was conducted in five different stages.

1. Tea industry map was prepared by using Arc GIS 10.3.
2. A brief profile of the tea industry of its growth in terms of evolution and historical background of tea plantation, history of traditional and new labourer, spatio-temporal changes of tea industry, labourer and extent development dynamics was attempted. This profile drew on available statistical data and other information.
3. With the core industry established, other allied associations and partners, link industries and support systems were identified to prepare a complete map of tea industry.
4. An industry supply chain was mapped in order to analyse the efficiency of tea industry and to identify the backward linkages of production and forward linkage of consumption.
5. With the help of different statistical methodology, the result of primary data was analysed. Percentage, mean, diagram and linear line graphs method have been used.

Beside these, information have also been depicted through maps and pictures. Through these processes, the entire task of the research accomplished.

Chapter-4

Evolution and History of Tea Plantation

4.1 Evolution and History of Tea Plantation in the World

The evolution and history of tea plantation in the world is very interesting and historically significant as a beverage. Tea plantation has been started for a long that its home as a wild plant is a matter of speculation. It is reportedly known that Chinese legends attribute the invention of tea to Shen Nung in 2737 B.C (Sana, 1989). There is an interesting story about the discovery of tea by Shen Nung. One day, emperor Nung was waiting for his pot to boil when a few leaves from a tree landed in the hot water burning in his fire and changed the boil water colour. He drank it and liked the taste. Then he identified the plant from which the leaves came and ordered his servants to cultivate more of these plants in his garden.

An early reference to tea is found in a letter written by the Qin Dynasty general Liu Kun in third century BC. Another early credible record of tea drinking in a medical text by Hua Tuo dates in the 3rd century AD. The first actual written reference found in a poem entitled “The lament of the discarded wife” in 5th century BC. In this poem, Confucius referred to a certain type of plant that is now generally assumed to be tea. In 600 A.D Chinese word C’ha meaning tea comes into use. In the 6th century tea drinking and tea plantation became common place in China. In 780, the Chinese government introduced the first tea tax. At that time tea was used not only medicinal remedy but also as refreshing drink. Lu, Yu (733-804 A.D) was regarded as the “Saint of Tea” because of his book *Cha Ching* (The Classis of Tea) which was the first book about tea in the world and had significant role at that time. The book included tea origin and history, tea growing and producing process, methods of drinking tea and tea ceremony.

4.1.1 India

A Scottish adventurer, merchant and soldier Robert Bruce found the plant growing “Wild” in Assam while trading in the region in 1823. This was the indigenous tea plant in Assam. There prevailed an indomitable enthusiasm to open up new tea areas and a glamorous development of tea plantation in this region. Bruce noticed local tribesmen brewing tea from the leaves of tea bush arranged with the tribal chiefs to provide tea to him with samples of the leaves and seeds because he planned to have scientifically examined. He put out the plants in his garden in 1827 and this was probably the beginning of plantation in the Indo- Pakistan sub-continent. After the death of Bruce his brother Lord William Charles, arranged for a few leaves from the Assam tea bush and sent to the botanical garden in Calcutta for further experiment in 1830. Finally after experiment the plant identified as a variety of tea. In 1833, when the British East India Company lost its monopoly tea trade with China, they became anxious to obtain a rival source of supply under their control. For this, they take further initiatives and formed a committee to explore the possibilities of tea plantation. The secretary of the committee Mr. G.J. Gordon went to China to import plants, seeds and Chinaman, who were supposed to be experts in tea. The first new plantation of China tea was put up at Jaipur in 1834 and later on at Deenjoy and Chabua. After 1840, the first English tea garden was established at Chabua in upper Assam. Assam tea companies began commercial production of tea in the region.

Beginning in the 1850s, the tea industry rapidly expanded. At present the major tea producing states of India are Assam, West Bengal, Tamil Nadu, Kerala, Tripura, Arunachal, Himachal, Karnataka, Sikkim, Nagaland, Uttarkhand, Manipur, Mizoram, Meghalaya, Bihar and Orissa, (18 States).The history of some mentionable tea plantation regions of India described below.

Assam

Assam is the biggest producer of quality tea in India. The Assam Company was formed with a capital of Rs. 5 lakh in England in 1839. Nazira is the oldest commercial tea company of Assam which is still functioning. The second company was formed in 1859 as the Jorhat Tea Company and even today its central office at Jorhat. The biggest research centre of tea in the world, now situated at Jorhat, was started in Calcutta in 1900 by the India Tea Association.

A laboratory was started at Heelea kah tea estate near Mariani in 1904. The laboratory was shifted to Tocklai (Jorhat) in 1912 and renamed as Tocklai Experimental Station. The experimental station became Tea Research Association (TRA) in 1964. The Assam tea plant grows in a lowland region in the valley of the Brahmaputra River, an area of clay soil rich in the nutrients of the flood plain and bordering with Bangladesh. Tea gardens are mostly found in Dibrugarh, Tinsukia Cachar, Sibsagar, Jorhat Golaghat Darrang and Sonitpur district.

Assam tea is generally harvested twice, one is first flush which picked during late March and secondly flush harvested later is the more prized. The leaves of Assam tea bushes are dark green, glossy and fairly wide. At present there are more than 850 tea gardens and 68,465 small tea gardens in Assam. More than six lakh labourers are engaged in tea garden in Assam and total area under tea 3, 12,210 hectors. The first Indian to start plantation of tea was an Assamese nobleman Maniram Dutta Barma, popularly known as Maniram Dewan.

North Bengal

North Bengal tea producing areas include the district of Darjeeling, Jalpaiguri, Cooch Behar and North Dinajpur which is adjacent to Panchagarh district of Bangladesh. There are 450 tea gardens spread out in the Darjeeling hills, Terai and Dooars region. Small tea

growers are largely concentrated in North Dinajpur, Jalpaiguri, Cooch Behar and at the foothills of Darjeeling hills. There are around 30,000 small growers in these regions.

Table 4.1: Tea Plantation Started of Different Regions in India

Region	Plantation Started
Assam (Wild tea)	1823
South India	1839
Darjeeling	1841
Terai	1862
Dooars	1874

Source: Indian Tea Board, 2014

Darjeeling

Darjeeling tea is famous for aromatic quality and also commands among the highest prices for tea in the world. It grows one of the world most exclusive teas at altitudes ranging from 600 to 2000 meters. A gentleman Dr. A Campbell was first brought Chinese tea seeds from kumaon and planted in his garden in Darjeeling town in 1841. But commercial plantation began in 1853. By 1874, there were 113 tea gardens in the Darjeeling district alone. The gardens of Darjeeling are situated at up to 2134 meters high elevations on steep slopes which provide ideal drainage and rainfall. The tea gardens of Darjeeling called by English, Indian or Nepalese name.

Dooars and Terai

The first tea plantation of Terai was established in 1862 by James White. This plantation called 'Champta'. The plantation of Darjeeling inspired to cultivate in Terai region. After Terai, plantation expanded in Dooars. Gazldubi was the first tea garden in Dooars. Dooars and Terai region covered 97,280 hectares area. The economy of Dooars is based on the Three Ts Tea, Tourism and Timber. Thousands of people are engaged as labourer in the tea estates and factories.

Kangra and Nilgiri

Kangra and Nilgiri is situated in Himachal Pradesh. In 1849, Dr. James conducted a feasibility survey for tea plantation and brought China tea plants from the nurseries at Almora and Dehradun and planted in government gardens at Kangra, Nagrota and Bhawama. The Kangra tea industry occupied prime position with respect to its quality. Kangra known as “The Valley of Gods” is famous for its distinct flavoured tea. Nilgiri tea is one of the India’s most distinctive teas. The first tea plantation at Nilgiris was on Thiashala and Dunsandle garden in 1859. At present there are 66,175 hectares area under tea plantation.

4.1.2 China

China is considered to have the earliest records of tea consumption and it is also the mother place of tea. In the early time tea was drunk as medicinal text. In the 8th century tea spread as a common beverage in China.

During the Song dynasty (960-1279 A.D) production and preparation of all tea changed. Steaming tea leaves was primary process used for centuries in the preparation of tea. After the transition from compressed tea to the powdered form, the production of tea for trade and distribution changed again. The Chinese used different methods to process tea in the mid of 13th century. The leaves were roasted and then creamed rather than steamed. This is the origin of today’s loose tea and practices of brewed tea. In 1391, loose tea production increased and procuring techniques advanced.

4.1.3 Sri Lanka

The tea plantation history of Sri Lanka is contemporary of Indian Sub-continent. Sri Lanka was first introduced tea in the 19th century after destroyed coffee rust. A tea plant was brought from China to Ceylon by the British for non-commercial purposes in 1824. It

was planted in the Royal Botanical garden in Peradeniya. After this, tea plants were brought from Assam and Calcutta of India for further experiment by East India Company in 1839. In the same year, Ceylon Chamber of Commerce was established and Planters Association of Ceylon was established in 1854.

The first tea garden established by Ceylon in 1960. But, James Taylor, a Scottish planter, established the first commercial tea garden in 1867 at Lookkandura in Kandy district of Sri Lanka. He began the garden on an area of 8 hectors and established a factory in the garden area in 1872. The first tea was made at Lookkandura in 1872. The great success of tea plantation attracted English planters and more plantations were established. This plantation replaced existed coffee fields.

After few years, in 1880, tea production in Ceylon increased rapidly. Henry Randolph Trafford considered one of the pioneers of tea planters in Ceylon had considerable knowledge of tea cultivation. Technology for processing of tea developed in the 1880s. As tea production in Ceylon progressed, new factories were established and introducing innovative methods of mechanization brought from England. For the development of tea plantation Ceylon Tea Traders Association was formed in 1894 and Colombo Brokers Association in 1896. A tea museum was established at Kandy in 2001.

The tea growing regions of Sri Lanka are clustered mostly among the mountains of the island's central Massif and its southern foothills. The major tea growing areas are Kandy and Nuwara Eliya in Central Province, Badulla, Bandarawela and Haputale in Uva Province, Galle, Matara and Mulkirigala in Southern Province, and Ratnapura and Keglle in Sabaragamuwa Province.

Ceylon tea is divided into three groups: High or Up of country (Udarata), Mid of country (Medarata), and Low country (Pahatha rata) tea, based on the geography of the land on which it is grown. Ceylon produces black, green and white tea. The most important

foreign markets for Sri Lanka carried the "Lion Logo". The name "Ceylon Tea" or "Sri Lankan tea" is still regarded as a sign of quality throughout the world. Lankan tea was exported to the former Soviet bloc countries of the CIS, the United Arab Emirates and other countries.

4.1.4 Kenya

G.W.L. Canine was introduced tea to Kenya in 1903 and planted tea at present Limuna. The first tea bushes have grown into large trees, forming an historical feature or what is now Unilever's Mabroukie tea estate. Commercial plantation started in 1930 in Kenya. Kenya is the largest producers of tea in African Continent. At present tea is one of the major cash crops of Kenya. The Tea Board of Kenya was established in 1950.

The main tea growing areas in Kenya is situated in and around the highland areas both sides of the great Rift valley and astride the Equator within altitudes between 1500 and 2700 meters above the sea level. These regions included the areas around Mt. Kenya, the Aberdares and the Nyambene hills in the central Kenya and Mau escarpment, Kericho highlands, Nandi and kisil highlands and the Clerngani hills.

There are both large plantation and small growers in Kenya. The number of small scale growers more than 5 lakh who are located across tea growing areas in the country and more than one lakh hectores area under small growers. The small growers' factories are managed by Kenya Tea Development Agency Ltd. (KTDA). Tea is planted in an area over 1, 57,720 hectores with production of about 3, 45,817 metric tons of made tea.

4.1.5 Other Locations

There are a number of countries which produce tea in the world. Among them, the background of major tea producing countries is described below.

Japan

Japan is one of the oldest tea producing countries in the world. The tea plantation history of Japan is contemporary of China. The first tea seeds were brought by a priest within 805 to 806 by Kukai in Japan. Tea became a drink of the royal classes during the regime emperor Saga. The Emperor encouraged the growth of tea plants. Japan imported seeds from China and planted in Japan. In 1191, the famous Zen priest Eisai brought back tea seeds to Kyoto. The oldest tea speciality book in Japan *kissa yojoki* (How to stay healthy by drinking tea) was written by Eisai. The tea ceremony of Japan was introduced from China in the 15th century by Buddhists as a semi-religious social custom. The modern tea ceremony developed over several centuries by Zen Buddhist monks under the original guidance of the monk Sen No Pkyu.

Argentina

Argentina is one of the dominant tea producing countries in South America. Argentina first introduced non-native varieties tea in 1920 which brought from Russia. Beginning in 1924, the Argentine Government urged farmers to experiment by planting tea seeds that the government imported from China and then distributed to interested farmers. The farmers of Misiones, Corrientes, Formosa, Chaco and Tucuman provinces tested the plantation of this tea in their land. Immigrant farmers also experimented with planting imported tea on their land. Tea remained a popular beverage and day by day increasing internal demand led to increased plantation of local tea. In 1952, new tea plantations were established in Misiones Province, growing a better quality tea than had been planted previously. By the end of the 1950, Argentina began exporting tea to Chile. Argentina has expanded its export market over the decades, reaching its current status as the ninth largest tea-producer worldwide. At present, Argentina yield per hector highest quantity tea in the world.

Turkey

The first tea was introduced in Turkey in 1839. Tea is one of the important tea producers in the world. It is an important part of Turkish culture and is the most commonly consumed hot drink, despite the country's long history of coffee consumption. Tea is most often consumed in households, shops and mostly *kıraathane*, which is social congregation of Turkish men. Despite its popularity, tea only became the widely consumed beverage of choice in Turkey starting in the 20th century. The south slope of Torus hill and Anatolia plateau region is the major tea producing region of Turkey.

Philippines and Iran

Philippines started tea plantation in 1824. They imported seed from Japan and planted in Java. After that, six journeys were made from 1827 to 1833 by a government envoy to collect seed and workmen from China for the development of tea plantation. The foundation of tea culture in Sumatra was inaugurated in 1909 by a British firm (Eden, 1958).

Lahijan is the first town in Iran to have tea plantation. Lahijan stands to have the largest area of tea cultivation in Iran. At present, Gilan is the main tea producing area in north Iran.

Besides the above countries, Brazil, Chili, Russia, Malaysia, Uganda, Ivory Cost, Congo, Taiwan, Mozambique, Ghana, South Korea, North Korea and other few countries started tea plantation at different period.

4.1.6 Timeline of Tea Plantation

Tea industry has developed as a long time in the world. The historical development of tea industry is shown at a glance in the following Table.

Table 4.2: Timeline of Tea Plantation in the World

Country	Year	Historical Development
China	2727 BC	Emperor Shen Nung discovered tea one day while drinking hot water in his garden.
	600	Chinese character C'ha, meaning tea, comes into use
	780	The first tax on tea in China, due to its popularity. The first book on tea, the <i>Ch'a Ching</i> (The Classic of Tea), written by the poet Lu Yu was published.
Japan	805-806	Tea seeds were first brought in Japan.
	1521-1591	Sen Rikyu, known as the "Father of Tea" in Japan, codifies the tea ceremony.
Russia	1618	Introduced to Russia, when the Chinese embassy visits Moscow, bringing a chest of tea as a gift for the Czar Alexis.
Europe	1635	The "tea heretics" of Holland argued over the positive and negative effects of tea, while the Dutch continued to enjoy their new found beverage.
North America	1650/1660	A Dutch trader introduced tea to the Dutch settlers in New Amsterdam
Europe	1652	Tea was introduced to England by the Dutch East India Company.
England	1660	England's first tax on tea, levied at 8 pence for every gallon of tea sold at the coffee houses.
	1664	Tea drinking became fashionable among the aristocracy of England.
	1670	The English begin to make and use silver teapots.
Europe	1675	In Holland, tea was widely available for purchase in common food shops.
	1685	England began to trade directly with China.
	1716	Tea was brought to Canada by the Hudson Bay Company.
	1750	Black tea exceeded green tea in popularity in Europe.
	1773	The John Company and the East India Company merged, forming the New East India Company. This new company had a complete monopoly on all trade with tea and

		commerce in India and China.
Bhutan	1780	Tea seeds introduced in Bhutan
America	1790	The first tea plantation in America
Sri Lanka	1860	Tea plantation started
	1867	Commercial plantation started.
India	1823	Indigenous tea was discovered by Robert Bruce in Upper Assam
	1841	Tea was first planted in Darjeeling
Bangladesh	1840	The first tea garden was established in Chittagong
	1857	The first tea garden was established at Malnicherra in Sylhet with a commercial purposes
	2000	Plantation started in North-western region
Indonesia	1872	Tea plantation began in Indonesia
Southern Africa	1882	Tea planted in Nyasaland in Southern Africa
Georgia	1892	Tea planted in Georgia
Iran	1898	Tea planted in Iran
Uganda	1900	Tea was introduced in Uganda
Kenya	1903	Tea was introduced in Kenya
	1919	Commercial tea plantation started in Kenya

Source: Sana, 1989 and Rahman, 2006

4.2 Evolution and History of Tea Garden in Bangladesh

The tea plantation districts of South-east and North-east region known as traditional. This traditional plantation started over one and half century ago. Sylhet is known the land of **“Two leaves and a bud”** located in North-east region of Bangladesh. On the other hand, North-western part of the country is the third region known as new plantation. The background of traditional and new tea plantation is described below.

4.2.1 Evolution and History of Traditional Garden

South-east region first introduced tea plantation in Bangladesh. The plantation of this region started in 1840 where the present Chittagong club is situated. In a word, Chittagong is the pioneer of tea plantation in Bangladesh. This pioneer garden was planted by importing tea plants of China varieties from Calcutta and the seeds collected from Assam of India. But this garden is no longer. The second tea garden Kodala was established in Chittagong. Mr. Hoque established this garden which was less than one hector. This garden is still now in production and total area is 1,006.26 hectors. The first home-grown tea was manufactured in 1843 in Chittagong.

Chittagong is historically commercial important place due to the sea port. As a result, many people came here from various countries for commercial purposes and realized the suitability of tea plantation. The suitable factors such as climate, physiographic, near to the port and transport facility were appreciated for the establishment of tea plantation in Chittagong. The Karnafuli provided transport facility for plantation. It is needed to mention as example that Kodala garden which is still in production is near to the Karnafuly and got the transport facility from this river. So, all these factors helped to start tea plantation in Chittagong. After successful production of Kodala tea garden, plantation increased in other places in Chittagong. In 1864, there was opened a plantation at Tundicherra and another plantation Karnafully established in 1880. Both these gardens still exist and in production.

In 1890-1891, tea production was 182,000 Pounds in South-east region which increased up to 11, 89,000 Pounds in the year of 1900-1901 and per acre yield was 308 Pounds. There were 21 tea gardens established by 1901. In 1905, the area under tea plantation was around 733hectores and produced 14, 80,984 Pounds tea. Next this, two of the present

existing gardens Patiya and Ramgarh were established in the year 1914 and 1916 respectively.

It is mentionable that after the First World War, tea gardens have been started to establish by the Bangladeshi ownership. There were two garden established within 1930 by native owners in Chittagong. During the British period, 26 tea gardens were established in South-east region. But at present, there are 23 tea gardens in South-east region.

After South-east region, North-east region is the second mother place of tea plantation in Bangladesh. The indigenous tea plants were discovered at Chand Khani hills in Sylhet. It

Table 4.3: First Tea Plantation of Three Regions in Bangladesh

Region	Name of First Tea Garden	Started Plantation
South-east	Experiment, Chittagong	1840
North-east	Malnicherra, Sylhet	1857
	Lalchand, Habiganj	1860
	Mertinga, Maulvibazar	1860
North-western	Kazi & Kazi, Panchagarh	2000

Source: BTB, 2015

was discovered by Mohamud Warish in 1855. But the first tea garden was established at Malnicharra in Sylhet sadar with a commercial purpose in 1857. This garden is situated approximate 3.5 k.m distances from the town. This was the beginning of tea plantation in Sylhet. This garden is still survives and total area is 1,008.52 hectares. During the starting period the progress was very slow. At that time, after some experimental plantation, it was established that tea plantation will be successfully grown in this region. The real foundation of plantation was laid up to 1959. Dr. J.B. Barry took 8097 hectares land for plantation in 1862. In the year 1868, there were 830 hectares area under tea plantation in Sylhet and total production was 2, 51,000 pounds.

In 1893, the yield of this region was 2, 06, 27,000 pounds. There was 71490 acres land under tea plantation which yield 3, 50, 42,000 pounds and average yield was 500 pounds

in 1900. After 1900, the production and purchase was satisfactory of this region because the connection of railway line between Chittagong and Assam through Sylhet was started in 1892 and the line was declared open in 1899. The Railwagon passed near many of the plantations and carried a considerable proportion of tea of the district and another factor was labourer wages, the level of wages was constant.

After the First World War, there was a rapid development in this region. During 1925 to 1927 there were established around 20 tea gardens. Only in 1927, there were 12 gardens established in this region. Hafeez tea garden was lastly established during the British reign. During the British period, 93 tea gardens were established in North-east region. At present there are 134 tea gardens in North-east region.

4.2.2 Evolution and History of New Garden

North-western region is new in tea plantation. After about one hundred and fifty years, in the year 2000, tea plantation was started in the district of Panchagarh which is situated on the piedmont plains of North-western part of Bangladesh. Panchagarh is near to the Indian tea plantation of Darjeeling, Jalpaigiri, Cooch Bihar and North Dinajpur. Darjeeling tea is well known for its high quality. The local people and the journalists were very interested and eager to start tea plantation in Panchagarh. Because they saw the nearest place of Tetulia-Panchagarh high way, India successfully planted and produced tea. So, the local people and civil society tried for proper concentration of concern institution and government to take initiatives for studying the feasibility of tea plantation in Panchagarh. Besides these, a number of national dailies focused on the possibilities and suitabilities for growing tea in the border areas of Panchagarh district. The national dailies also mentioned that the very adjacent border areas of India surrounding Panchagarh and Thakurgaon districts are growing tea successfully on both small and big holdings. As a

result, the government took initiative for studying the feasibility and probability of tea plantation in Panchagarh district through Bangladesh Tea Board and concern ministry with financial assistance of European Commission. After the submission of positive report of the concern committee, the door of tea plantation was opened in Panchagarh. The report mentioned that in this region approximately 16,000 hector lands is suitable for tea plantation.

Kazi & Kazi tea garden is the pioneer of tea plantation in Panchagarh district. They started first tea plantation at Rowshanpur under Tetulia Upazilla in 2000. Then day by day plantation area is increasing in Panchagarh district. Besides tea garden many small growers and holders grow tea like as an agricultural production. Now tea plantation started at different places of Thakurgaon and Lalmonirhat district in the North-western region.

4.3 History of Tea Labourer in Bangladesh

The labourers of North-east and South-east region are working in tea garden from the beginning of tea plantation. They work in the garden from generation to generation. They were traditionally involved as labourer in tea garden. On the other hand, the local people of North-western region work as labourer at new tea garden.

The history of labourer is closely related to the beginning of tea plantation. In Bangladesh, most of the tea gardens are located in the North-east region of the country which is near to the Assam the mother place of tea plantation in Indian sub-continent. So, the historical background of labourer has similarities with Indian labourer.

The initial process of labourer recruitment in tea plantations in India involved diverse extra legal forms of market as well as non-market power. Poverty-stricken potential migrant workers, who included poor peasants, agricultural labourer and ruined artisans,

were given loans by the garden *sardars* to clear out their debts to *zamindars* and *sahukars*. Through this, they entered into the grip of the *sardars*. It would thus hardly be meaningful to consider the transformation of this class of workers into tea labourer as an optimizing decisions made by the free choice by the people who were faced with the alternative prospect of persistent unemployment disguised or open as well as starvation. Apart from the labourer shortages they initially faced, the early planters had also been confronted by labourer protests that took the form of desertion or assault, as well as informal collective bargaining and occasional strikes. In 1841, the Assam companies recruited the first batch of labourer from Choto Nagpur division in Bihar. But diseases en route had completely wiped out the first batch of imported labourer. This disaster did not put a stop to such attempts and individual tea gardens imported labourer sporadically up to 1959. It was only after the direction of the government the planters adopted some unformed recruitment procedure. In India, Plantation Labour Act 1951 was enacted as a welfare-enhancing measure on the part of government but labour market institutions did not develop as such. Practice of mono-culture and relative backwardness helped in the perpetuation of the condition.

4.3.1 Origin of Traditional Labourer

During the British period, the British tempted labourer and brought them in North-east region. They were told that they would make money at a very short time if they could manage employment in the tea estate. At the time, there was tremendous poverty and they suffered a great deal. In these circumstances, they felt that if they could go there, they would get jobs and earn money. Having this hope they sold everything and came and settled here. When they go there they found that they were given false promises. But they became plantation labourer for their mere sustenance. When the British first brought them

here, each of them was given taka 50 as their establishment cost and as a result they entered into a deal with the British management. Even though they faced great difficulties, still because of their agreement and since they had sold everything in their native village home, they were unable to go back there.

At the initial stage, there was a special process introduced to collect the labourer. The British tea companies collected labourer by “Girmit culture”. At the beginning stages of tea labourer collection, the owner of estates, manager, clerk and other staffs called them as coolie or coolly. The Webstars Encyclopedia Unabridged Dictionary of English described these coolie/coolly as an unskilled native labourer of India, China etc. The British companies collected the labourer from Assam, Madras, Orissa, West Bengal and other regions of India. They collected these labourers for life-long working condition in tea garden by signing agreement. Four years contract that eventually obliged them to remain on the tea garden for generation to generation. As they were illiterate and unconscious, they did not understand what the document contained when they signed it. That was the beginning of hard work of the labourer. After that they started to lose their cultural identity and captivity that never came to an end. At present the tea labourer are completely cut off from their native village of India.

There was jungle where the present tea garden situated. This jungle was unsuitable for living people. At the beginning, all the tea estates have been established by clearing Jungles and started to leave there by making temporary residence. The non-local labourer who brought from Assam, Bihar, Madras, Orissa and other places in India did this job and cleared the Jungle. After the settlement of the labourer in the North-east region they realized that the story of the golden leaves was a lie and it remains a mystery to them till date.

But after the changes of time, they are started to work to the main stream of economic activities. A number of labourer descendants work in government and non government institutions. There is mentionable that the descendants of labourer are studying in the higher educational institutions with a small scale at different stages.

4.3.2 Origin of New Labourer

In the beginning, North-western region was faced labourer as a major problem for tea plantation. It was completely new job for the labourer. The local labourer were not familiar with tea gardening. They were not interested to work in tea garden because of no pre-experience. But after the motivation they started to work in tea garden. At present, the new labourer willingly works in tea garden. They took this work as profession job.

The local agricultural labourer, day labourer, housewife and unemployed person work as labourer in tea garden. But there are some exceptional cases in large garden. One of the large gardens of North-western region collected 35 Santali families from the nearer district and made a labour line in the garden. There is remarkable that the labourer who lives in the line take alcohol like traditional labourer of North-east and South-east region. Most of the labourers work permanently in large tea garden of North-western region, but their job nature is not similar as traditional labourer. Some labourer work permanently in small holder's garden but there is no permanent labourer in small grower's garden.

4.3.3 Anthropological Background of Traditional Labourer

Almost all the labourers who are working in North-east and South-east region born in the garden of Bangladesh and their fathers or grandfathers came from India and settled in the past. Most of the labourer came to know from their fathers or grandfathers that they migrated from different places of India.

The labourer who were brought from India, they were both plain land and hilly inhabitants. The labourers who came from the plain land were mostly non-tribal Hindus and Muslims while the labourers who came from hilly areas were the tribal or Adibasi communities. The communities or ethnic groups of the labourer are Hijra, Rajbonshi, Robidas, Karmokar, Garo, Chasha, Almik, Bakti, Draon, Santals, Muraomajhi, Kalindi, Baraik, Nayek, Munda, Khorla, Kharoan, Vhuhar, Malpaharia, Rajganda, Kishan, Tanti, Teli, Bashpore, Bunerjee, Goala, Ganju, Kanu, Oraon, Tripura, Mahali, Lohar, Turi, Ghasi, Bhumij, Sabor, Pashi, Doshad, Pan, Pordhan etc.

The labourer of Adivasi origin were however quite different physically and racially from the rest of labourers. Normally their face is thin and long, eyes are brown and medium size, nose is broad and flat. They have less hair on their body, the lips are medium. The labourers are medium in height. They are either tanned or black in colour. On the other hand, Oraon, Santals and other tribal labourers are slightly different from Adivasi labourers. They are black in colour, face is sharp and long. Their eyes are same colour with Adibasi labourers. They have hardly hair on their body and hair is very rough. The hand and legs are long and they are very hard worker.

Although ethnically, the plantation labourers are mainly divided into Hindu caste groups and Adibasi communities, yet all of them today claim themselves to Hindus. Most of the labourers are converted from other religion into Hindus. There are also a number of Muslims and Chirstan labourers in tea garden. Whether Hindus, Adibasis, Muslims or Chirstans they may are all immigrants from different states of India. None of them is local people.

But at present some local people work in tea garden of North-east and South-east regions, because of labourer shortage. They live outside of garden and work at daily basis.

4.3.4 Anthropological Background of New Labourer

On the other hand, all the labourers of third tea producing North-western region are local people. They are not like as traditional labourers. There is no anthropological diversity of the labourers. Anthropological background of the local labourers is as like other common people of the country. But there are some Santal families in a large tea garden. They are collected from the nearest districts and live in the labour line of the garden. Most of the labourers are Muslim and a small number of Hindus work in the garden.

4.3.5 Language of Traditional Labourer

The labourers of tea garden have no communication to their origins of India. Most of them don't recall their forefather's language. A number of the labourers speak a short of distorted Hindi. The labourers also speak in a mixed language of Orissa which is called "Deshali". Their accents while speaking in Deshali is testing their cultural corrosion. The labourers are divided into three categories on the basis of language. These are-

1. **Kolio Language-** Santals, Munda, Khorias, Ho, Culk/Kurk
2. **Drabian Language-** Oraons, Koand, Goand, Malpahari and
3. **Arja Language-** Uria, Bengali and Hindi language people.

Besides the above mentioned historical background, each ethnic or Adivasi or other group of labourer has own family pattern, marriage culture and kinship pattern, religious beliefs and rituals, rituals associated with birth and death, social stratification and traditional alcohol drinking culture.

4.3.6 Language of New Labourer

As the new labourers of North-western region are local people, they all talk in Bengali. But the Santal labourers talk both in Bengali and their own language. The Santals native language is rich with songs, stories and histories but mostly in oral form.

Chapter-5

Key Influencing Factors Affect Tea Plantation

5.1 Geographic Characteristics of Bangladesh and Tea

Bangladesh is a low-lying, riverine country located in South Asia. It is situated in between 20°34 North Axis and 26°38 as well as 88°01 East Meridian of Longitude and 92°41 East Longitude. 'The Tropic of Cancer' passes through over the middle of Bangladesh. Bangladesh has 1, 47,570 square kilometers or 56,977 square miles total area. The country is formed by a delta plain at the confluence of the Padma, Meghna and Jamuna rivers and their tributaries. The alluvial soil of Bangladesh is highly fertile but vulnerable to flood and drought. The hill raised above the plain only in the Chittagong hill tracts in the far South-east and the Sylhet division in the North-east region. The hilly area of South-east and North-east region is famous for tea plantation.

Bangladesh is one of the major tea producing countries in the world for suitable physical factors and cheap labourer. Tea production is influenced by some physical factors such as physiography, topography, climatic factors. Tea plantation needs a suitable climatic condition. But Bangladesh grows tea under marginal land and climatic conditions. Such as low elevation, poor topography, the presence of impervious subsoil layer and low nutrient status. On the other hand, the winter months of Bangladesh very often go without rain and the minimum temperature sometimes goes as low as 7°C. As a result, during the months from December to March very little crop is harvested. During January to mid March, almost all the garden stopped its production as no green leaf harvested. These are such conditions, a careful consideration of tea plantation is very much essential to increase production and sustainability of tea garden in Bangladesh.

5.2 Physical Factors

There are some physical factors which influences tea plantation. Tea plantation and production of green leaf depends on these factors. The key influencing physical factors of tea plantation in Bangladesh is discussed below.

5.2.1 Physiography

The physiography of tea producing region of North-east and South-east region is different from the other places of the country. There are three tea producing region in the country. These are North-east, South-east and North-western region. There are physiographic similarities between north-south and South-east region but North-western region is different from traditional tea producing region. The physiography of traditional and new plantation area is mentioned below.

Physiography of Traditional Garden

The physiography of North-east and South-east region gives the opportunity to produce tea in the country. The only exceptions of Bangladesh's low elevations are the Chittagong hills in the South-east, the low hills of Sylhet in the North-east and highlands in the north and north-west. The Chittagong hills constitute the only significant hill system in the country and in effect, are the western fringe of the north-south mountain ranges of Burma and eastern India. The Chittagong hills rise steeply to narrow ridge lines, generally not wider than 36 meters, with altitudes from 600 to 900 meters above from the sea level. At 1,052 meters altitude, the highest elevation in Bangladesh is found at Mowdok Mual, in the South-eastern part of the hills. Fertile valleys lie between the hilly lines, which is generally runs in the North-south. West of the Chittagong hills is a broad plain, cut by rivers draining into the Bay of Bengal that rises to a final chain of low coastal hills, mostly below 200 meters and maximum elevation of 350 meter from the sea levels. West

of these hills, a narrow, wet coastal plain located between the cities of Chittagong in the north and Cox's Bazaar in south.

The hilly area of Sylhet, Moulvibazar and Habiganj where tea produced area is situated in the North-east region. These hills possess an average height not exceeding 244 meters. The hills of the north are locally known as tillah. Their heights vary 30 to 90 meters. Chiknagul, Khasia and Jayantia are the main hills in this part. This part comprises of about 8% of the total volume of land of Bangladesh.

Physiography of New Garden

Panchagarh, the new tea plantation region is situated on the piedmont plain of Himalayas. It is bounded on three sides by 288 km long Indian border, having quality tea producer Darjeeling district on the north, Jalpaiguri and Cooch Behar districts on the North-east, West Dinajpur district and Purnea district on the west. Dinajpur and Thakurgaon districts on the south, Nilphamari district on the east. Its soil is sandy, alluvial and bears close affinity with the soil of the old Himalayan basin. On the North-western part of the district there exists underground layer of pebbles.

5.2.2 Topography

The topography of the tea producing regions is different from other places of the country. The topography of traditional and new plantation area is discussed below.

Topography of Traditional Garden

The topography of traditional garden is divided in three types. There are- tillah, high tillah Or low flat.

1. Tillah: Nearly 32% of tea land is tillah. The flat topped hills with their slopes are included in this category. Tillah or low hills are outliers of the Tripura hill range in India. These tillahs are up to 9 meter in height steeply rounded with unconsidered sandy soils

derived from tertiary sandstone rocks and shale's or broken pieces of literate occur below 2 to 5 feet. The south slopes of these tillahs are more susceptible to drought during dry season. The tillah is suitable for tea but subjected to water stress and erosion. Seed plant is more suitable for plantation in tillah because of its tolerance capacity.

2. High Flat: High flats are the higher valleys constitute about 45% of tea area composed of sand, silt and clay. The high tillahs are undulating 20 to 30 feet above the plains and dissected by narrow valleys created by erosion. Soils are well drained without any rock fragments in the substratum but gentler slopes than tillahs. The soils are suitable for tea plantation.

3. Low Flat: Nearly 23% of tea land is constituted with low flats. Low flats are the valley floors. Low flats are undulating with moderately well drained and subjected to flush flooding up to a day after heavy shower in monsoon. The top soils of low flat is brown, the substratum is grey, may be relatively rich in organic matter but subjected to water logging. Low flat land has a semi-permanent water Table. Recently most of the gardens use clone plant on low land. In low flat land, clone plants give more production than seed plants.

Topography of New Garden

Tea plantation was a great challenge in the harsh terrain with little vegetation in North-western region. The soil of new plantation is plain but sandy with rocks and rubble underneath. The drainage capacity of this soil is well. Topography of the Panchagarh district is elevated, 60 to 85 meters high from sea level, well drained and free from normal flood hazards. But it was a great challenge to plant tea in the harsh terrain with vegetation and rubble underneath.

5.2.3 Soil Characteristics

Tea plantation needs special characterize soil. The soil required for tea is often referred to as tea soil. But the plant has been found to thrive on soils of any facture. Tea is found to grow on sandy loam as well as on bil soils which are similar to peat soil. Tea being a deep rooted plant requires for a satisfactory growth a loose, porous and well drained soil. Sandy loam is considered to be the best fixture for tea growth. A freely drained soil is needed for tea plantation. Saturated surface layer is not conducive to the healthy growth of tea leaves. There are some specific characteristics of good soils for tea plantation. These are- texture: Sandy loam, PH: 4.5 to 5.8 and availability of organic matter Nitrogen, Phosphorous, Potassium, Calcium and Magnesium.

Soil colour has a significance role for drainage and aeration. The colour indicates its drainage condition and aeration colour of the soil is primarily due to the presence of organic matter, manganese and chemical nature of iron compound. The significance of soil colour is mentioned in the following Table 5.1.

Table 5.1: Significance of Soil Colour

Colour	Significance
Red colour	Good drainage and aeration
Yellow colour	Imperfect drainage and aeration
Grey colour	Poor drainage, aeration and poor in organic matter
Black	Poor drainage and rich in organic matter

Source: Rahman, 2006

Organic matter is very much important for any crop production. It is the key to soil fertility. It contains nitrogen and other essential nutrients such as combination of carbon, oxygen and hydrogen. Organic matter improves the structure of the soil, maintenance and improvement of organic matter status of the soil by sound cultural practice such as growing green maturing crops, cover crops, grasses or burying and compost into the soil.

Tea production is affected if the deficit of organic matter in the soil and the longevity of plant must be affected in future.

5.2.4 Climatic Factors

Bangladesh is considered to be tropical monsoon climatic country with three distinct seasons. These seasons are warm season (mid February to mid May), monsoon season (mid May to mid October) and cold season (mid October to mid February). The year begins and ends with a dry period. The seasonal variation of climatic elements in tea regions of Bangladesh is one

of the prime factors for the establishment of tea garden.

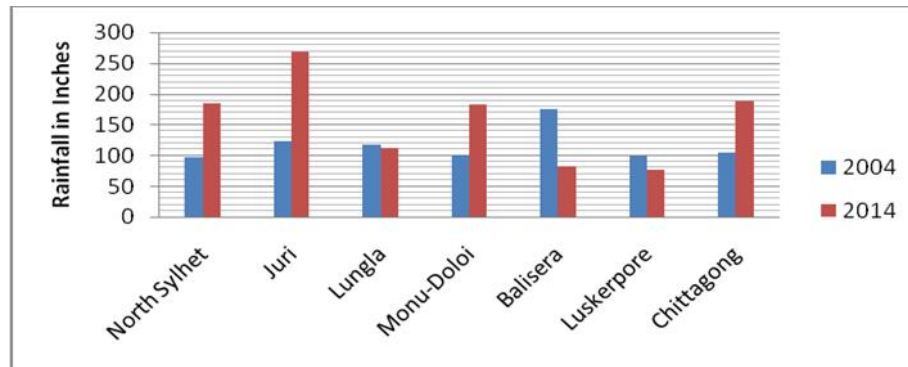
The climatic factors determine the success of tea production. Rainfall and temperature play the most important role in the development and the growth of tea. Tea plantation has a wide range of tolerance as it is cultivated between sea level and altitude of over 2000 meter. The major climatic factors of tea plantation which influences production are discussed discussed below.

5.2.4.1 Rainfall

Sufficient water with well drainage system is very much essential for tea plantation. Most of the water for plantation provides rainfall but the rainfall is not well distributed all over the year. Tea plantation needs average rainfall 287 inches and range between 225 to 350 inches. The annual rainfall is marginal for tea plantation in Bangladesh. Even the distribution of rainfall throughout the year is more important than the total amount. The wet month is defined as one having 20 inches or more of rain while a dry month receives 10 inches of rain or less. The dry month is considered from November to March. The rainy season continues from May to October and above 80% of annual rainfall is obtained during June to September.

According to BTB, there are seven valleys where tea is produced in Bangladesh. Recently North-western region is included in production. The rainfall variation of different valleys is shown in the following Figure 5.1.

Figure 5.1: Rainfall Variation of Different Valleys (In Inches)



Source: BTB 2015

The above Figure shows that North Sylhet valley got 96.97 inches rainfall in 2004 which stands 184.80 inches in 2014. The Figure shows that the rainfall increased almost double in 2014 than 2004. On the other hand, in 2014 the rainfall was more than double in jury valley than 2004. At the same time, rainfall increased at Monu-Doloi and Chittagong valley. But rainfall decreased at Lungla and Luskerpore valley. The Figure shows that rainfall also decreased at Balisera valley. The rainfall of Balisera valley fluctuated between the year of 2004 and 2014. This valley got the lowest rainfall in 2014 which was less than half of 2004.

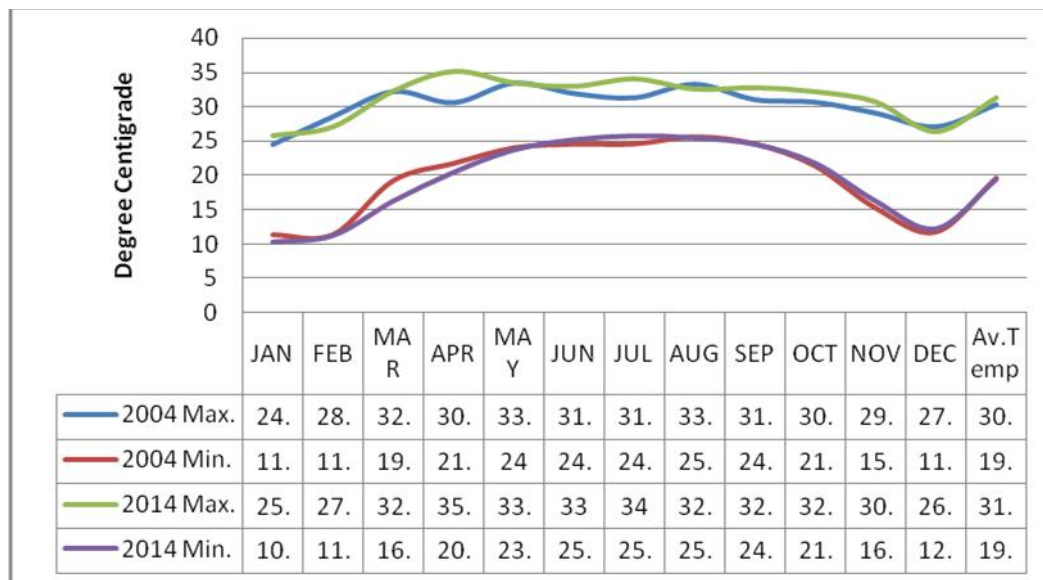
On the other hand, the mean annual rainfall is 2700 to 3000 mm which is eventually distributed nearly six months of the year. High relative humidity is found always in Panchagarh district.

5.2.4.2 Temperature

Temperature is one of the most important climatic factors for the growth and production of green leaf. Photosynthesis and respiration of plants are influenced by temperature. Tea being a perennial plant is grown under a wide range of temperature regimes in the world. It is cultivated best in temperatures ranging from 12.7°C to 28°C and the growth of tea

plant is found retarded at the upper or lower limit of this temperature. The cropping seasons of tea is found to vary from 5 to 12 months in the existing tea areas of the world. In Bangladesh, temperature becomes generally highest in April and May. April is called warmest month in the year. But the temperature diminishes after September or October, after November or December rain becomes meager and prolonged drought occurs. To understand the temperature variation at Srimangal a station of tea producing area is shown in the following Figure 5.2.

Figure 5.2: Comparison of Average Temperature at Srimangal (2004 and 2014)



Source: BTB, 2015

The Figure 5.2 shows that average minimum and maximum temperature at Srimangal was 19.61°C and 30.32°C in 2004. And it was 19.47°C and 31.29°C in 2014 respectively. There was no far difference of temperature between 2004 and 2014 at Srimangal. So, the temperature was suitable for tea plantation.

5.2.4.3 Humidity

85% humidity is suitable for tea plantation. Relative humidity is highest during night and early in the morning and lowest at mid day. Average monthly humidity approaches 90% during the monsoon (June to October), falling to 65% in March. An overall relative

humidity in South-east and North-east regions varies from 56% to 80% and 68% to 86% respectively (BTB and Bangladesh Meteorological Department, 2015).

5.2.4.4 Sunshine

The growth of tea is largely determined by the intensity of sunshine. As the tea is very sensitive to the day length, it appears that winter dormancy in tea occurs only in those tea areas that are at higher latitudes. Although an intensity of 1500 to 2500 feet candles is known to be sufficient for photosynthesis. The overall effect of Evapo-transpiration has great importance for the growth of plant.

5.2.4.5 Drought

Drought is a natural factor which influences production. Tea plantation face drought due to seasonal variation. The tea plantation regions experience water surplus during rainy season but water deficit during November to April. Thus, it suffers from drought in the early of the tea cropping season. The drought is caused mainly by adverse climate conditions that exert influence on crop physiology and yield potential. Main effect of drought is the water loss from the plant surface through high evapo-transpiration rate and evaporation from the soil surface, plant lose water through the process of transpiration and gestation.

Tea gardens experience longer dry spell during winter and often rainless days are observed during December to February even March to April. As a result, in this period production almost closed.

5.2.4.6 Wind Breaks

Bangladesh faced wind break several times in a year due to seasonal variation. Tea plants may be damaged by storm and high wind. But wind blowing over tea plants increases the loss of moisture by evaporation from the leaf surface. The high speed of the wind will cause larger loss especially during dry winter. The leaves will wilt and may suffer

permanent damage. To protect tea from such storms flowing over tea the use of some trees as wind break is common in tea plantation.

5.2.5 Land Erosion

Land erosion is a common feature near the river. But although, most of the tea garden situated in the hilly area, sometimes faces land erosion. Land erosion is likely to take place whose maximum duration first five years when the plantation young. This erosion occurs due to heavy rainfall with a speed of 20 miles/hour. When tea plants become matured, canopy is formed by matured tea bush over the soil. At that time, rain cannot hit the soil due to canopy and shade tree, grasses help to protect erosion. During the field survey, a number of respondents mentioned that soil erosion affects plantation especially where plant near to the river or stream. Surface erosion happened due to the action of surface flow or channelized flow of water, in contrast, results information of rills and gullies by the scouring action of over increasing volumes of muddy water.

5.2.6 Drainage

Drainage means the removal of excess water from the root zone of the plant in the quickest possible time, without causing any injury to the standing tea plant. Proper drainage is very much essential for tea plantation. Tea plant cannot tolerate water logging. Proper drainage results in restricted root-proliferation making the plants drought susceptible and more prone to many root diseases. The efficient drainage system aims at removing surface and runoff water during excessive rain particularly from tillah and high flat areas and also reducing the water Table to a minimum depth of 1.0 to 1.5 meter during monsoon in flat areas. Drains must be cleaned and regarded during March.

5.2.7 Shade Tree

Shade tree is an important feature for tea plantation. It also gives timber which is one of the sources of income and keep environment green. The salient characteristics of tea plantation are that it is mono culture and accordingly soil fertility cannot be conserved by a system of crop rotation. To make good this defect, in most plantations other species are inter planted with the main crop for the purpose of controlling and enhancing the supply of nutrients from the soil.

Shade trees are essential for modulating the environment of tea eco-system. It is also enriching the soil fertility by supplying nutrients. Moderate shade allows 50% to 70% sunshine in the plantation is considered suitable. Shade trees are considered necessary for the following reasons.

1. To reduce leaf temperature and protect the tea bushes from sun scorch.
2. Supply valuable humus through leaf fall.
3. Reduce the incidence of pests and diseases and Break up the hot winds.

For the above mentioned purposes a suitable and systematic shade management essential in Bangladesh. A mixed stand of permanent, semi permanent and temporary shade is recommended for proper plantation.

5.2.8 Tea Disease

Plants like animals are overwhelmed by a multitude of diverse diseases caused by various living organisms and non-living agents. These agents are grouped as biotic agents (such as- Bacteria, algae, fungi, virus) and non-biotic agents (such as nutritional deficiency). These casual agents produce a sort of pathological states to plant which are expressed as symptoms or syndrome of maladies. The most common foliar diseases in Bangladesh tea are Black Rot, Corticium, Invisum Patch and Theca Bern; Blister Light, Grey Bligh etc.

The disease of tea plant affects production. So, tea plantation needs proper pest and disease management.

5.3 Labourer and Other Social Factors

Besides physical factors, labourer is the major influencing factor of tea industry. Besides labourer, there are other some social factors which influences tea plantation. The labourer and other social key influencing factors are described below.

5.3.1 Labourer

Labourer is a primary factor of production of tea industry. Tea industry widely known as labourer oriented industry. Every operation right from the preparation of soil for seed bari to the pruning of plants, spraying fertilizer and pesticides, irrigation, weeding, green leaf pluck, withering, termination and processing in factory is highly specialized job, requiring skill and experience. The plucking operation requires precision and the touch of soft fingers of the women labourer. For this, Engagement of women's labourer is higher in tea plantations because of their gendered-attributes to the task of picking tea leaves in particular and for maintaining a steady social reproduction of labourer. Women have more skilled and nimble fingers than men. So, both men and women labourers are significant factor of tea industry.

5.3.2 Capital

Capital refers to financial assets or the financial value of assets such as cash and funds held in deposit accounts, as well as the tangible machinery and production equipment used in environments such as factories and other manufacturing facilities. Additionally, capital includes facilities, such as the buildings used for the production and storage of the manufactured goods. Capital is one of the most important economic factor for any

industry. In tea industry, a large amount of capital need to prepare a garden, establishment factory, infrastructure for staffs and labourer, wages of labourer, purchasing fertilizer and pesticides, irrigation, vehicle for transportation etc. But small growers and holders can start tea plantation with small capital by using their own land property. A number of gardens in Bangladesh face economic crisis. As a result, they can't compete with other gardens.

5.3.3 Market

A market is defined as the sum total of all the buyers and sellers in the area or region under consideration. The area may be the earth or countries, regions, states or cities. The value, cost and price of items traded are as per forces of supply and demand in a market. The market may be a physical entity or virtual. It may be local or global, perfect and imperfect. Market also influences tea industry like other industries. Bangladesh has a wide internal consumption market and also global market which is a positive factor for the tea industry.

5.3.4 Transport

Transport is a method of travelling or moving things from one place to another. It has a significance role for industry. Transport is used in every sphere of an industry to carry anything from one place to another. In tea industry, transport is used for carrying green leaf from field to factory and factory to warehouse for auction, carry labourer from one section to another section of a garden etc. If transport system does not work properly, green leaf and made tea lost its quality and affects the industry.

5.3.5 Plantation Methods and Materials

Methods and materials have a significant role on tea plantation. Tea production and quality depends on proper plantation methods and materials. There are some major

methods such as land prepare for seed bari and nursery, mulching, pruning, tipping, weeding, plucking round which influences plantation. Besides plantation methods, planting materials such as fertilizer, pesticides, irrigation, factory, spare parts and utility services have significance influences on tea plantation.

5.3.6 Government Initiatives and Industrial Policy

Government initiatives and industrial policy influence any industry of a country. The industrial policy of a country is official strategic effort to encourage the development and growth of part or all of the manufacturing sectors as well as other sectors of the economy. The government takes measures aimed at improving the competitiveness and capabilities of domestic firms and promoting structural transformation. In these considerations, government initiative and industrial policy influence the development of whole tea industry. Tea industry is very different from other industries. The production process of tea involves both agriculture and industry. So, it requires special initiatives and industry friendly policy which can positively influenced the industry.

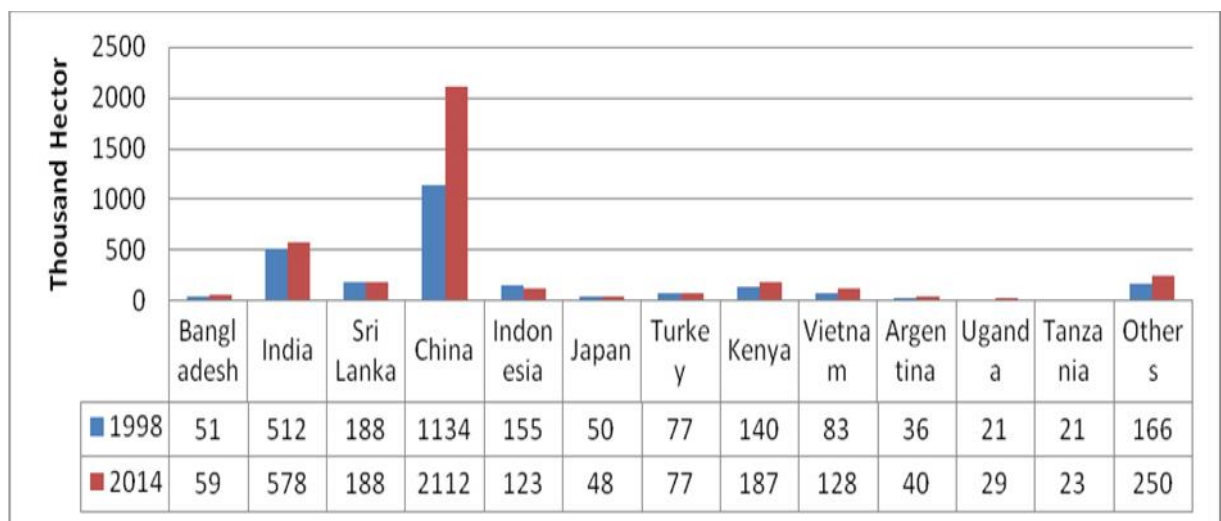
Chapter-6

Temporal Changes of World Tea Industry

6.1 Tea Plantation Area in the World

There are more than forty tea producing countries in the world. Among the tea producing countries, India, China, Sri Lanka, Kenya, Indonesia, Bangladesh and Japan are dominant in this industry. According to ITC- 2014, there was 3,841,000 hectares area under tea plantation in the world. China has the highest tea plantation area in the world. At the same year, India was in the 2nd position and Sri Lanka 3rd position where Bangladesh 8th position in respect of tea plantation area. During the mentioned time, almost all tea producing countries increased tea area except Turkey. In the year 2014, China had 2112 thousand hector tea area which is nearly doubled than 1998. China rapidly increased tea plantation area to ensure supply internal consumption demand and dominant the international tea market as their business policy. On the other hand, the plantation area of India was 578 thousand hector, Sri Lanka 578 thousand hector, Kenya 187 thousand hector and Bangladesh over 59 thousand hector in 2014. The world tea plantation area is given in the following Figure 6.1.

Figure 6.1 Tea Plantation Areas of Major Countries (1998 and 2014)

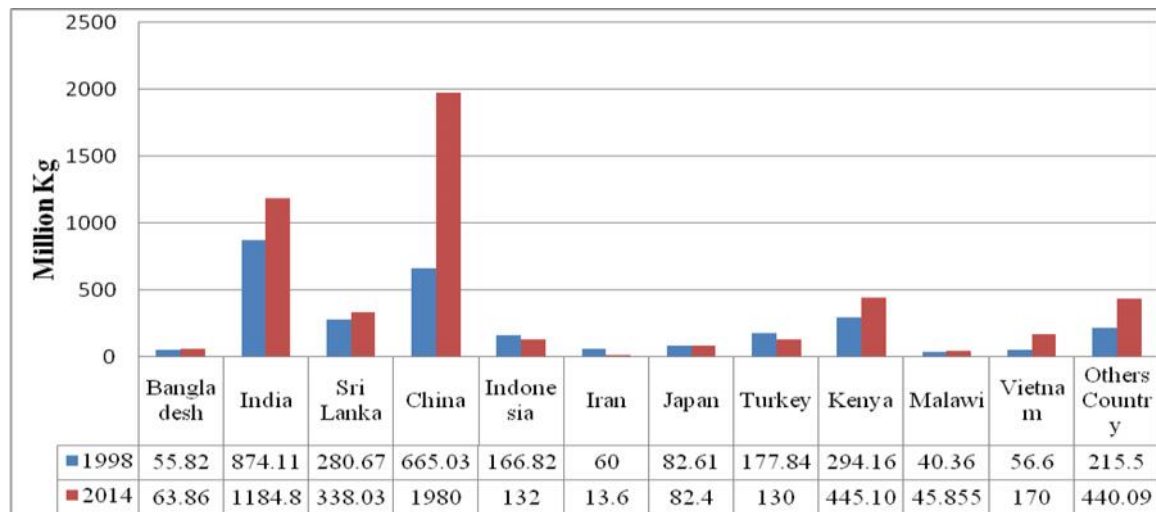


Source: ITC Bulletin -2003 & 2014 and BTB 2004 & 2015

6.2 Country Wise Production

In the world, tea production was increased over the years. Among the tea producing countries, China, India, Sri Lanka, Kenya, Indonesia, Turkey, Vietnam and Bangladesh are dominating tea producers. But the production increasing pattern is not equal of all countries. Such as China rapidly changed internal production within few years but the others were unable to do. To know the changes of world production compared to the year of 2003 and 2014. The Figure 6.2 shows that world tea production was increased in 2014 compared to 2003. Major tea producing countries also increased production. According to ITC, the world tea production was 5026 million kg in 2014. In this year, the production of China was 1980 million kg, India 1185 million kg, Kenya 445 million kg, Sri Lanka 338 million kg, Bangladesh 64 million kg and rest of the tea was produced in different countries. In 1998 world tea production was 2969.52 million kg. Production changes in major countries is shown in the following Figure 6.2.

Figure 6.2: Production Changes of Major Countries (1998 and 2014)



Source: ITC Bulletin, 2003 & 2014 and BTB 2004 & 2015

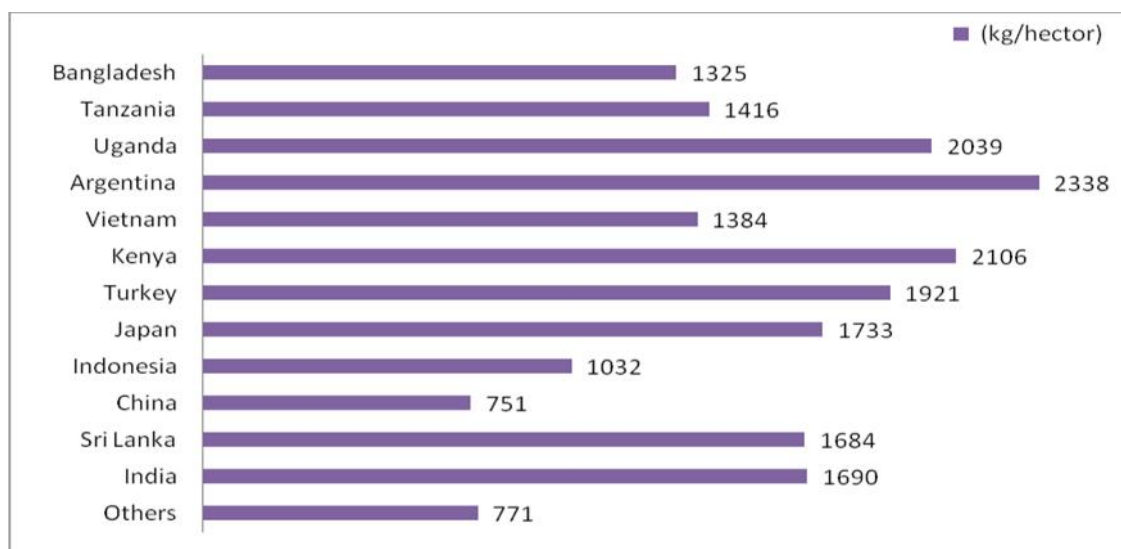
The above Figure shows that China has dramatically changed production within few years. In 2014, China increased tea production to 1315 million kg more than 1998. The Figure shows that the production reached more than double within 15 years. At the same

time, Bangladesh increased production only 12.22 million kg than the year 1998. Apart from China and Bangladesh, tea production increased in Sri Lanka, Kenya, Malawi and Vietnam etc. As seen in the Figure 6.2 production declined in Indonesia, Iran and Turkey. According to the above mentioned data, China accounted for 28% of world production, followed by India 17%, Sri Lanka 5%, Kenya 6% and Bangladesh only 1.3% in 2014. In 1998, India was first position in production but in 2014 China achieved this position.

6.3 Yield Variation of Major Countries

Per hector yield is not equal in all countries. It varies from country to country. It is mostly depends on physical factors, age of tea bushes, land fertility and productivity, labourer productivity, management strategy and policy etc. In 2013, Bangladesh yield only 1325 kg/hector where Argentina 2338 kg/hector, Kenya 2106 kg/hector, India 1690 kg/hector and Sri Lanka 1684 kg/hector. On the other hand, China yield only 751 kg/hector although produced highest quantities tea in the world. The yield trend of major tea producing countries is shown in the following Figure 6.3.

Figure 6.3: Yield Variation of Major Countries in 2013

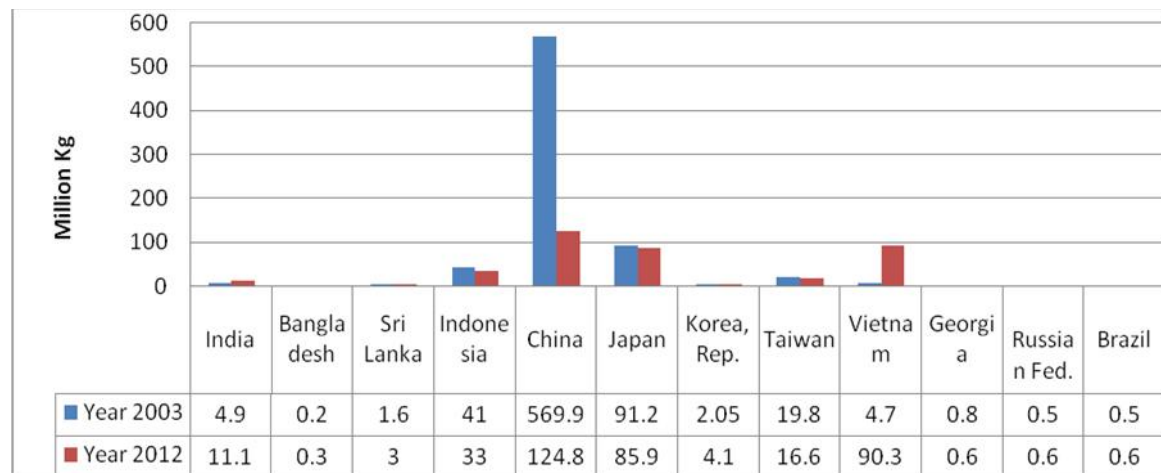


Source: ITC, 2014

6.4 Green Tea Production

In 2012, green tea production was 1495.77 million kg out of total production 4624.62 million kg which was only 779.48 million kg out of 3062.67 million kg in 2003. Within 10 years, green tea production increased nearly double than 2003. China is the highest green tea producer in the world. In 2012, China produced 124.82 million kg where Vietnam produced 90.30 million kg, Indonesia 33 million kg, India 11.08 million kg and Bangladesh only 0.25 million kg. Green tea production comparison between the year of 2003 and 2012 is shown in the following Figure.

Figure 6.4: Comparison of Green Tea Production in the World (2003 and 2012)



Source: ITC-2013

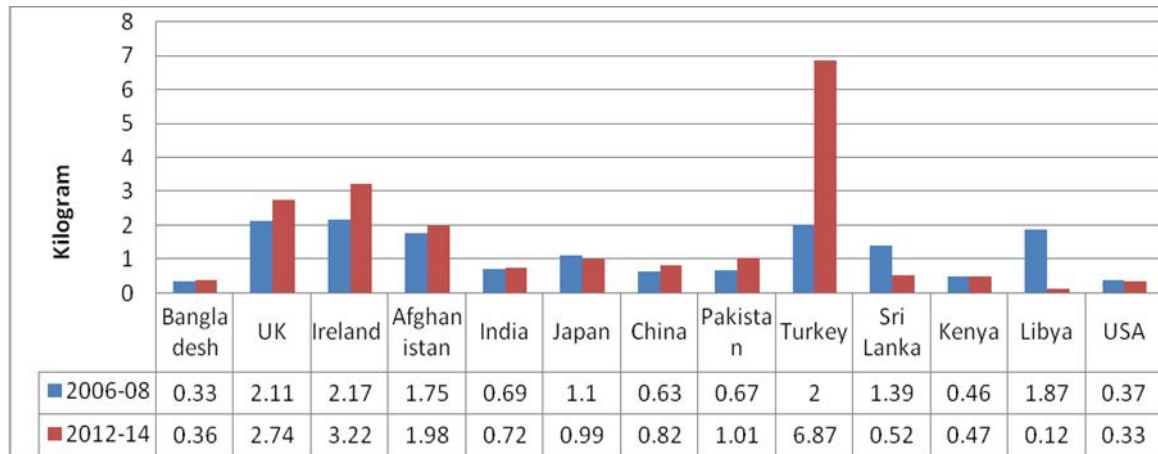
6.5 Per Capita Consumption in Major Countries

The quantity of per capita⁵ consumption varies from country to country. Per capita consumption is also influenced by tea culture and tea drinking behaviour. According to ITC (2014), per capita consumption is very high in Turkey compared to the other countries. The years 2012-14, per capita consumption was 6.87 kg in Turkish which was only 2 kg in 2006-08. At the compared year 2006-08 and 2012-14 per capita consumption

⁵ Per capita consumption is average consumption per head of total population in kilogram.

of India 0.69 kg and 0.72 kg, Pakistan 0.67 kg and 1.01 kg, China 0.63 kg and 0.82 kg, Ireland 2.17 kg and 3.22 kg respectively. The comparison of per capita tea consumption is shown in the following Figure 6.5.

Figure 6.5: Per Capita Consumption Variation of Major Countries



Source: ITC, 2014

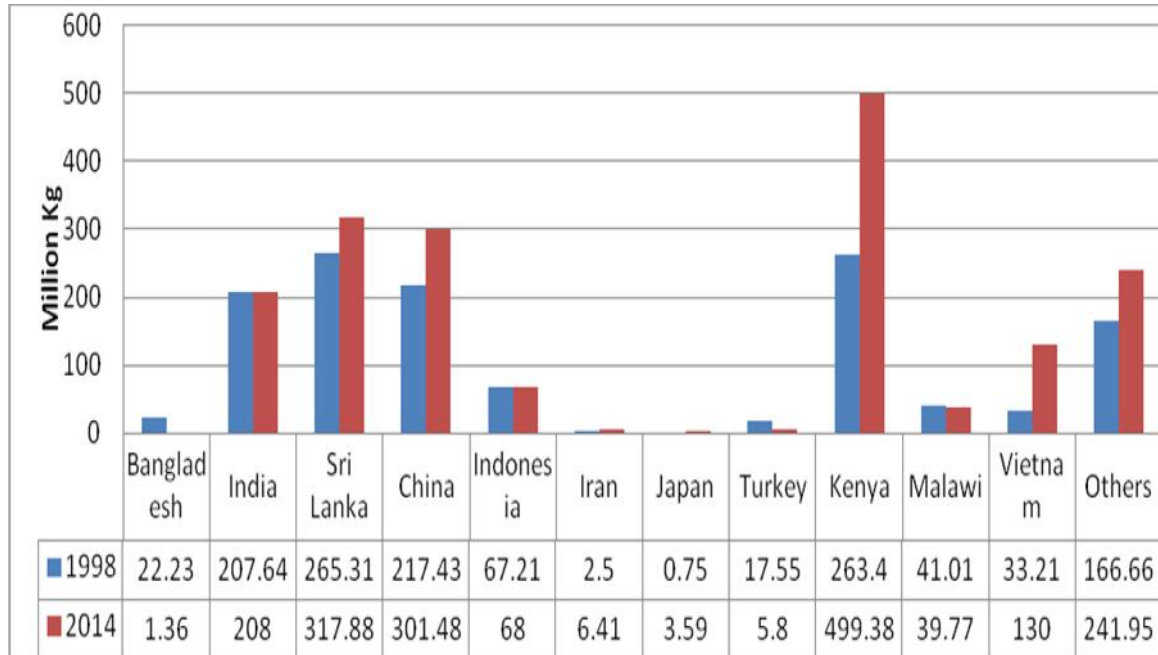
The above Figure shows that per capita consumption is low in major tea producing countries than other countries. The per capita consumption of the Bangladeshi people also increased with a small scale. But total yearly consumption is very high which does not allow more export.

6.6 Major Exporting Countries

The major tea producing countries consumed large quantity of own produced tea because of high internal consumption market. As a result, they are not capable to export more. But those tea producing countries whose consumption market is small than production, they comparatively export more than other countries. According to ITC, world tea export was 1824 million kg in 2014. In this year, Sri Lanka exported 318 million kg, Kenya 499 million kg, China 301 million kg, India 208 million kg and other countries exported the rest of tea. On the other hand, world tea total export was 1305 million kg in 1998 where China exported 217 million kg, India 208 million kg, Sri Lanka 265 million kg, Kenya

263 million kg and Bangladesh 22.23 million kg. According to the Figure 6.5, large quantity of export decreased within last few years. In 2014, the export stood only 1.36 million kg. In 2014, China was in the first position in production but Kenya first in export.

Figure 6.6: World Tea Export Changing Trend (1998 and 2014)



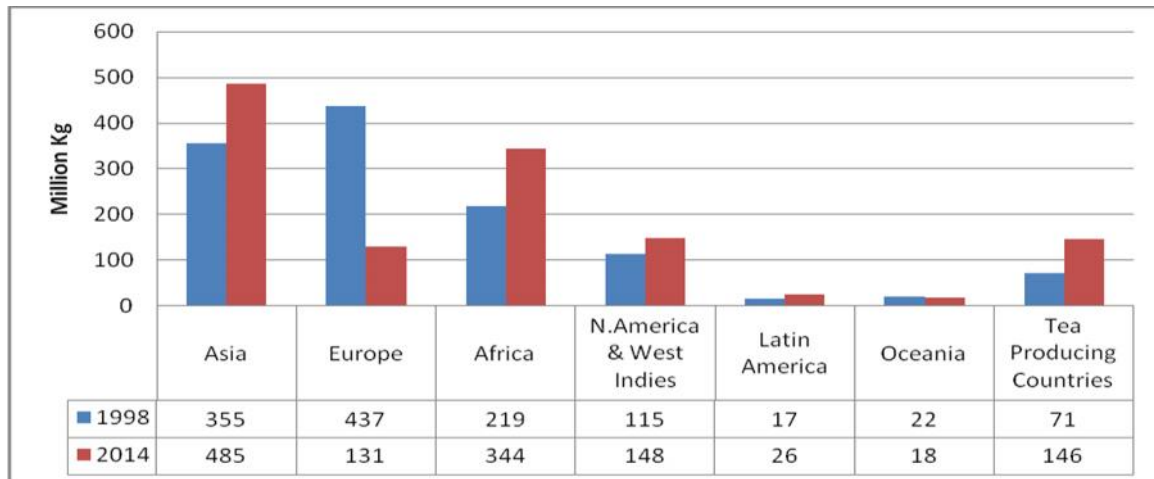
Source: ITC Bulletin, 2003 & 2014 and BTB, 2004 & 2015

Kenya, Sri Lanka, China, India, Vietnam are the dominant exporting country. In export, Kenya has dominated the world market for several years and its rate of growth is much faster as compared to other competitive countries. While Kenya dominates the international export market, India, China, Indonesia, Vietnam and Bangladesh have declined their export share in 2014 as compared to the previous year 1998. There is needed to mention that low domestic consumption of tea has allowed Sri Lanka and Kenya to maintain relatively high export share.

6.7 Import Trend of Geographic Regions

Many countries import tea for internal consumption in the world. There are both tea producing and non-producing countries. Mostly non-producing countries import tea for domestic consumption. Asian countries always import tea highest quantities for internal consumption although this region first in production. In 1998, Asian countries imported around 355 million kg out of 1305 million kg of international trade which stood 485 million kg out of 1301 million kg in 2014. On the other hand, major tea producing countries imported 71.40 million kg tea in 1998 which reached up to 146 million kg in 2014. The comparison of tea import of different geographic region is given in the following Figure 6.7.

Figure 6.7: Comparison of Tea Import at Different Geographic Regions (1998 and 2014)



Source: ITC Bulletin 2003 & 2014 and BTB 2004 & 2015

Chapter-7

Regional Pattern and Temporal Changes of Tea Industry

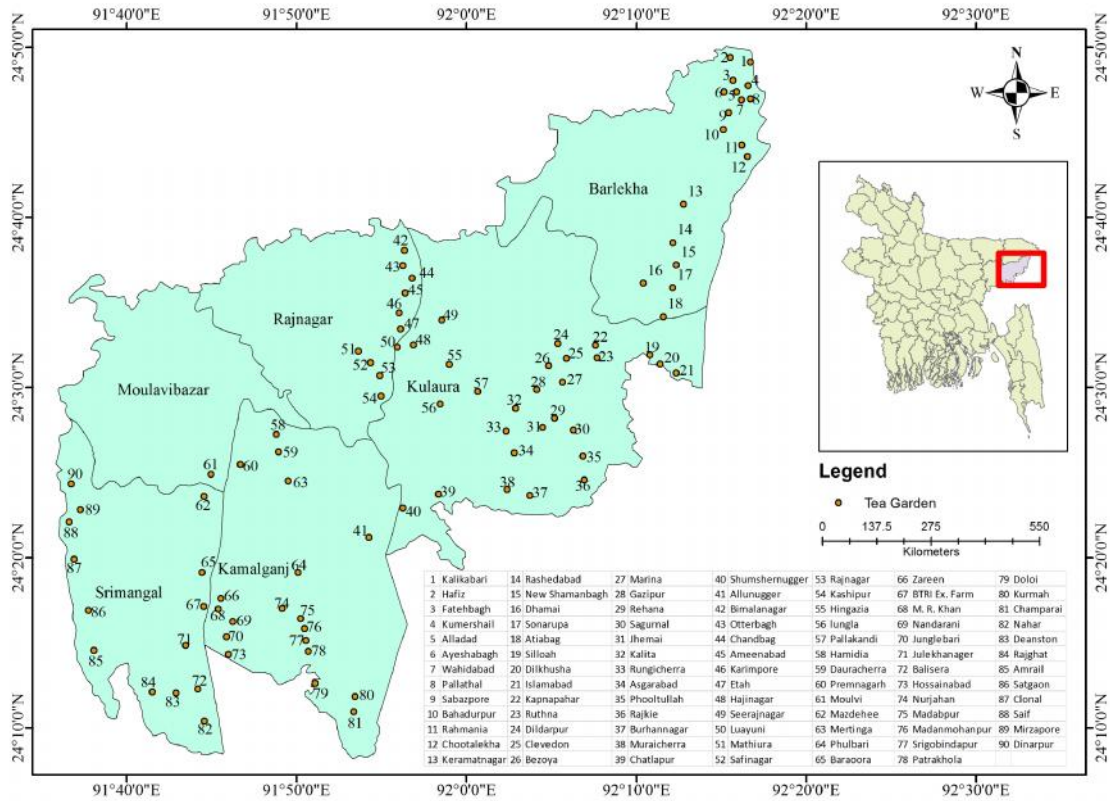
7.1 Regional Pattern of Tea Garden

There are few districts of three regions in Bangladesh where tea gardens are situated. The regions are North-east, South-east and North-western region of the country. Most of the large garden agglomerated in North-east region specially Maulvibazar district. Sylhet and Habiganj district also concentrated with large tea garden. At the same time, large garden agglomerated in Chittagong district of South-east region. On the other hand, small growers and holders are agglomerated in Panchagarh district of North-western region. Besides small growers and holders, large garden also established here.

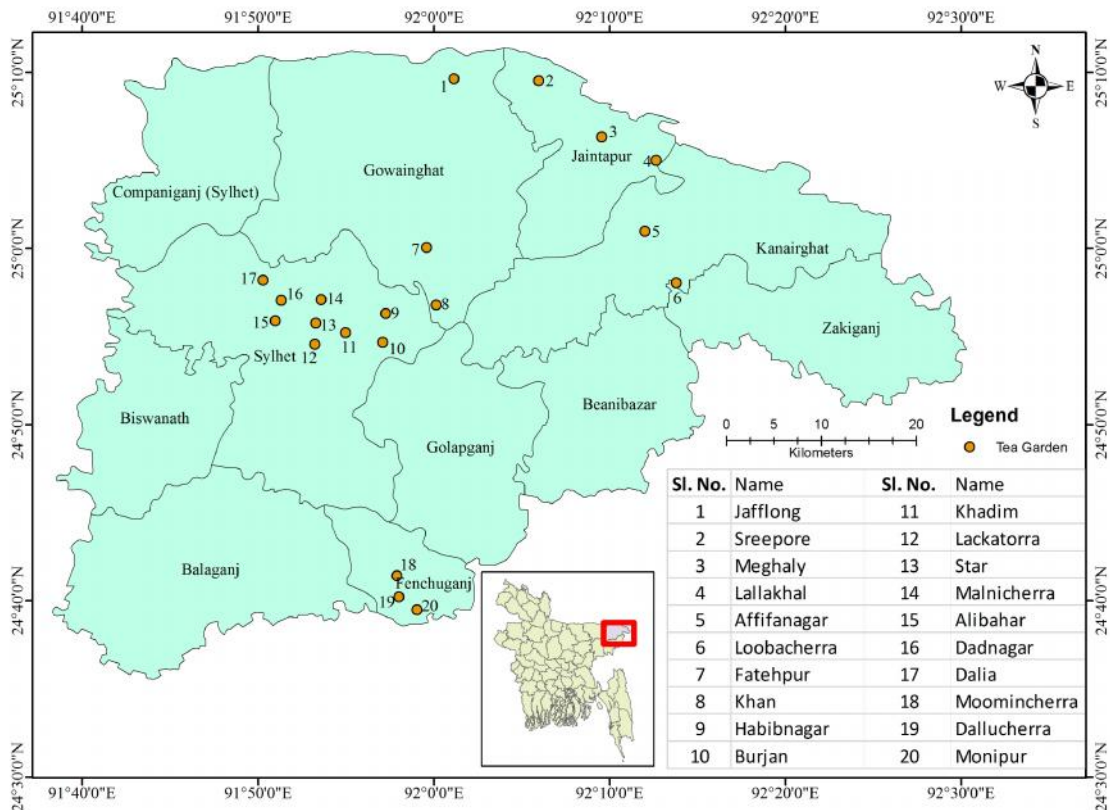
7.1.1 North-east Region

North-east region is the dominant tea producing region of the country. The tea producing district of Maulvibazar, Sylhet, Habiganj and Brahmanbaria district is situated in North-east region. In this region, all gardens are large in size. There are no small growers and holders. Among the tea producing districts of North-east region, most of the garden agglomerated in Maulvibazar district. Maulvibazar district belongs 90 gardens out of 166 (Map 7.1). The tea garden of Maulvibazar district is situated at Srimangal, Kamalgonj, Rajnagarh, Kulaura, Barlekha (including Juri) and Maulvibazar sadar upazilla. On the other hand, tea gardens of Sylhet district concentrated at Sylhet sadar and Jaintapur upazilla. Besides these, tea gardens are situated at Fenchugonj, Kanaighat and Goainghat upazilla in Sylhet district (Map 7.2). In Habiganj district, tea gardens are situated at Bahubal, Madhabpore and Chunarughat upazilla. There is also a tea garden in Brahmanbaria district at sadar upazilla which is not in production (Map 7.3).

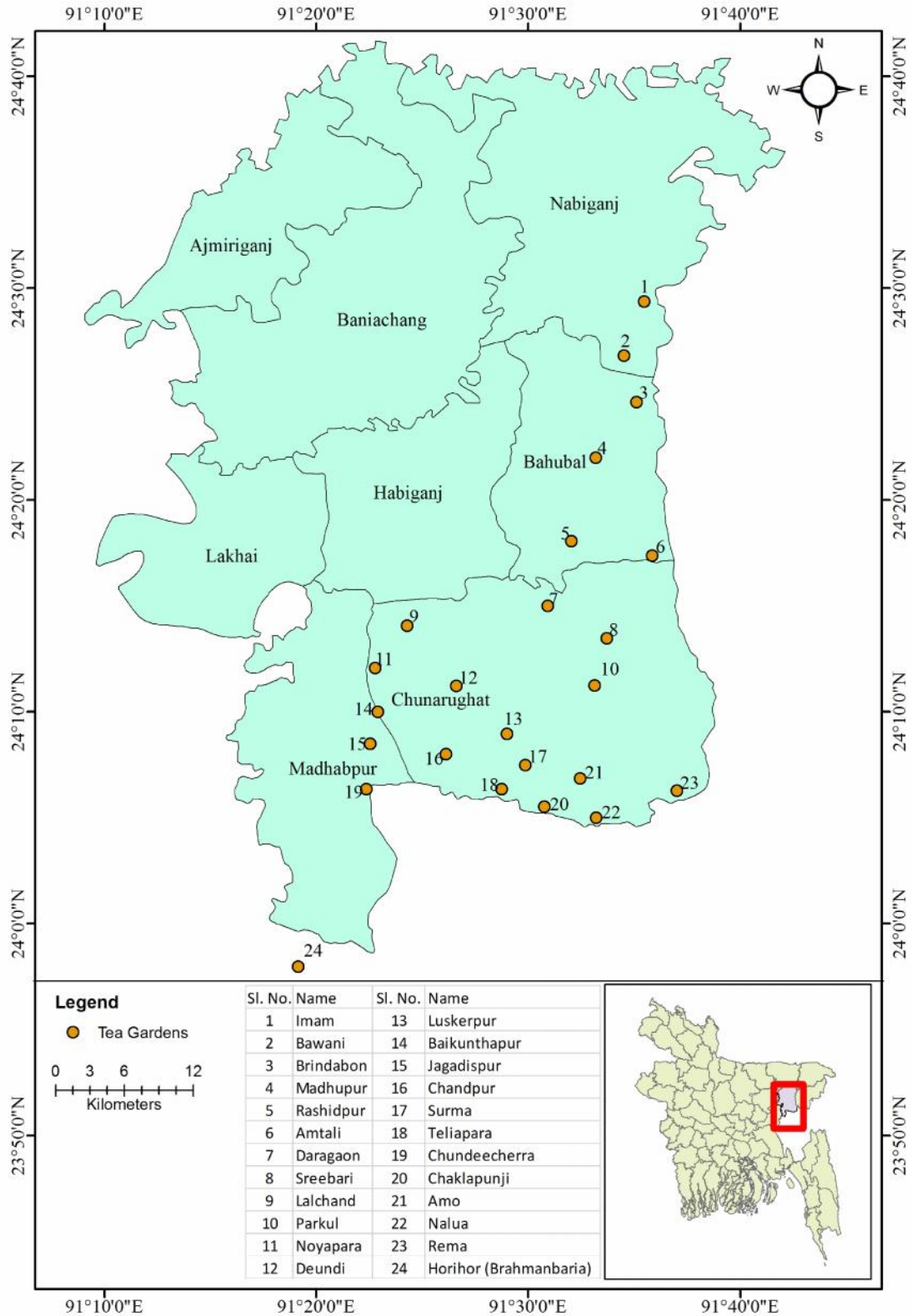
Map 7.1: Large Tea Gardens in Maulvibazar



Map 7.2: Large Tea Gardens in Sylhet



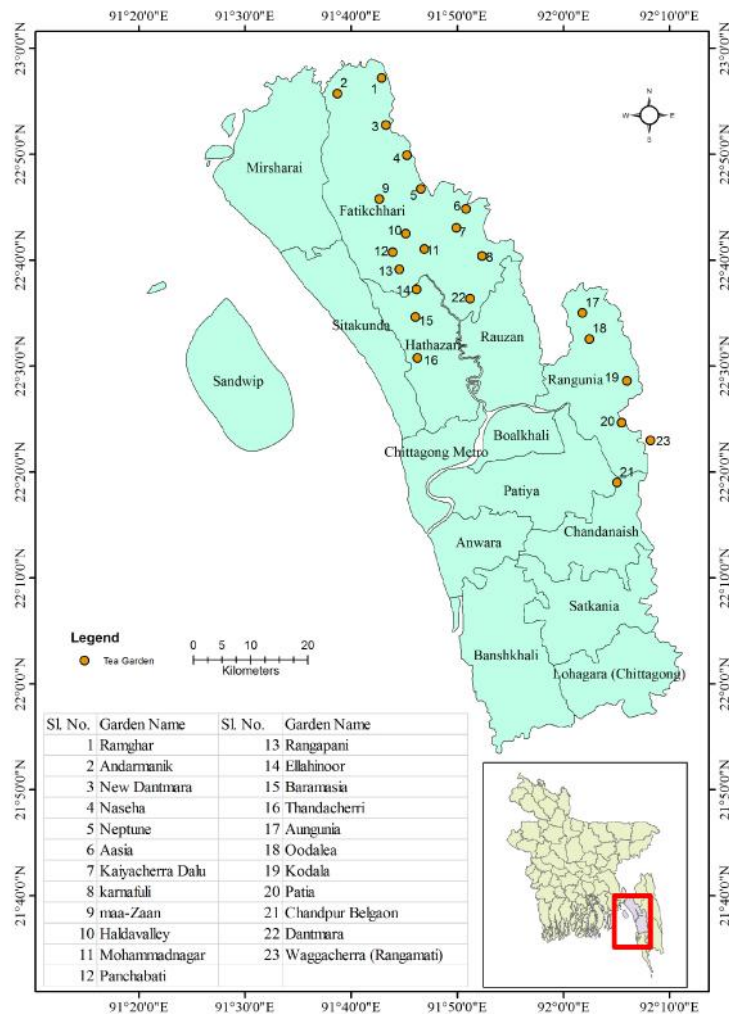
Map 7.3: Large Tea Gardens in Habiganj



7.1.2 South-east Region

South-east region is the second largest tea producing region of the country. There are 23 tea gardens in this region. All the tea gardens of this region are agglomerated in Chittagong district. Only one tea garden is situated at Kaptai upazilla in Rangamati hilly district (Map 7.4). There are 14 upazilla in Chittagong district. But most of the tea gardens concentrated in Fatikchhari upazilla. There are 19 tea gardens in Fatikchhari. Besides Fatikchhari, each garden belong Patia, Rangunia and Hathazari upazilla. The only tea garden of Rangamati is situated in Kaptai. Besides large gardens, small block plantation started in Bandar Ban and Rangamati district. South-east region is trying to increase overall production where it is almost successful.

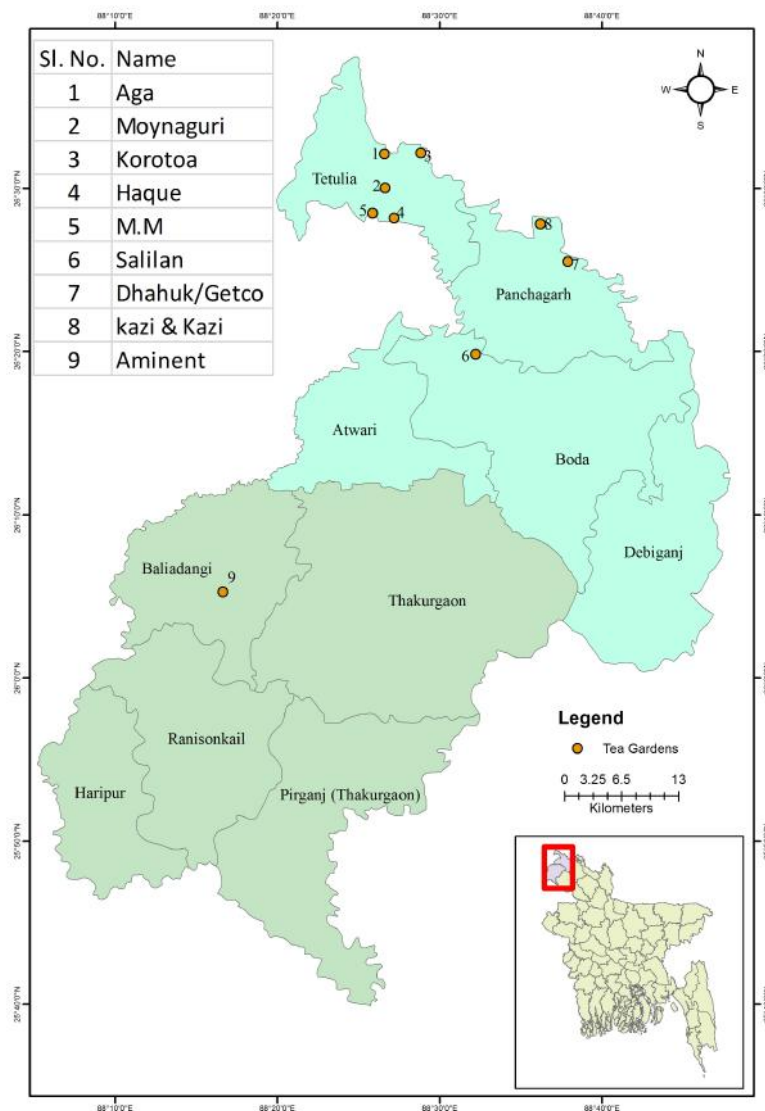
Map 7.4: Large Tea Gardens in Chittagong



7.1.3 North-western Region

North-western part of the country is known as the plain land tea plantation region in the country. This region is the piedmont plain of Himalayas. It was unimaginable that tea produce in plain land. But this unthinkable work has been done by the North-western region. In this region, tea plantation started in 2000 which is mentioned before. All the gardens both large and small block are established in plain land of Panchagarh district. Recently, Thakurgaon and Lalmonirhat district of North-western region started tea plantation with a small scale (Map 7.5). North-western region is familiar for small scale

Map 7.5 : Large Tea Gardens in Panchagarh and Thakurgaon



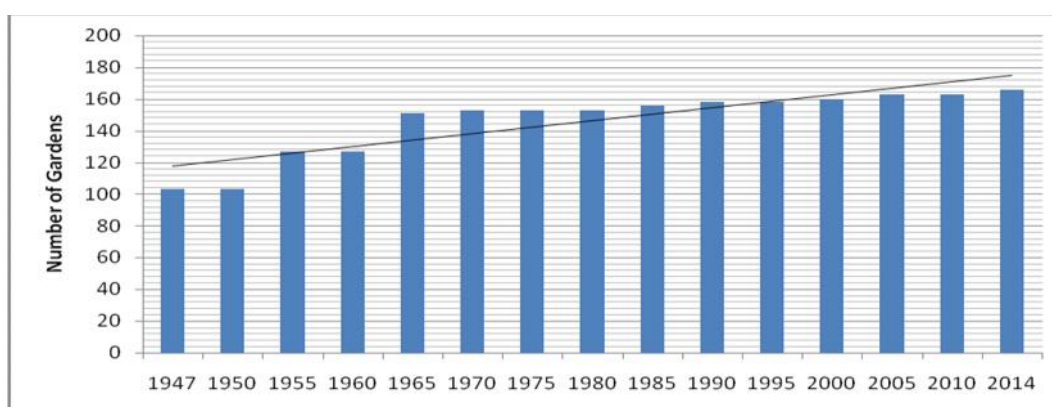
tea plantation. Besides small scale plantation, there are 15 small holders and 9 large gardens. According to BTB Regional office of Panchagarh, there are 276 small growers in Panchagarh district (November, 2014). Most of the gardens agglomerated in Tetulia upazilla. Besides Tetulia upazilla, tea gardens are also established at Panchagarh sadar and Atwary upazilla. The general farmers planted small and medium scale plantation in this region. On the other hand, large gardens were established by company and proprietor. Besides panchagarh, there is also a large garden in Thakurgaon district at Baliadangi upazilla.

7.2 Tea Garden and Management Pattern

Tea garden and management pattern depends on various aspects. Such as- tea garden established at different periods on the basis of entrepreneurs initiatives and logistic support of the government. On the other hand, grant area and tea area, different ages of tea plant, garden ownership and management, land lease pattern, land use pattern are very much important factors for tea industry.

7.2.1 Increasing Trend of Tea Garden

There are 166 tea gardens in Bangladesh. During the British period, there were 103 tea gardens in Bangladesh. From 1947 to 2014, 63 new gardens were established at different districts of North-east, South-east and North-western region. During the period of 1947 to 1970 it reached at 153. From 1970 to 1990, only 7 tea gardens were established at different district. So, there was a long gap of new garden establishment from 1970 to 1999. As a result, there was created an imbalance among tea production, consumption and export. In 2000, new plantation started in North-western region and included in production trend. Figure 7.1 shows the tea garden establishment trend from 1947 to 2014.

Figure 7.1: Increasing Trend of Tea Garden (1947 to 2014)

Source: BCS 1982, 2011-12 & BTB-2015

Besides the large garden, small growers and holders started tea plantation with small scale from the beginning of 21st century. In the early stage, it was very slow but after success of few farmers it has rapidly increased. The farmers take it as a profitable agricultural product. At present, there are many registered and unregistered small growers and holders in North-western region. The above Figure 7.1 shows that there is a moderated positive trend of tea garden establishment.

7.2.2 Regional Variation of Total Area and Tea Area

According to BTB, there are 115,707.89 hectares total area under tea garden in Bangladesh. But tea plantation area only 59,609.43 hectares which is 51.52% of total land. In 2003, grant area was 114, 912.87 hectares and tea area was 52,201.63 hectares. According to statistics, 6.09% tea area increased in 2014 than 2003. The grant area, tea area and registered suitable area for tea plantation of three regions are shown in Table 7.1.

Table 7.1: Regional Pattern of Total Area, Tea Area and Suitable Area for Plantation

Region	Total Area (Hector)	Net Tea Area (Hector)	Land Used for Tea (%)	Suitable for Tea Plantation (Hector)
North-east	98027.24	51495.68	52.53%	4864.51
South-east	15636.63	6599.92	42.20%	2278.17
North-western	2049.02	1513.83	73.88%	535.28
Total	115712.89	59609	51.52%	7677.96

Source: BTB, 2015

The above Table 7.1 shows that North-east region belongs the highest quantity of total area and net tea area. This region used 52.53% land for tea plantation. On the other hand, South-east region covered only 6599.92 hectares tea area which is 42.20% of total land. North-western region has 2049.02 hectares total grant area which is covered 73.88% tea area. So, according to the Table 7.1, total area and tea area is the major difference among three regions. At the same time, three regions have only 7677.96 hectares suitable area for tea plantation. So, it is needed to find out new tea plantation area for increase tea production.

7.2.3 Tea Area at Different Ages

There are different ages of tea plants in a garden. Among different ages tea plant, 17,585 hectares area covered mature tea at different gardens in Bangladesh. According to BTB, 15,279 hectares area have old tea plant and 8651.24 hectares have very old tea plant. Only 1101.98 hectares area have uprooted/rehabilitated tea plant and 5604.60 hectares immature tea. So, total production and average yield affected by old ages tea bushes. The tea area and percentage of different age's plant is shown in the following Table.

Table 7.2: Tea Area at Different Ages -2014

Age of Tea Plantation	Tea Area (Hector)	Percentage
Seedbari/Nursery	959.80	2%
Uprooted/Rehabilitated	1101.98	2%
Immature Tea (0-3 years)	5604.60	10%
Young Tea (4-10 years)	8912.17	15%
Mature Tea (11-40 years)	17586	30%
Old Tea (41-60 years)	15279	26%
Very Old Tea (above 60)	8651.24	15%

Source: BTB, 2015

According to BTB, Sterling companies owned 23,443 hectares land while Bangladeshi companies and proprietors owned 90,221 hectares. But land utilization ratio for tea plantation of sterling company is more than Bangladeshi companies and proprietors.

Sterling companies used 12,821 hectares land for tea plantation which is nearly 55% of total area. And Bangladeshi companies and proprietors used around 46,788 hectares land which is 50.71% of total land.

7.2.4 Garden Ownership and Management

Most of the tea gardens were pioneered by the British owners as part of their colonial policy. After that a few Indian entrepreneur also came forward and started tea plantation. At present, the ownership and management of tea garden is mainly handled by the private sector. The owners, proprietors and agencies of tea companies are controlling the production. There are two types of ownership and management of tea gardens in Bangladesh. These are- Sterling companies and Bangladeshi companies & proprietors. Besides these, small growers and holders are self ownership and management practices existed. There are 21 gardens owned by the sterling companies and 145 gardens owned by Bangladeshi companies and proprietors. The number of tea garden owned by sterling companies and Bangladeshi companies & proprietors is given in the following Table 7.3 .

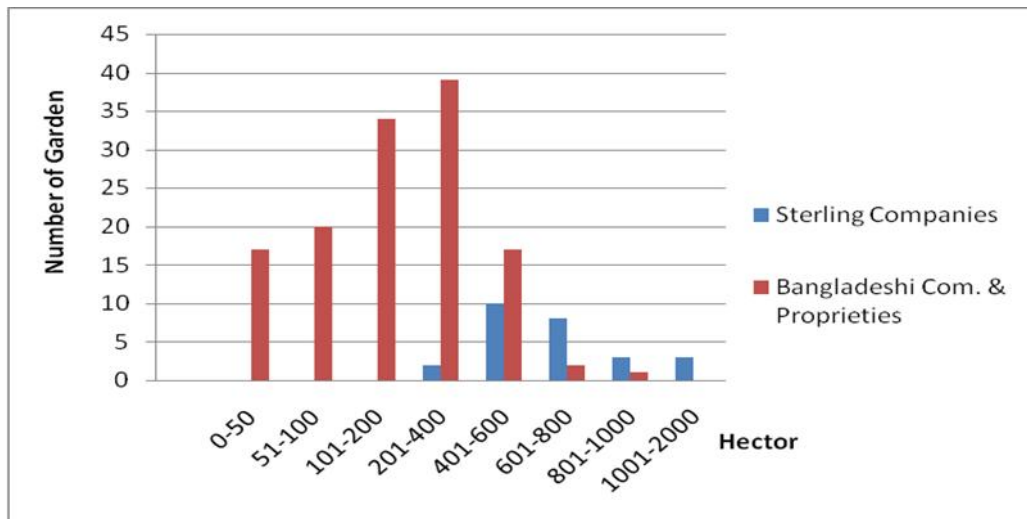
Table 7.3: Ownership and Management of Tea Garden

Type of Ownership and Management		Number of Tea Garden
A. Sterling Company	Duncan Brothers (BD) Ltd.	16
	Deundi Tea Co. Ltd.	4
	The New Sylhet Tea Estate Ltd.	1
B. Bangladeshi Ownership	Bangladesh Tea Board	3
	National Tea Co. Ltd.	13
	Finlay	7
	Private Ltd. Co.	53
	Proprietary	59
	Sub Total	166
	Small Growers	276
	Small Holders	15
Total		457

Source: BTB-2014

The size of tea gardens is not equal, differences exist. Because the size of tea gardens depend on land leased situation. The government gives the land lease to the companies and proprietors for different tenure. Management wise size of tea garden is shown in the following Figure 7.2.

Figure 7.2: Size of Tea Garden by Management Type



Source : BTB, 2015

The above mentioned Figure shows that the garden size of sterling companies is bigger than Bangladeshi companies and proprietors. Although, the number of tea garden of Sterling companies is less than Bangladeshi companies and proprietors. On the other hand, the small growers' garden size up to 2.02 hectares and small holders' garden size 2.03 to 8.1 hectares.

7.2.5 Tea Garden Land Lease Pattern

The tea gardens of North-east and South-east region established by taking land leased from the government. The government gives the land lease for different tenure. The traditional tea producing region of South-east and North-east belong 113,663.87 hectares land for tea garden. The land lease agreement is signed between the garden owner and Deputy Commissioner on behalf of the government. Among the tea garden, 130 have

signed lease agreement with the government. There are 16 gardens under process of lease and 14 gardens have not finalized due to various problems. There are prevailing ownership dispute, case against proper land recording, non transfer of land documents, dispute among share holders, non-payment of BTBs dues and other problematic matters. The present land lease status is shown in the following Table.

Table 7.4: Land Lease Status of Tea Garden (2014)

Lease Status	Lease Period	Number of Tea Gardens
A. Lease deed signed	95 Years	10
	40 Years	19
	35 Years	72
	30 Years	07
	20 Years	23
	5 Years	01
	Sub Total (A)	132
B. Lease deed not signed	Under processing	16
	Have not finalized	14
	Sub Total (B)	30
Grand Total (A+B)		162

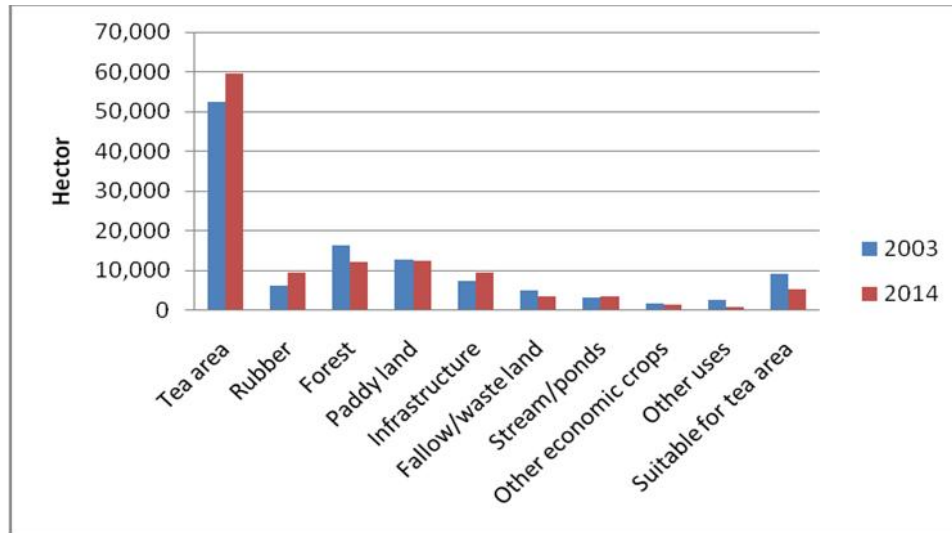
Source: BTB, 2015

7.2.5 Tea Garden Land Use Pattern

The tea garden land uses for various purposes. The land use of a garden differs in many aspects except small growers and holders. In large tea garden, the main emphasis is given to a particular crop tea. The other uses of land are directly or indirectly associated with the tea cultivation. In 2003, total area of tea garden was 113,349 hectares which stood 115,708 hectares in 2014. According to BTB, there was 51.52 % land is used for tea in 2014 which was 45.43% in 2003. In 2014, 48.48 % land uses for various purposes including suitable for new tea plantation areas which was 54.57% in 2003. The land of tea garden is used for various purposes such as office, factory, residence, agriculture, rubber,

stream or pond and other, infrastructures. The land utilization of tea industry is given in Figure 7.3.

Figure 7.3: Land Utilization Changes in the Tea Garden Area (2003 and 2014)



Source: BTB-2015

7.3 Tea Production and Yield Variation

The first condition of positive changes of tea production is to increase tea area with garden and average yield per hector. Bangladesh has already increased tea production over the years but not equally with internal consumption demand. More or less tea production increased every year except natural calamities or other related causes. Yearly total production also influences on consumption and export market. Tea production and yield variation analysed on the basis of yearly, management, valley and also district wise production. About types of produced tea in Bangladesh is also discussed here.

7.3.1 Types of Produced Tea

The pattern and types of production tea is directly linked to the market demand and different sale practices of each region. The market demands sometimes force producers to change the nature of production and mode of manufacturing tea. Such as the elite and

health conscious consumers of the country converting their tea drinking behaviour from black tea to green tea or organic tea steadily. The nature of tea production mainly includes chemical to organic forms and the type of tea shifts from orthodox tea to CTC. Tea is traditionally classified on the basis of degree or period of fermentation. Bangladesh mostly produced black tea. At present, almost 30 country produce 70% black tea, 25% green tea and the remaining 5% consisted of oolong tea. Black, green and oolong tea are widely made in Asian countries to consume as a beverage and has been familiar in China and Japan from few centuries. Besides black tea, a small quantity of green and organic tea is produced in Bangladesh. The produced tea in Bangladesh is described below.

Black Tea: Black tea is known fully fermented tea which is very much popular in Bangladesh. It is a type of tea that is more oxidized than oolong, green and white tea. Black tea is generally stronger in flavour than the less oxidized teas. Two principal varieties of the species are used for black tea. These are- the small leaved Chinese variety plant, used for most other types of teas and the large-leaved Assamese plant. These species traditionally used for black tea.

Green Tea: Green tea is medicinally beneficial because of non-fermented leaves retain a higher concentration of natural vitamins and polyphenols than fermented counterparts. Bangladesh produced a small quantity of green tea. It is derived solely and exclusively, produced by acceptable processes, notably enzyme inactivation and commonly rolling or combination followed by drying, from the tender leaves, buds and shoots of varieties of the species *Camellia sinensis* (L.) O. Green tea has a more subtle, delicate flavour and far less caffeine than fermented tea.

Organic Tea: Organic tea means tea produced naturally without using chemical fertilizer. The major source of organic matters are animal manure crop residues farmyard waters bio slurry from farm bio-gas plants, green Manneering practices and other organic varieties

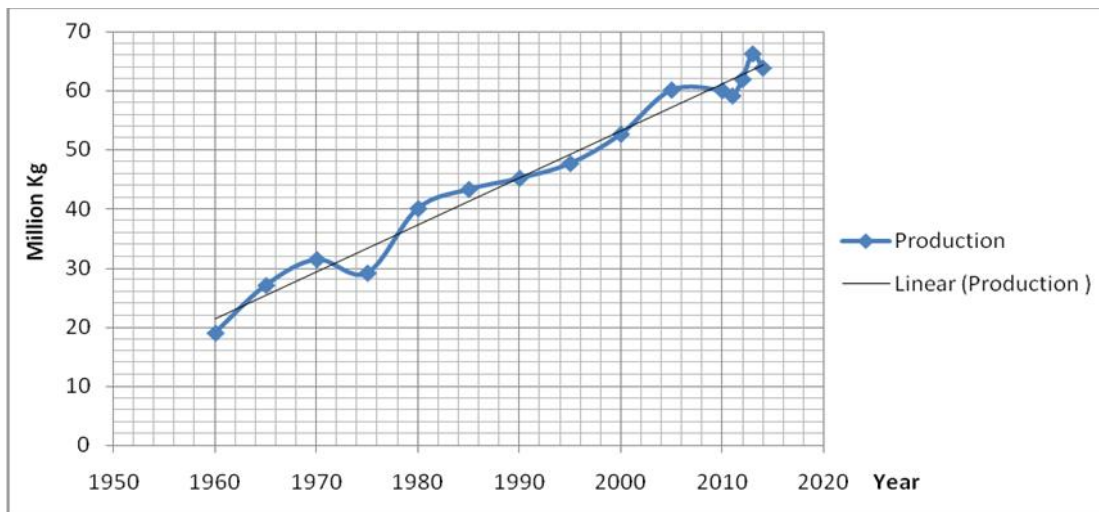
such as water hyacinth. This tea production has begun in North-western region of the country. Kazi and Kazi tea garden has taken the lead in this respect.

Organic production of agricultural products has become very popular, as these are free from the harmful effects of chemical fertilizer. Organic tea here is produced in such puritan form that no chemical pesticide is used and mechanical vehicle is allowed. Only carts driven by cows and horses are allowed to enter the garden and processing area. It appears that organic tea has a great future here. In the developed world where labourer is expensive and use of power driven machines is common their organic tea production is very expensive. So, Bangladesh can make demand in the global market of organic tea and government efforts are needed in this regard.

7.3.2 Production and Yield Variation Trend

In 1960, the area of tea plantation was 31,418 hectars. At present, under the area of tea plantation is 59,609 hectars. During the period of 1960 to 2014, tea production gradually increased from 19.01 million kg to 63.86 million kg excepting few years such as 1975, 1983, 1989, 1995, 2006, 2011 and 2014. In the year 1980 and 1990 production was 40.04 million kg and 45.16 million kg respectively. In 2013, tea production was 66.26 million kg which decreased 2.40 million kg in 2014. The concern authority claimed that unfavorable climate responsible for fluctuated tea production. It is mentionable that Bangladesh produced 0.38 million kg organic tea in 2014 which was 0.31 million kg in 2012. According to the obtained data, every year organic tea production increased than previous year. The production trend is given in the following Figure 7.4.

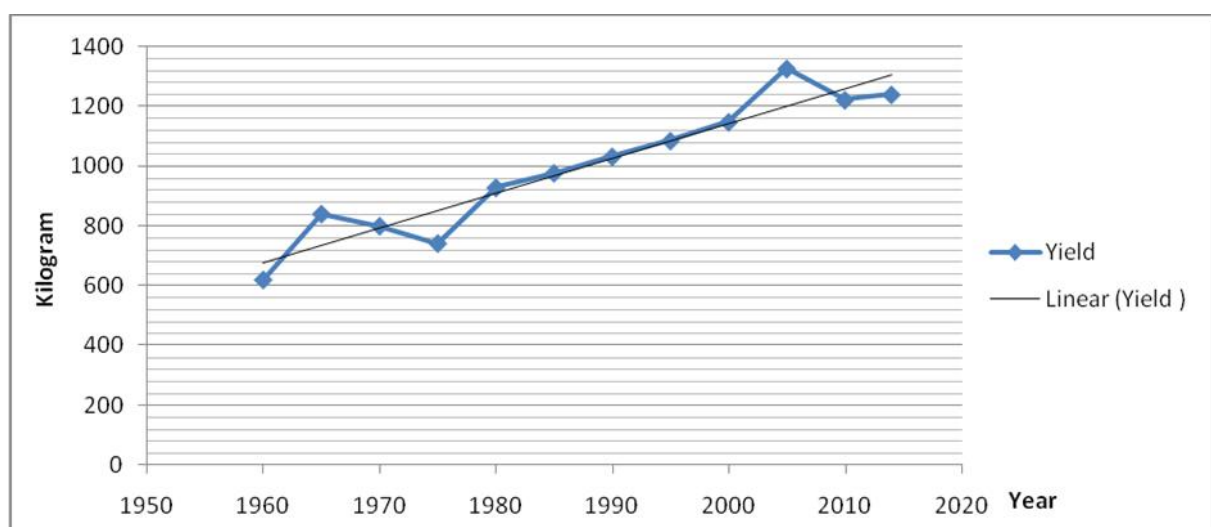
Figure 7.4 : Tea Production Trend (1960 to 2014)



Source: BCS, 1982, 1990-91, 2011-12 and BTB, 2015,

The overall yearly production is affected by per hectare yield. Bangladesh increased total production and per hectare yield but not satisfactory. Because other competitive countries yield per hectare more than Bangladesh. Figure 7.5 shows that 1960 to 2014, per hectare yield was increased from 618 kg to 1280 kg. In 1960, per hectare yield was 618 kg which reached at 798 kg in 1970. In the year 1990, per hectare yield was 1009 kg which was 1147 kg/hectare in 2000. In 2010, the yield increased upto 1221 kg/hectare. Per hectare yield trend is shown in the following Figure.

Figure 7.5: Per Hectare Yield Trend (1960 to 2014)



Source: BCS 1982, 1990-91, 2011-12 and BTB 2015,

According to the mentioned Figure 7.5 per hecter yield gradually increased except few years. Such as 1970, 1975, 2014. But the major tea producing countries such as- Argentina yield per hecter 2338 kg, Kenya 2106 kg, Turkey 1921 kg, Sri Lanka 1684 kg, Vietnam 1348 kg and neighborhood country India yield per hecter 1690 kg in 2013 where Bangladesh yield only 1280 kg/hecter. So, the average per hecter yield in Bangladesh is less than other major tea producing countries. Many of the tea bushes in Bangladesh are well over 50 years. This has resulted in loss of vigor and production. According to the field study, management factors also created per hecter yield variation.

7.3.3 Management Wise Production and Yield Variation

There are two types of management of tea garden which mentioned before. Sterling companies produced around 13.65 million kg tea in 2014 which was 29.03 million kg in 2003 including Finley. At present, Finley limited included with Bangladesh ownership which renamed the Consolidated Tea and Lands Co (Bangladesh) ltd and Bararora (Sylhet). But the brand name Finley uses the present company by giving royalty. In 2003, Sterling companies yield was 1543 kg/hecter including Finley which stood 1224 kg in 2014 excluding Finley. According to the obtained data, in 2014, per hecter yield of Finley was 1234 kg where government ownership national tea companies yield only 941 kg/hecter. Between two management Bangladeshi companies and proprietors average yield is low than Sterling companies. Among Bangladeshi companies and proprietors, average yield of NTC is low than others. Private companies and proprietors yield 1020 kg/hecter in 2014. The yield of Duncan Brothers decreased in 2014 than 2003. The performance of Sterling company and Bangladeshi company or proprietors is given in the following Table 7.5.

Table 7.5: Management Wise Production and Yield Variation (2003 and 2014)

Types of Management		2003		2014	
		Production (Million Kg)	Yield (Kg/Hector)	Production (Million Kg)	Yield (Kg/Hector)
A. Sterling Company	Duncan Brothers (BD) Ltd.	13.54	1579	10.64	1234
	Deundi Tea Co. Ltd.	3.13	1509	2.43	1214
	The New Sylhet Tea Estates	0.51	868	0.58	1087
	James Finlay	11.85	1579	-	-
Sub Total (A)		29.03	1543	13.65	1224
B. Bangladeshi Ownership	Bangladesh Tea Board	1.69	1315	1.47	1223
	National Tea Co. Ltd.	5.73	1163	4.82	941
	Finlay	-	-	12.07	1598
	Private ltd and Proprietary*	22.76	757	31.84	1020
	Sub Total (B)	30.08	1064	48.76	1241
Total (A + B)		59.11	1255	62.41	1239

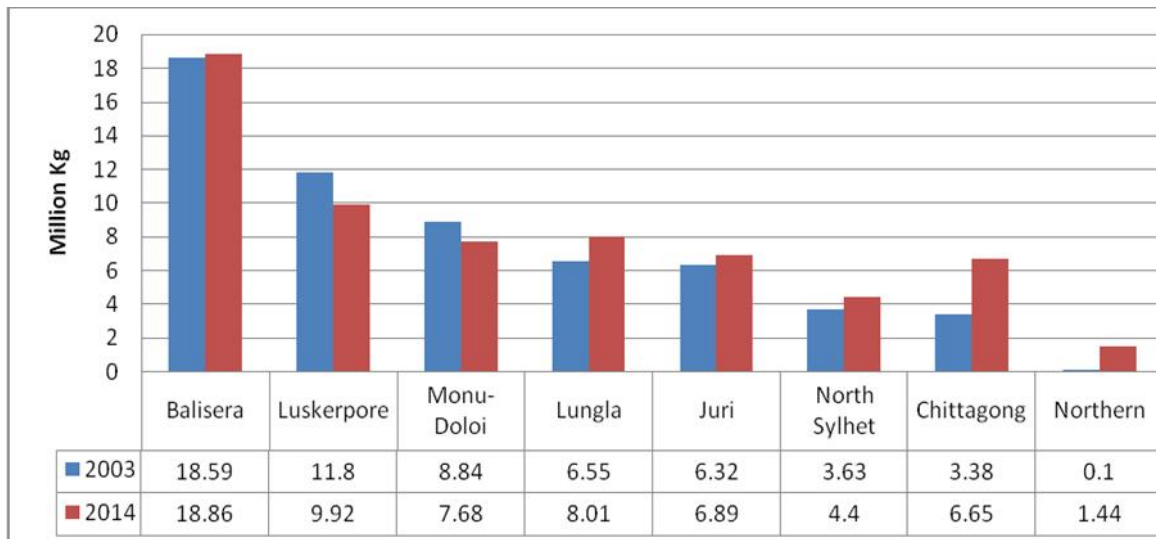
*Including Small Growers and Holders

Source: BTB, 2004 and 2015

7.3.4 Valley Wise Production and Yield Variation

The tea garden of North-east and South-east region is divided into 7 valleys by BTB namely Balisera, Luskepore, Monu-Doloi, Lungla, Juri, North Sylhet and Chittagong. Recently North-western region included in production. It is mentionable that valley wise tea land distribution is not equal. As a result, total production varies from valley to valley. In 2014, Balisera valley produced 18.85 million kg which was 18.59 million kg in 2003. Luskerpore valley produced 9.92 million kg in 2014 which was 11.80 million kg in 2003. But production decreased at Luskerpore and Monu-Doloi valley in 2014 compared than 2003. At the same time, Chittagong valley produced 6.65 million kg which was nearly doubled to 2003. North-western valley produced 1.44 million kg tea in 2014 which was 0.10 million kg in 2003. The comparison of valley wise production is shown in the following Figure.

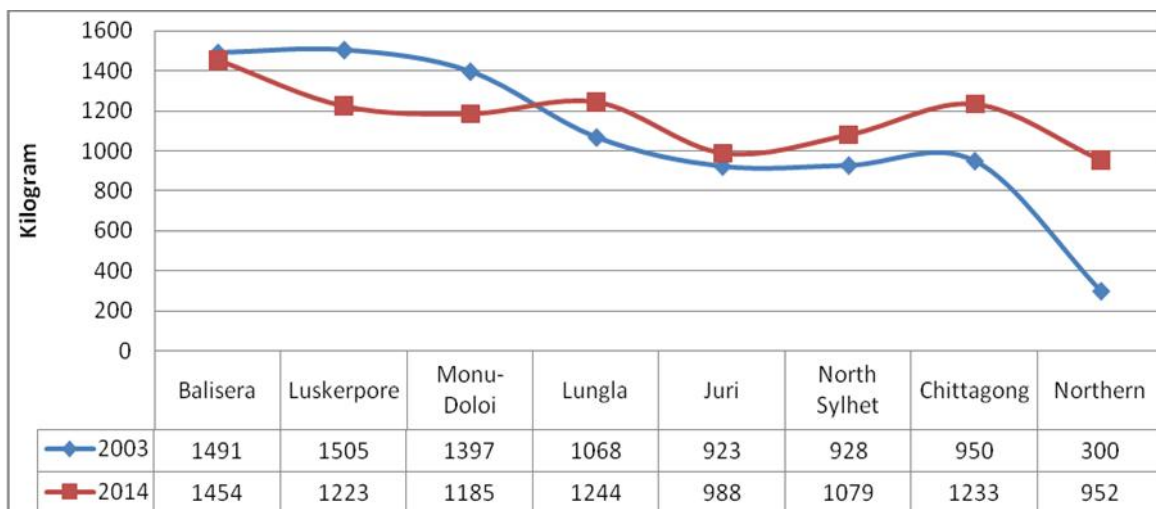
Figure 7.6: Comparison of Valley Wise Production (2003 and 2014)



Source: BTB, 2004 and 2015

According to the Figure 7.7, Balisera valley yield per hectore more than other valley's. This valley yield 1454 kg/hectore in 2014 which was 1491 kg/hectore in 2003. But in 2003, Luskerpore valley yield 1505 kg/hectore which is the highest quantity yield. But in 2014, the yield was only 1223 kg/hectore. In 2014, Lungla, Juri, North Sylhet and Chittagong valley increased per hectore yield comparatively than 2003. North-western region also increased per hectore yield.

Figure 7.7: Valley Wise Yield Variations (2003 and 2014)



Source: BTB, 2004 and 2015

7.3.5 District Wise Production and Yield Variation

Among the tea producing districts, Maulvibazar is called the capital of tea gardens. Most of the tea gardens agglomerated in Maulvibazar district. As a result, Maulvibazar district produced highest quantity of tea. This district produced 36.84 million kg tea in 2014 which was 35.98 million kg in 2003. At the same time, Habiganj district produced 13.70 million kg which was 15.50 million kg in 2003. There was a fall of production 1.8 million kg than 2003. However, at the same time per hectore yield decreased in Habiganj than the compared previous year. In 2003, Habiganj district yield per hectore 1496 kg which stood 1257 kg/hectore in 2014. On the other hand, Chittagong, the South-east tea producing district increased production more than North-east region. In 2014, Chittagong produced 6.61 million kg which was only 3.35 million kg in 2003. And the garden of Chittagong district also increased per hectore yield 981 kg to 1261 kg during the period of 2003 to 2014. Besides these, Panchagarh district, the North-western part of the country produced 1.44 million kg tea in 2014 which was 0.10 million kg in 2003. The changes of district wise production and yield is shown in the following Table 7.6

Table 7.6: District Wise Production and Yield Variation

District	2003		2014	
	Production (Million kg)	Yield (Kg/Hector)	Production (Million kg)	Yield (Kg/Hector)
Maulvibazar	35.98	1258	36.84	1252
Habiganj	15.50	1496	13.70	1257
Sylhet	4.26	939	5.23	1102
Chittagong	3.35	981	6.61	1261
Rangamati	0.02	164	0.04	267
Panchagarh	0.10	300	1.44	952
Total	59.21	1255	63.86	1239

Source: BTB, 2004 and 2015

7.3.6 Organic and Green Tea Production

In tea sector, organic tea plantation is new in Bangladesh which introduced in 2000. Organic tea produced only Kazi & Kazi tea garden which is situated in the North-western region of the country. This garden produced 0.31 million kg tea in 2012 which reached 0.38 million kg in 2014. According to the organic garden authority, the demand of organic tea is increasing day by day in the global market. Organic tea made a brand named “Teatulia” which has a popular market in the United States of America. Besides global market organic tea is also get popularity in the local market.

On the other hand, Bangladesh produced small quantity of green tea. In 2003, Bangladesh produced only 0.2 million kg which reached 0.28 million kg in 2007. In 2012, green tea production was 0.25 million kg. So, the green tea production increasing trend is very slow. But it has a prosperous market both nationally and globally.

7.3.7 Production and Yield Variation of the Three Regions

North-east region belong the highest quantity of tea land and production. But in 2014, total production was not more than 2003. In 2003, North-east region produced 55.74 million which reached 55.77 million kg in 2014. So, there is no major change of overall production between the compared two years. On the other hand, South-east region increased production nearly double than 2003. At the same time, North-western region also increased production from 0.10 million kg to 1.44 million kg.

Table 7.7: Production and Yield Variation of the Three Regions

Region	2003		2014	
	Production (Million kg)	Yield (kg/Hector)	Production (Million kg)	Yield (kg/Hector)
North-east	55.74	1321	55.77	1238
South-east	3.37	971	6.65	1238
North-western	0.10	300	1.44	952

Source: BTB 2004 and 2015

In 2014, per hector yield of North-east region was 1238 kg which was 1321 kg/hector in 2003. So, there was a fall of per hector yield in 2014 compared than 2003. But in 2014, in South-east region per hector yield increased than 2003. At the same time, per hector yield also increased in North-western region.

7.3.8 Production Variation at Different Ages Tea Plant

Plant age is one of the major indicators of green leaf production of a tea plant. There is different age's tea plant in the plantation area. According to the Table 7.8, old and very old tea plantation covered 41.7% tea area which affected the total production and yield per hector. The performances of tea plantations at different ages are given in the following Table.

Table 7.8: Production Performance at Different Age's Tea Plant (2003)

Age of Tea Plantation	Tea Area		Production		Yield (Kg/Hector)
	Hector	%	Million Kg	%	
Seed bari / Nursery	800.62	1.5	-	-	-
Immature tea (0-3 years)	4309.52	8.3	-	-	-
Young tea (4-10 years)	5258.86	10.1	3.70	6.2	1169
Matured tea (11-40 years)	20,058.55	38.4	38.10	64.3	1758
Old tea (41-60 years)	10,639.92	20.4	10.63	18.0	839
Very old tea (above 60 years)	11,135.16	21.3	6.78	11.5	505
Total	52,201.63	100%	59.21	100%	1247

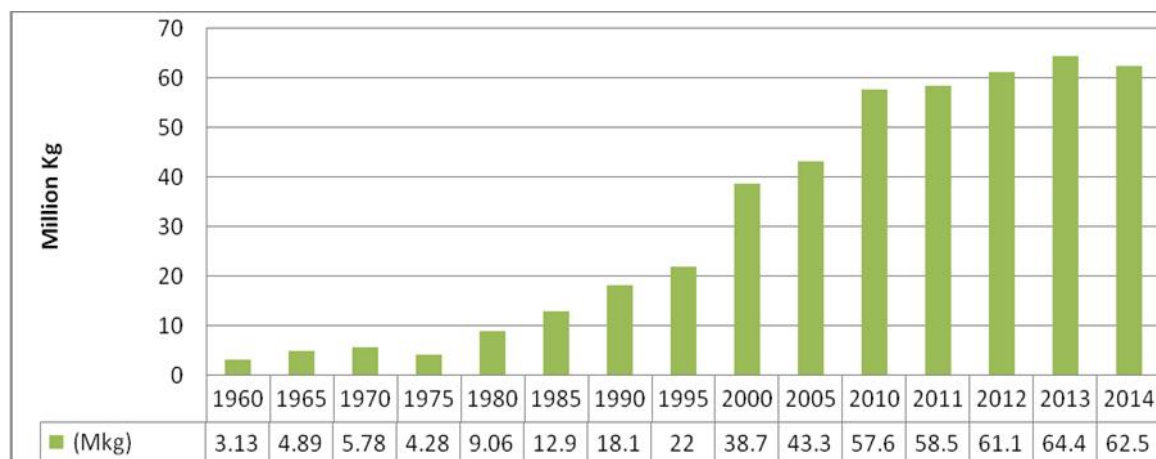
Source: BTB, 2004

The above Table shows that matured tea plantation produced highest quantity tea and yield. In 2003, the average yield of matured tea was 1758 kg/hector which is only 839 kg/hector from old tea and 505 kg/hector from very old tea. So, there are high differences of average yield per hector of different age's plant. The Table shows that low yield of old and very old plant affected on overall production and yield.

7.4 Tea Consumption Trend

Bangladesh has a large domestic consumption market which influenced on production. Most of the people take tea from the early age of life. The study of tea drinking behaviour conducted in this research which shows the tea drinking average age only 12 years in Bangladesh (Field Survey). The Figure 7.8 shows that tea consumption trend gradually increased in Bangladesh. In 1960, internal consumption was only 3.13 million kg which reached at 5.78 million kg in 1970. In 1980, the internal consumption was 9.06 million kg which crossed 18 million kg in 1990. In 2000 and 2010, the consumption was 34.54 million kg and 58.02 million kg respectively. In 2014, internal consumption was 62.50 million kg which around 98% of total production. This high rate of consumption in Bangladesh gives the opportunity to the producers to fetch the captive market with the relative high prices of tea. But in an open economy and globalization, good quality and low price are the main factors for acceptance of any product. The tea consumption trend in Bangladesh is shown in the following Figure.

Figure 7.8: Tea Consumption Trend (1960 to 2014)



Source : BCS, 1982, 1990-91, 2011-12 and BTB, 2015

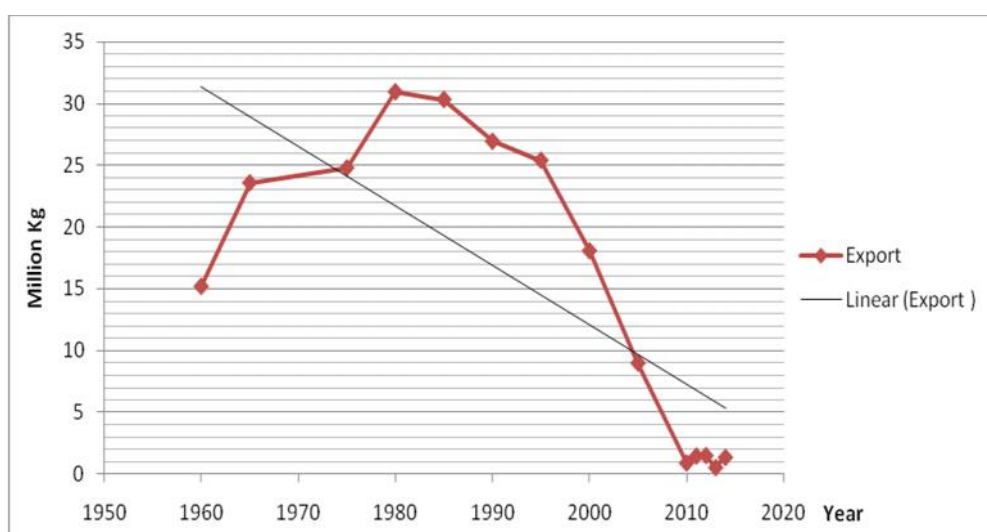
Although national total consumption increased over the year, per capita consumption is low compared to other countries. Average annual per capita tea consumption in

Bangladesh is 0.40 kg where United Kingdom 2.24 kg, Ireland 2.96 kg, Turkey 2.6 kg and Sri Lanka 1.38 kg.

7.5 Tea Export Trend

Once upon a time, tea was an export oriented industry in Bangladesh after jute. But overall tea export fluctuated considerably over the period. In 1960, Bangladesh exported 15 million kg tea which increased up to 1968 and then started decreasing. After the Independence, export increased gradually. In the year 1980, tea export trend again declined. After that, export increased again from the year 1986 to 1993. In 1993, Bangladesh exported 31.91 million kg tea. But after this year, the export trend decreased gradually. In 2014, Bangladesh exported only 1.36 million kg tea where imported 5.9 million kg for internal consumption. According to the Bangladesh Arthanitik Samikha 2015, Bangladesh earned 16 million US dollar (0.21% of total export earnings) in the fiscal year of 2003-04 which stood only 4 million US dollar (0.013% of total export earnings) in the fiscal year 2013-14. The tea export trend is given in the following Figure.

Figure 7.9: Tea Export Trend (1960 to 2014)



Source: BCS, 1982, 1990-91, 2011-12 and BTB, 2015

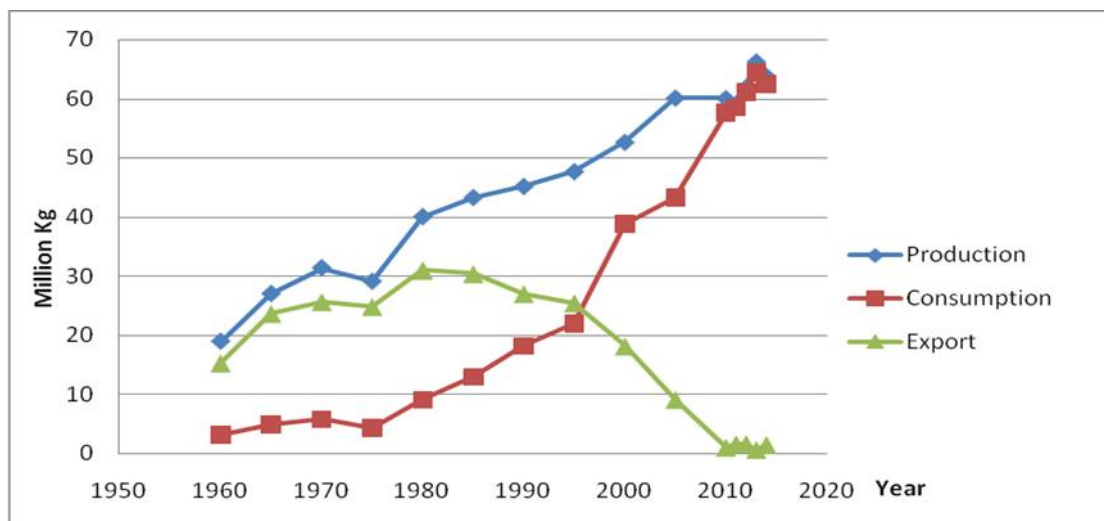
Two decades ago, Bangladesh exported tea to 22 countries such as Saudi Arabia, Oman, Qatar, India, Greece, Sudan, Jordan, Taiwan, Kazakhstan, Kirghizstan, Turkey, Yemen etc. But in 2014, Bangladesh tea exported only to 4 countries. This year, the major destination of Bangladeshi loose and packet tea was Pakistan. Another three countries were U.A.E, Kuwait and K.S.A. High domestic consumption of tea has not allowed Bangladesh to maintain relative high export share. But there is open a door of hope, Bangladesh started organic tea export recently which plays a significant role in the tea economy. Organic tea exported to U.S.A, England, Russia, Malaysia, Germany and Japan. The export trend of Bangladeshi tea has been decreased gradually because of internal consumption increasing day by day. At the same time, quality of made tea is also responsible for this which can't compete with the international market. The international demand and export is also determined by the various standards and norms at the international and national level. The standards and norms vary from country to country. These norms may not be the same for other countries. The consumer's consciousness and initiative regarding the issues have a major role in influencing sale practices. For instance, in New Zealand, the consumer has the option of choosing the packet by reading the label, which gives details of quality and environmental justice. In a similar way, organic tea producers in Tamil Nadu are selling their tea to the market through direct marketing. The tea packet describes the quality and procedures of tea production and their environmental consciousness.

7.6 Comparison of Production, Consumption and Export

There is a strong relation among production, consumption and export. Consumption and export quantity depends on production. Bangladesh increased production over the years. At the same time, internal consumption increased rapidly. As a result, internal

consumption affected export quantity. The Figure 7.10 shows that production and consumption curve is upward but the export curve goes downward. So, Bangladesh lost not only export market but also started tea import for supply internal demand which affected national economy, production and also employment opportunity. The trend of production, consumption and export is shown in the following Figure.

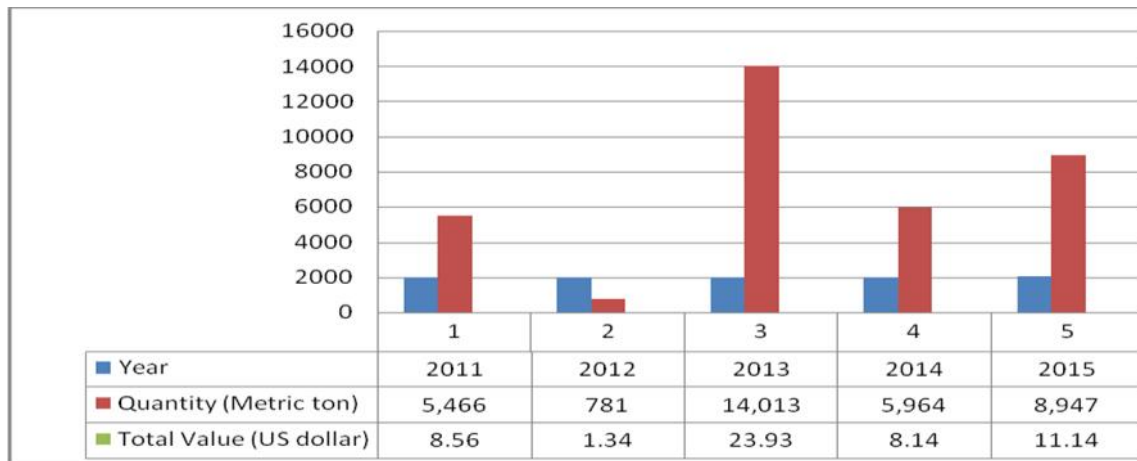
Figure 7.10: Comparison of Production, Consumption and Export



Source: BCS, 1982, 1990-91, 2011-12 and BTB, 2015

7.7 Tea Import Trend and Values

Bangladesh started tea import for internal consumption from the beginning of 21st century. Day by day, import quantity is increasing due to the deficit of internal supply and demand. Bangladesh imported tea from various countries such as India, Indonesia and Vietnam etc. According to the ITC report 2016, Bangladesh imported 8,947 tons tea in 2015. The import trend and total values of last five years is given in the following Figure. Figure 7.11 show that Bangladesh imported highest quantity tea in 2013. According to the planters and entrepreneurs, it is very alarming for tea industry. Because tea import trend affected the local market and production. Overall, tea import influences the industry dynamics and national economy.

Figure 7.11: Tea Import Trend and Values (2011 to 2015)

Source: ITC, 2016

7.8 Tea Marketing System

The marketing system of tea is not same as other agricultural or industrial product. There are two ways of made tea sale. These are- Sale through auction and direct sale from the estates or gardens.

Sale through Auction

Generally tea is sold in the only tea auction market in Chittagong on every Tuesday of a week. But in case of holiday the auctions takes place on the next working day. Tea sold through auction follows the steps:

Step-1: The particular garden sends the tea invoice to one of the 16 warehouses in Chittagong city. For sending invoice the information like number of tea chests, quality of tea, grade of tea, name of the tea garden, registration number of the truck by which the invoice is sent must be written in the garden invoice form.

Step-2: After receiving the invoice, the warehouse authority keeps the tea chests in their warehouse. The charge of warehouse varies from warehouse to warehouse. But generally the charge is Tk. 9.50 per chest for two months. If the garden keeps this tea chest over two months, they have to pay extra Tk. 1.50 per chest.

Step-3: The garden has to select one of the six broker's company in Chittagong. The warehouse authority divides the tea, on the basis of quality, into three categories. These are- A. Good, B. Fair and C. Weak. After categories, sends one copy of invoice from to the selected broker company. The broker then goes to the warehouse and draws 3 kg sample per lot for leaf grade and 1kg sample per lot for dust grade tea.

Step-4: After collecting samples, the broker company tastes the tea by palate in order to assess the expected sale price. The price of the tea is determined on the basis of quality, colour, appearance and market demand etc. The broker company then prints a catalog which contains name of the garden, lot number, quantity, expected sale price, warehouse address etc.

Step-5: Catalog and one ounce sample from each lot are then sent to each registered bidder before one week of the auction day. Each bidder determines the value of the tea after tasting by his own taster on the basis of the export requirement. Tea is sold to the bidder who offers the highest price. Tea sale is completed when the auctioneer announces its completion by the fall of hammer. Any dispute between bidder and seller is settled by the auctioneer and their decision is final. All lots are subject to a reserved or upset price, unless expressly stated to the contrary or declared by the auctioneer when the lot is first put up for sale. If such price is not offered, the lot is withdrawn and is placed on a list of 'out lots' and the lots on such lists are available for disposed with brokers and seller by bargaining according to by laws of the TTAB.

Direct Sale from the Estate or Garden

According to the rules, the tea garden authority can sale a limited quantity of tea in the local market as approved by the Bangladesh Tea Board. A garden can sell 15% to 20% of total production by this method. The sale prices are determined through bargaining between the garden and the seller. Before selling, the garden must take permission from

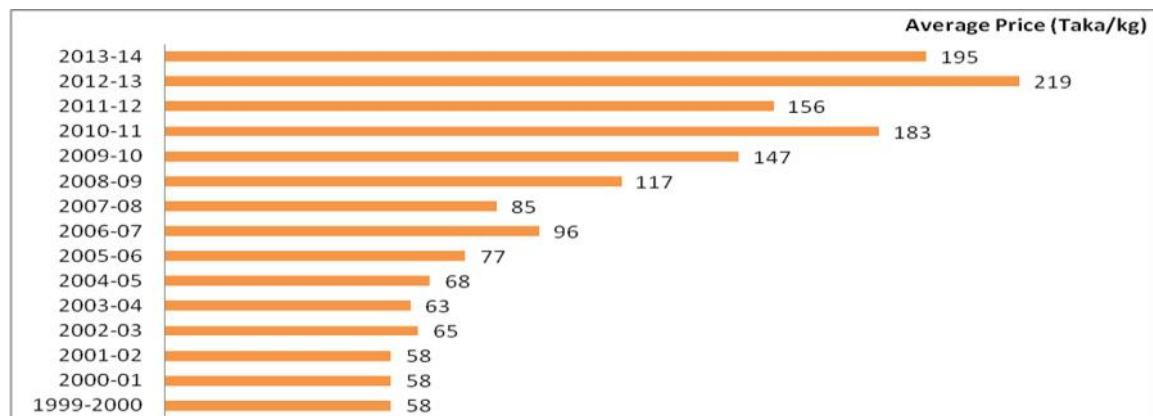
BTB and VAT authority. They have to mention the quantity and grade of tea to be sold. After getting the permission the garden sells to the buyers after adding VAT to the price.

7.9 Tea price in Chittagong Auction

Changing price has an impact on the tea economy. All the garden owners, small growers and holders depend on their tea income and run the industry. Therefore, changes of the price impact the entire economy and living standard of the people who are involved with the industry. Tea prices in auction relatively fluctuated over the time. According to the Figure 7.12, the average price in auction was more or less stable during the fiscal year 1999-2000 to 2005-2006. But after that tea prices were unstable in auction. Figure 7.12 shows the average price of sold tea in Chittagong auction.

Figure 7.12: Average Price of Sold Tea in Chittagong Auction

(1999-2000 to 2013-14)



Source: BTB, 2015

The above mentioned Figure shows that average price of tea in Chittagong auction was over 58 taka in 1999-2000 fiscal year which increased up to 68.14 taka/kg in the fiscal year of 2004-05. After four fiscal years, in 2008-09 it reached nearly 117 taka/kg. Again in 2011-12 fiscal year, tea prices declined and sold 156.14 taka/kg which was 183.18 taka/kg in 2010-11 fiscal year. So, it is clear that the prices in auction facing an unstable situations due to the uncompetitive and monopoly market. So, there is needed to e-auction system where everyone can participate and make the market more competitive.

7.10 Economic Significance of Tea Industry

The tea industry continues to occupy an important place in the economy, even though relative export contribution has declined in the recent few years. Tea utilized large quantity of resources and provides employment over 133 thousand labourer. 6.65 lakh people depend on this industry for their livelihood. Tea garden uses a significant proportion of hilly land which is not suitable for agriculture. Bangladesh produced 63.88 million kg tea in 2014. Tea industry supply 62.50 million kg tea for internal consumption but the demand more than supply. As a result, Bangladesh imported tea for internal consumption. If the production failed to fill up local demand, large quantity of tea must be needed to import for internal consumption. As a result, a lot of foreign currency will be required for tea import which will impact on the national economy. Bangladesh has already started tea import and expends a large amount foreign currency. Bangladesh has increased production tremendously over the last few decades. It is needed to mention that production increased due to increasing per hector yield and also a new including tea plantation region. The contribution of export earnings is given in the following Table.

Table 7.9 : Tea Export Earnings and Percent of Export Earnings

Fiscal Year	Export Earnings (Million US Dollar)	Share of Export Earnings (%)
2002-03	15	0.229
2003-04	16	0.210
2004-05	16	0.184
2005-06	12	0.114
2006-07	7	0.057
2007-08	15	0.106
2008-09	12	0.077
2009-10	6	0.037
2010-11	3	0.013
2011-12	3	0.012
2012-13	2	0.007
2013-14	4	0.013

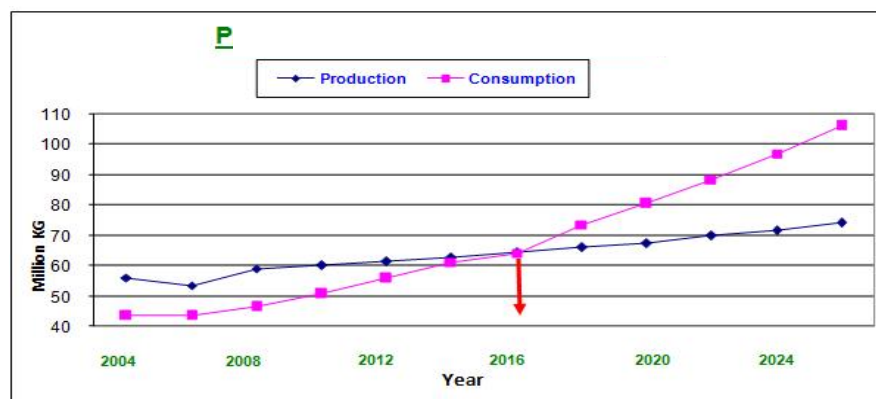
Source: Bangladesh Arthanitik Samikha, 2012 and 2015

The above Figure shows that export values and share of contribution of total export earnings decreased almost every year. So, Bangladesh should have needed to take necessary steps to increase export and also production.

7.11 Prediction of Production and Consumption

The people of Bangladesh consumed 62.5 million kg tea in 2014 where per head consumption was 400 gram. At present, the internal demand increased 3.23% and production increased 2% every year. At the same time, export decreased 2.98% every year. Bangladesh has already started tea import from the last few years. According to the statistics, during the period 1980 to 1989 average export was 68% of total production. 1990 to 1999 average export 50% and 2000 to 2009 average export was 19% of total production. But during the period 2010 to 2014 average tea export was only 2%. If this trend goes on, internal demand will increase at 76 million and production will reach up to 70 million kg in 2021. On the other hand, internal demand will reach up to 110 million kg and probable production will be 85 million kg in 2041. As a result, deficit will be created 25 million kg which will need to be ensured by importing tea. According to the previous production and consumption trend, the prediction of future production and consumption trend is shown in Figure 11.13.

Figure 11.13 : Prediction of Future Production and Consumption



Source: BTB-2015

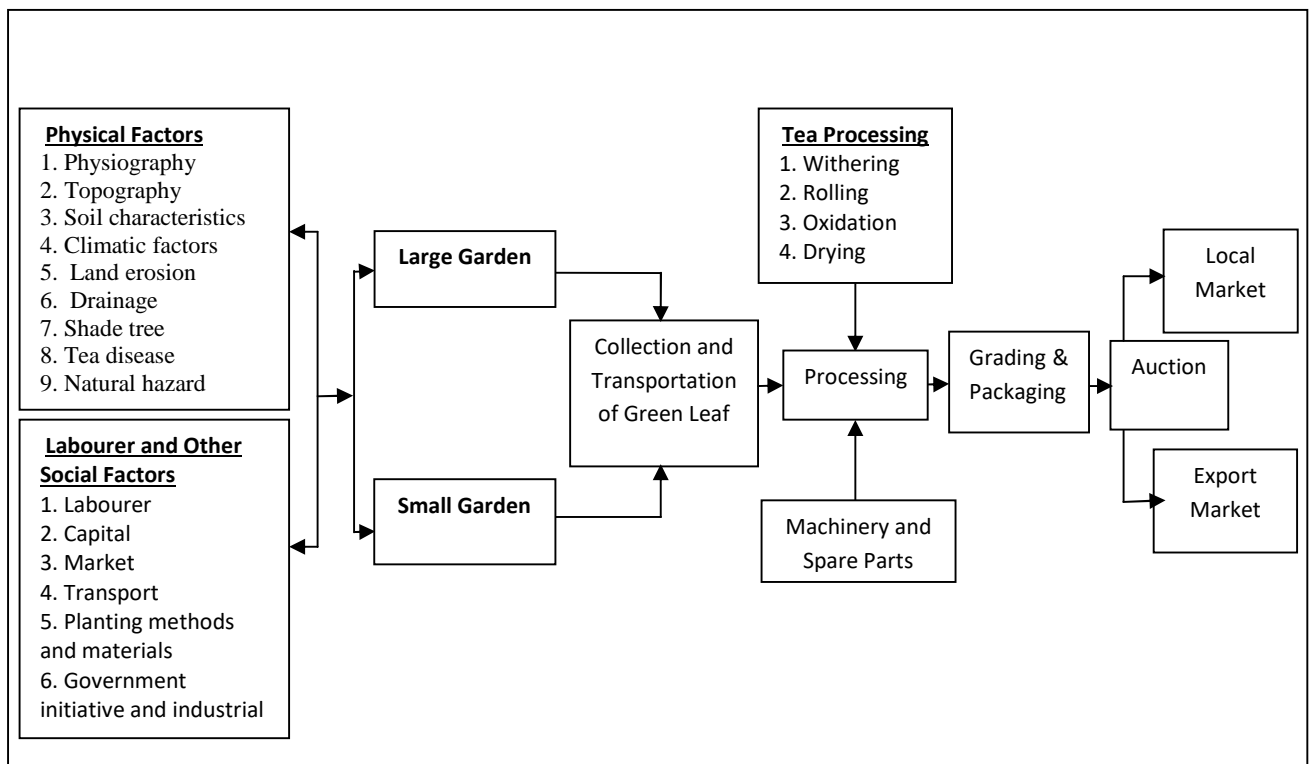
The above mentioned Figure shows that if the present production and consumption goes on, Bangladesh will be turned into a major tea importing country instead of exporting country. As a result, the national economy will lose its export earnings and a lot of foreign currency will be spent for tea import. So, it is very much essential to take necessary initiatives for the development of tea garden and production.

Chapter-8 Supply Chain and Clusters of Tea Industry

8.1 Supply Chain

Figure 8.1 shows the linkage for the processing and production supply chain. There are five stages in the supply chain of tea industry. Large tea gardens are the main source of supply raw materials. Recently small gardens are included to the supply chain process. In tea industry, raw material means green leaf. There are some physical and management factors which influences the quality and quantity of green leaf production. In the supply chain process green leaf collected from the field and sent it to the factory. Pick up or tractors are the main vehicles for carrying green leaf. A part of the labourer carry the green leaf from

Figure 8.1: Supply Chain of Tea Industry in Bangladesh



field to factory and storage it in front of factory. Then it is processing in the factory and grading it. After grading the made tea packages in PP woven bag or chest and storage in factory or direct send it to the warehouse for auction. After auction the made tea goes to the local or global market.

8.2 Tea Industry Clusters

The cluster is exclusively focused on the industry and shows the linkage of backward and forward factors, institutions, association, governance and its impact. The clusters of tea industry are details discussed below (Figure 1.1 in Chapter 1).

8.2.1 Backward Linkage of Production

Backward linkage is very much important for any industry. It can be defined as “the growth of an industry leads to the growth of the industries that supply inputs to it”. There are many backward linkages which run the tea industry. The backward linkage and its significance to run the industry are described below.

Physical Factors

There are some physical factors which work as important backward linkage of tea industry cluster. The major physical factors of tea industries are physiography, topography, soil characteristics, climatic factors, land erosion, drainage, shade tree, various disease and natural hazard. These factors have significant role on sufficiency of tea production. Such as- drought, heavy rainfall or tea disease affected tea production. On the other hand, proper drainage, sufficient shade tree is very much essential for the growth of tea plant.

Labourer

Tea industry is the single largest employer in the country providing over 133 thousand labourer. Among the labourer over 50% are women. Almost all the labourer depends on

the tea garden for their livelihood. Recently, the labourer has been changing their dependency trend on tea garden for their livelihood. Although over 133 thousand labourer involved in tea industry, they are not equally distributed. So, a number of garden facing labourer crises.

Labourers are needed for all kinds of work in garden. For this reason, tea industry is known as a labourer intensive industry. Every operation right from the preparation of soil for seed berry to the pruning of plants, spraying fertilizing and pesticides, irrigation, weeding, plucking of green leaves, withering, and termination is highly specialized job, requiring skill and experience. Such as the plucking operation require precision and the touch of soft fingers of the women labourer. Well production procedure and quality of tea depends on skilled labourer. On the other hand, there is also essential a large number of semi-skilled or skilled labourer.

Green Leaf

Green leaf is the main backward linkage of the industry. Because green leaves is the raw material of tea industry. If green leaf supply obstructed by any way, the whole industry will be fall flatted. The sources of green leaves are the garden of Maulvibazar, Sylhet, Habiganj and Chittagong. Last few years ago, Panchagarh district included in tea plantation. Lalmonirhat, Thakurgaon and Bandar Ban also included with tea plantation. So, besides increasing tea plantation ensuring quality of green leaf is very much essential for high quality tea for competitive market.

Fertilizer and Pesticides

Fertilizer and pesticides are very essential for green leaf production. But the efficiency of fertilizer and pesticides supply depends on other industries. If these materials are not available in proper time the production must be hampered. According to the requirements of BCS, the Ministry of Industry allotted fertilizer through BCSIC for the garden of

South-east and North-east region. But the gardens of North-western region who are not member of BCS do not get the government facilities. They purchases fertilizer from the open market of the locality. As a result, a number of gardens of North-western region are deprived of the government facilities. This picture shows the discrimination of the industry. According to BCS annual report (2011-12), the requirements of the association and allotment from the government is mentioned in the following Table.

Table 8.1 : Requirements BCS and Allotment of Government

Name of fertilizer	Requirement of BCS (in Metric Ton)	Quantity allotted by govt. (in Metric Ton)	Deficit/Balance (in Metric Ton)
Urea	12,701	12,700	-1
SOA	730	Nil	-
TSP	4,375	4,300	-75
SSP	10	10	-
MOP	6,468	6,400	-68
DAP	157	157	Nil

Source: BCS, 2011-12

The above allocation was made at a time in accordance with the demand of BCS. But the government made no allocation for SOA, reportedly, for want of stock. The above mentioned statistics shows that SOA was not allocated. As a result, there was lacking of supply chain. To ensure the supply of quality pesticides is another challenge for the industry. Because there is no pesticide quality testing instruments to the garden authority before spraying in the field. The garden authority purchase pesticides from different private company. So, there is an opportunity of low quality of pesticides supply which affected tea plant, production and human health.

Irrigation

Tea plantation needed sufficient water for growth and survive of tea bushes round the year. So, after rainy season irrigation is an important backward linkage of tea industry. Canals, streams, ponds and deep tube-well or shallow tube-wells are the main sources of irrigation in tea garden. River is also a source of irrigation. Most of the garden recovers the water deficit of tea plant through irrigation. According to the Figure 5.1, valley wise

rainfall fluctuated between the compared year 2003 and 2014. This rainfall fluctuation mostly recovered by irrigation. As a result, irrigation cost of the garden increased which affected COP. To ensure sufficient irrigation need sufficient source of ground water. If the ground water deficit created, the irrigation system will be collapsed which affected tea production.

Capital

Capital is one of the major backward linkages of production of any industry. In tea industry, capital needed for infrastructure establishment, machineries purchase, factory establishment, salary and wages of staffs and labourer and other various purposes. The entrepreneurs collected capital from self source or by taking loan from the financial institutions or others way. There is few number of tea garden who can't able to pay salary or wages regularly. Such as- Baikunthapur tea garden at Madhobpur upazilla in Habiganj district. Recently, labourer unrest arises for wages in the garden. As a result, production was hampered which affected the whole industry. So, tea industry needed sufficient capital which runs the industry smoothly.

Machineries and Spare Parts

Most of the factories are backdated of tea industry, which were established in the contemporary period of tea garden establishment. The tea processing machineries and spare parts mostly purchased from India. According to the report of BTB (2015), there are 120 factories in different tea plantation regions which are not sufficient for the industry. Besides these, the factories are not geographically well distributed. At present, 1% import duty has been paid of tea processing machineries and spare parts.

Factory

A factory or manufacturing plant is an industrial site, usually consisting of buildings and machinery or more commonly a complex having several buildings, where workers

manufacture goods or operate machines processing one product into another. Factory plays an important role in tea industry. It is one of the elements to ensure good quality tea. On the other hand, green leaf need to rapidly processing for production. So, sufficient and modern factories are essential for this industry. There are 120 tea factories. But this is not sufficient in comparison with the demand. There is needed to mention that in North-western region faces problem due to the shortage of factory. A number of large garden, small growers and holders affected economically and also green leaf. As a result, green leaf loses its quality and the growers do not get reasonable price.

Packaging

There are a number of packaging and marketing companies. After auction, these companies packaging and marketing tea at home and abroad. There are 18 packaging bulk exporters in the country. Such as- M.M. Ispahani ltd, H.R.C Syndicate ltd, A Khair ltd, Deundi Tea Company ltd, Shaw Wallace BD ltd, Duncun Brothers ltd, Meghna Tea ltd and Uniliver Bangladesh ltd etc. Marketers play a major role in the tea industry. They include packeters or blenders and all of them are national brand companies. Appropriate packaging is very much essential factor to keep the quality of made tea.

Warehouse

Warehouse is an important backward linkage of tea industry. Warehouse is the place where tea chest or packet keeps for auction. There are 16 warehouses in Chittagong. After finishing the process in factory, each garden authority sent the made tea to the warehouse. The warehouse authority preserves the chest on the basis of fare. Usually each chest paid 9.50 taka fare for two months. But after two months, the warehouse authority takes per chest additional 1.50 taka fare for every month. The garden authorities pay the fare. According to the field study, the respondents of management level mentioned that there

are sufficient warehouse for keeping tea packet or tea chest but the fare comparatively high.

8.2.2 Forward Linkage of Consumption

Forward linkages exist when the growth of an industry leads to the growth of other industries that uses its output as input. Tea industry has a prosperous forward linking with high demand of local market and wide export market. Here is needed to mention a quotation of BCS which is cited in the annual report of 1982. They mentioned that, “unlike Bangladesh, India, Sri Lanka, Indonesia and other tea producing countries have a very strong domestic market because per capita consumption in those countries is much higher and increasing at a faster rate. In this country, the domestic consumption is very low and shows no upward trend to give hope”. But at present the scenario is completely different. In 1982, production was 6.53 million kg which stood around 63.86 million kg in 2014. At the same time, the global market is also increasing and spreading all over the world. On the other hand, Bangladesh exported tea to 28 countries in 1998 and the quantity was 15.24 million kg. And it stood only 1.36 million kg in 2104 and exported to only 4 countries. At the same time, Bangladesh started import from the last few years. In this perspective, Bangladesh can retrieve her previous export market and explore new global export market. Besides these, Bangladesh must need to increase production and average yield. For this necessary initiative must be taken by the concern authority.

8.2.3 Institutions

There are a number of institutions related to the development of tea industry. Bangladesh Tea Board is the main concern body of tea industry under the Ministry of Commerce. The related institution of tea industry and their function is discussed in the below.

Bangladesh Tea Board

Bangladesh Tea Board is a statutory body under the ministry of commerce. It was constituted in accordance with the Tea Ordinance of 1977. During the British period, tea plantation in Indian Sub-continent was regulated in accordance with the Indian Tea Estate Act, 1903. In 1951, Pakistan Tea Board was set up consisted of 11 members in accordance with the Tea Act, 1950. After independence, Bangladesh Tea Ordinance was promulgated in 1977 and Bangladesh Tea Board was established. At its initial level, there were three full time members along with an adviser. After an amendment of the Tea Ordinance in 1986, the member of the board was increased up to 11 persons. As per decorum, the Chairman, two fulltime members, one Secretary and one Deputy Secretary appointed by the Government. And other members, officers and employees are appointed by the board. The head office of the board was first set up at Motijheel in Dhaka. But in 1984, the office of BTB has been transferred from Dhaka to Chittagong. At present the head office of BTB is situated at Nasirabad in the district of Chittagong.

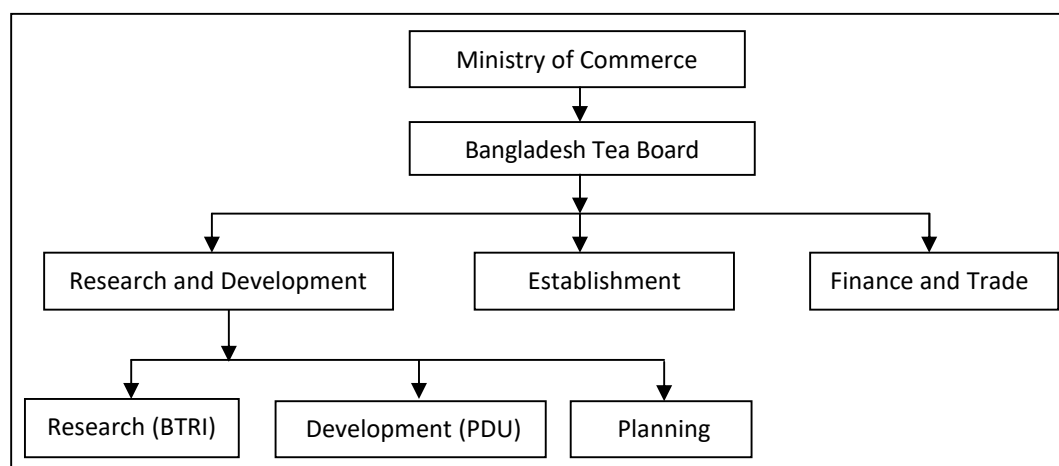
Chairman is the chief executive and principal accounts officer of BTB. He provides executive and operational guidance to the head office with field staffs. BTB has provision for 357 personnel to execute its activities. There are a number of wing of BTB. The administrative set up of tea industry is given in Figure 8.2.

Functions of Bangladesh Tea Board

- To regulate, control and promote the tea cultivation, sale and export.
- To control and improve the quality of tea.
- To conduct comprehensive scientific and technological research to raise productivity of tea and improve its quality.
- To register tea estates with the Board and grant licenses to the planters, manufacturers and other dealers engaged in the business of tea.

- To assist establishing new tea garden, improving productivity of existing tea garden and to undertake welfare measures for tea garden labourer and employees.
- To undertake, acquire or manage any tea concern or to take such measures in the interest of the tea industry as directed by the government, from time to time.

Figure 8.2: The Administrative Set Up of Tea Industry



Source: BTB, 2015

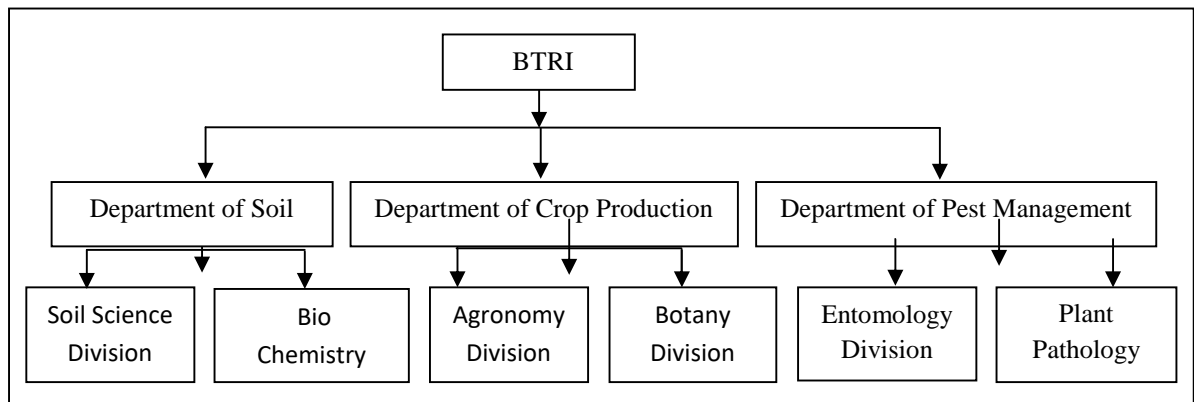
Bangladesh Tea Research Institute

Bangladesh Tea Research Institute is an autonomous institution under Bangladesh Tea Board. It was first established by the Pakistan Tea Board in 1957 at Srimangal as Pakistan Tea Research Station. After liberation, in 1973, the research station was raised to the status of an institute and named the Bangladesh Tea Research Institute. BTRI is the research wing of Bangladesh Tea Board. Director is the technical and administrative head of the institute. It has provision for 182 personnel including research and technical staffs. BTRI is located about 3.2 kilometers away from Srimongal upazilla sadar in Moulvibazer district. BTRI has four substations. These are-

1. Kaliti, Moulvibazar
2. Sylhet Sadar, Sylhet
3. Fatikchhari, Chittagong and
4. Panchagarh Sadar, Panchaagarh.

This organization was established to solve various problems of growing and manufacturing tea and to establish the industry on sound scientific footing. Now, this institution engaged in conducting comprehensive scientific, technological and economic research for the development of tea industry. There are three major research departments which encompass six research disciplines.

Figure 8.3: Research Wings of BTRI



Source: BTB, 2015

Besides the above research wings, BTRI has other two research divisions. These are- tea technology division and statistics-economics division.

BTRI organizes annual training courses, workshops and seminars. In addition, the institute has collaborative research programmes with other research institutes and universities. Some of the important activities of the institute include producing high yielding and quality clones of tea establishment of bi-clonal and poly-clonal seed baries, conservation of genetic resources of tea, rising of vegetative cuttings in the nursery using commercially feasible technique and supplying of rooted and fresh cuttings of improved clonal materials to tea garden. BTRI introduced BT 1-18 of high yield varieties. The technical news and innovations of the institute are regularly disseminated through its publications. These include the tea journal, annual reports, circulars, pamphlets etc.

Project Development Unit

Project Development Unit is a unit of development activities under Bangladesh Tea Board. It was established in 1980 as a component of Bangladesh tea rehabilitation project. PDU is situated with a separate office at Srimongal. It has a provision for 51 personnel for operating its function. It works in the field of development and extension. Its main function is to prepare and review the schemes for tea garden and assist in implementing development projects. PDU arranges funds from Bangladesh Krishi Bank to run all approved projects and monitors their progress.

Besides these, PDU organizes training programs for enhancement of the skills of tea labourer and staffs of the tea gardens and organizes special workshops for selected staff members. It also organizes to develop manpower in the tea industry special training certificate course conducted by the management training centre with joint collaboration of the Bangladesh Institute of Management. One of the main functions of PDU is to collect and updated information of the industry. Besides these, PDU implemented welfare development schemes by the education trust. It also gives away funds to the labourer for social ceremonies such as wedding, Puja.

Management Training Centre

Management Training Centre is a training institution to develop manpower of tea industry. It was established in 1988 at Srimangal under project development unit of BTB. MTC has been providing theoretical and practical training to the management personnel, staff member and labourer of tea industry in different aspects of tea management, field and factory operation, labourer welfare, computer application, tea financing etc. It has organized training programme with joint collaboration of Bangladesh Institute of Management. In 1988, a certificate course on tea management was introduced for the Managers and Assistant Managers of the tea garden. Later on, this course has been

upgraded to Post Graduate Diploma in 1993. MTC has an Academic Council which looks after the management and administrative aspects of the course. The Academic Council is constituted with 9 members representing BTB, BTRI, PDU, BIM, BTA, TTAB and BAU. The director general of BIM is the chairman of this council. MTC also conducted short training on tea planting and processing. This short training focused on tea financing, primary health care and nutrition, various applications of computers for the tea planters, labourer, medical staff and BKB personnel. Tea production course for the staff of tea garden has also been organized. But according to the field study, PGD or short course receiving situation at field level is very frustrated. At the same time, training receiving situation of the labourer is very frustrated. So, there is needed to take initiatives by the concern authority to increase skill and health consciousness of the labourer.

Auction and Broker House

Tea auction is the place of selling manufactured tea in bulk from tea garden to the buyers through who sell it in the local market or export it to other countries either in bulk or in packets. Some of the produced teas are also sold at estate level with prior permission of BTB either directly to overseas buyers or to the internal traders.

The first tea auction was held on 16th July, 1949 in Chittagong. On that day 3000 odd chests was offered. After the establishment of the auction only in 1971 during the liberation war it was suspended. After the liberation war it was restarted on 8th June, 1972. Tea auction is held on usually every Tuesday in Chittagong. If the day government holiday the next day auction held. Tea traders association of Bangladesh organizes the weekly tea auction in Chittagong through the appointed tea brokers of Bangladesh tea board. This auction market is situated in Chittagong which is the major port city of the country with sufficient warehouse and port facilities and well connected by road, railways and air. There are six broker houses in Chittagong who participate tea auction market in

Bangladesh. These are-National Brokers, KS Brokers, Produce Brokers, Progressive Brokers, Purba Bangla Brokers and Unity Brokers Ltd.

The auctioneers play a significant role in the whole transformation of the value chain and tea auction. A tea auctioneer has a regular dialogue with the producers and buyers and is able to monitor changes in demand and production patterns. They always give instructions to the producers to make quality tea. The value and demand of the tea is fixed through negotiations and convergence with the producers. His standing in the trade depends on how prompt and accurate he is in giving information to both the sections. The auctioning companies offer manufacturing advisory services to producers in response to change market requirements. So, they are able to relay the positive and negative attributes of tea to its manufacturers. Though producing companies have expertise in processing techniques the auctioneers merely acts as guides, because they are more in touch with market realities. Auctioneers also constantly update their data bank of crop Figures in different parts of the world, price levels at all auction centres, availability of various grades and types of tea, consumption trends etc.

Bangladesh has a large auction market for tea. Following the partition of India in 1947, the tea producers felt the need for tea auctions in Bangladesh to sell their made tea. This promoted four eminent international tea brokers namely W.F Cress Well, J. Thomas, A.W. Figgis and Carrot Moran to jointly form a company along with Khan Bahadur Mujibur Rahman and on 6th June 1948, Pakistan Brokers Limited was formed. This institution later renamed National Brokers Ltd.

Financial Institutions

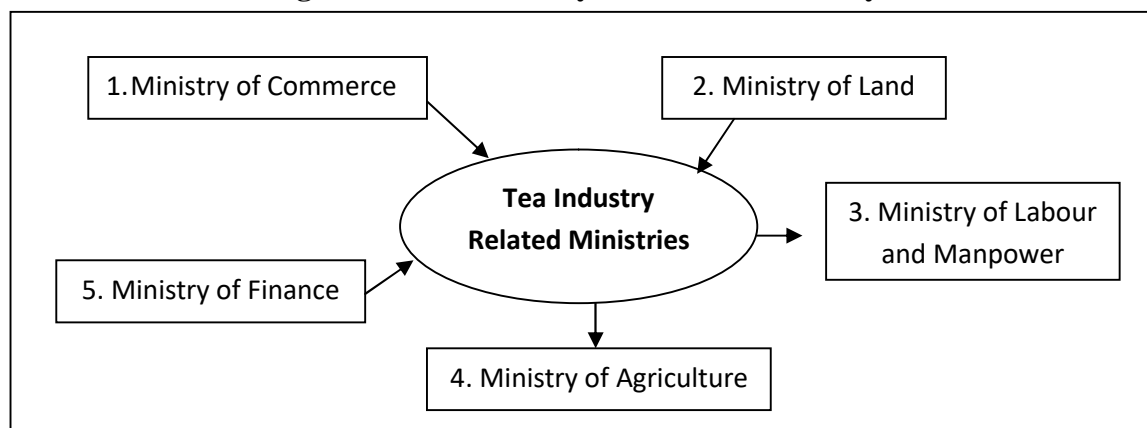
Besides the above mentioned institutions there are some financial institution related to this industry. Bangladesh Krishi Bank and Rajshahi Krishi Unnayan Bank give necessary financial assistance as loan in tea industry. European Commission also gives financial

assistance for development project. But during the field survey most of the small growers and holders and a number of studied garden mentioned that they face economic crisis due to the insufficiency of financial support. They also mentioned that the interest is comparative high than their capacity. As a result, a number of least developed tea garden of South-east and North-east region faced various problems. So, the concern authority should have needed to take necessary steps to solve the problem of the entrepreneurs.

Other Institutions

Bangladesh Export Promotion Bureau is related to export made tea under the ministry of commerce. Ministry of Labour and Manpower works as the issuing authority of all trade unions and also as the authority striving for alleviation of industrial dispute.

Figure 8.4: Tea Industry and Related Ministry



Source: BTB, 2015

Ministry of Land is related to allocation of government land lease procedure by the Deputy Commissioner. Ministry of Agriculture involved to allocation of fertilizer through BCSIC. Tax and Excise division involved to collect revenue on behalf of Ministry of Finance. So, we can say that there are multi institutions and ministries involved to operate the industry.

8.2.4 Associations

Association is an organization where a group of people work together for a particular purpose. They promote some idea or object for the same purpose. In this context, there

are some associations which are directly involved to the tea industry in Bangladesh. These associations are linked with others for their own interest and to run the industry.

Bangladesh Tea Association

Bangladesh Tea Association or Bangladeshio Cha Sangsad was established in 1960. The head office of BTA was first established at Agrabad in Chittagong. But in 2015, the head office shifted from Chittagong to Dhaka. BTA has one central committee and two branch committee. The branch of tea association is situated at Sylhet and Chittagong.

The principal activities of the association are to promote and safeguard the interests of its member engaged in production, manufacture and sale of tea, coffee and rubber. Besides this, the association negotiated with the government and labour union of tea garden. The association also sign various agreement specially labourer wages and welfare facilities with labour union.

Small Tea Growers Association of Bangladesh

Small Tea Growers Association is the organization of small growers and holders of North-western region. The association was established in 2005. The association tries for the development of new plantation with small scale and takes initiatives to solve various problems of the small growers and holders. They also negotiate with the concern authority of tea industry.

Tea Traders Association of Bangladesh

Tea Traders Association of Bangladesh is the association of tea buyers. 'Buyer' means any person, firm, company, corporate body or co-operative society including a consignee or commission agent with a place of business in tea industry of Bangladesh who receives tea by way of stock transfer from the manufacturer. They can be engaged in purchasing or procuring tea either from public tea auctions or directly from manufacturers of tea. The buyers are the major stakeholders in the auction system to stabilise the price mechanism

and sale practice. The profile and nature of buyers is dynamic and have different connotations in the market.

Labour Union

Every tea garden has a Panchayet of the labourer. It is the local-level organization to look into the interests of tea labourer. The panchayet consists of 11 members who are elected by the labourer. It works as a unit of BCSU. Panchayet have links with their central union. The main functions is given below-

- If any problem arises within the garden, the panchayet tries to solve it by discussing it with the management.
- If any labourer is deprived of his due wage and he complains to the panchayet, takes the panchayet steps in this regard.
- If any worker dismissed from his work then the panchayet tries to find out the causes of dismissal and takes appropriate measures.
- If any problem arises (such as family's conflict, quarrel) among labourer panchayet take initiatives to solve the problem.

Bangladesh Cha Sramik Union is the central organization of tea labourer. The Central Committee of BCSU elected by the representatives of the garden level association which known as panchayet committee. Every labourer of tea garden gives monthly subscription for the union. But there is no direct connection between the labourer and the union. The leaders of the union enter the garden through the panchayet. The main function of BCSU is given below:

- To improve the socio-economic condition of the labourer.
- To maintain a good relationship between the labourer and management.
- To bargain with the BCS to increase the wages and other facilities of the labourer.
- To settle the disputes between the labourer and the management.
- To solve the local problems if the panchayet fails to solve.

Bangladesh Tea Estate Staff Association

Bangladesh Tea Estate Staff Association is being the recognized bargaining agent for the tea estate staffs. The registered office of BTESA is situated at Srimangal in Maulvibazar. The association negotiates with BCS for salary, housing facilities, allowance, welfare facilities, water supply and other facilities and signs agreement which is applicable to all categories of members of BTESA.

8.2.5 Transport

Every sphere of carrying tea related materials is needed transport. Recently, transport system has been developed in Bangladesh. But the link road of tea garden is not sufficient and well occupied. There is need to develop link road of tea garden. During the survey it was observed that a number of tea garden face problems for link road and they changes vehicles several times. As a result, transport cost increases and affect on tea quality.

8.2.6 Garden Management

Garden management is the major work at management level. Garden management means those who are directly involved with plantation at garden. They look after the gardens from land preparation to finish the product. They are administrative person of tea garden. Usually, assistant managers to general managers of a tea garden known as garden management authority. They work according to the direction of the garden owners. The production and profit of a garden depends on proper management. So, they have needed to dedicate for the development of garden. Their characteristic, performance, knowledge about plantation methods and methods applying capacity needed to assessment.

8.2.7 Governance

Governance is very much important to operate an industry smoothly. There are need some utility services, infrastructure, policies and strategies.

Utility Services

Tea industry needs some utilities which are very much important for processing green leaf in factory. At present there are 120 factories which on production. Beside these, 3 factories have been under process of establishment. On the other hand, 4 factories closed due to economic and other problems. 46 gardens have no own factory. They sell their green leaf to other garden's factory. Two utility services closely related to tea industry. Uninterruptable gas and electricity is very much essential for production process.

Out of 166 gardens, 140 have electricity and 26 gardens have no electricity. Among the factories, 100 factories have gas connection for production. Those who have factory but no gas supply they use oil, coal or farness oil. As a result, their production cost increases than other factories. On the other hand, those gardens have no gas or electricity they face measurable sufferings. A number of respondents mentioned during the survey that they do not get sufficient gas and electricity. As a result, most of the time they use generator which affected the production, quality of made tea and increases production cost.

According to Bangladesh Arthanaitik Samikkha-2015, the demand of gases in tea industry was 1 billion CFT in 2014-15 fiscal years. But the supply was 0.8 Billion CFT. So, neat deficiency was 0.20 Billion CFT gas. Besides the labourer who lives in the garden need some utility services every day. They need electricity and water. But this utility supply is also very insufficient than their demand.

Infrastructure

Tea gardens have many needed infrastructures for various purposes. Among the infrastructure there are offices, bungalows, factories, labourer housing existed. According to BTB, 9315 hectares land used for infrastructure which is around 8% of total land. There are both Pacca and katcha infrastructure in tea garden. But the housing situation is very poor. Around 68,544 labourer house in the gardens where most of them are katcha houses

(51,979). Besides these, hospital, dispensary, schools also have included in tea gardens. So, infrastructure is very much essential part of tea industry.

Policies and Strategies

Tea industries need specific policies and strategies for sustainable development. Appropriate policy and strategies will ensure the sustainable development. For this purpose, BTB draw up a strategic development plan “vision-2021”. The main target of the vision is to increase production 100 million kg within 2025 and development of tea industry. Besides these, BTB prepare an action plan. The action divided in three categories short term for five years, midterm plan for 10 years and long term plan for more than 10 years. Besides these, tea industry needed specific “Tea Policy”. If prepare a new tea policy and the policies and strategies properly implemented, the industry will get the glorious prospects again.

8.2.8 Global Impact

Tea industry has a wide global impact. As tea consumption trend and export market is increasing day by day in the world. In 2014, world tea production was 5026 million kg. Among the produced tea, 1824 million kg tea exported different countries. So, there is a large export market where Bangladesh can compete and earn a lot of foreign currency. At present Kenya, Sri Lanka, India, China dominated the world tea market. Once upon a time, Bangladesh was also a dominated tea exporting country. At that time, internal consumption market was very small. But the trend of tea consumption has been changed. In these perspectives, to compete in the global market sufficient production must be increased and ensure quality. At the same time, it is needed to increase market oriented tea production such as green tea, organic tea.

Chapter 9

Discussion and Analysis at Management level

9.0 Introduction

This chapter explores the existing management pattern and potentialities between the large and small garden of three tea producing regions in Bangladesh. For this purposes, data has been collected from the concern management authority who are directly involved in plantation at field level. Assistant manager to general manager of large garden and small growers & holders of small garden are closely related from how to prepare tea land to green leaf production. In this chapter, the small growers & holders are considered as self manager of small garden. The study reveals the respondents educational qualification, age, sex distribution, experience, training both at home and abroad which are considered important factors for proper management of tea garden. It is needed to mention that the management level respondents of traditional large garden have more experience than the new tea plantation of North-western region. According to the study, at management level respondents of large garden take it as profession but most of them have no job security. On the other hand, the small garden respondents of small garden take it just as profitable agricultural product.

This chapter elaborately discussed and analysed the ratio of total area and tea area, source of land, loan borrowing situation, soil characteristics, labourer availability, types of plant, size and age, fertilizer and pesticides using pattern and sufficiency, drainage and irrigation, green leaf plucking practices, way of ensuring green leaf quality. Transport system from field to factory and factory to warehouse also discussed with carrying time and cost, garden expansion trend, future plan of the garden are depicted in this chapter.

The discussion and analysis of this chapter provided the differences of management practices between large and small small garden.

9.1 Respondents Characteristics (Designation, Age, Sex and Education)

In this chapter, the management level respondents represent as large garden management authority of the studied garden. This chapter is analyzing on the basis of two categories respondents. These are assistant managers to general manager of the large garden and small growers & holders of small garden. Both of the respondents of large and small garden gave their interview on behalf of their garden.

Designation

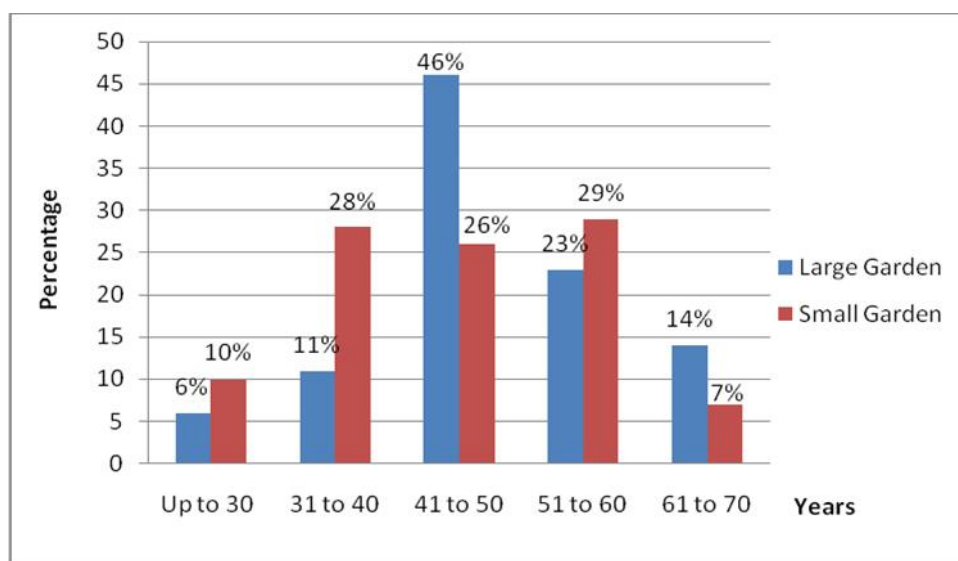
There are different levels of management authorities in large tea garden which started from assistant manager to general manager or above. In large tea garden, assistant manager to general managers are directly involved in field level. In this study, the respondents started from assistant manager to general manager are directly involved in production. According to the obtained data, about 6% of them are general manager, 74.29% manager and 11.43% assistant manager of the studied tea garden. Among the rest of respondents, there are also deputy managers and senior assistant managers.

On the other hand, small garden respondents maintain their small block tea plantation by themselves. They take it just a source of income. Those who have own land plant tea instead of other agricultural product. They are encouraged observing the others tea plantation and motivated to start small block plantation. So, these respondents are considered as self manager. They prepare land for tea plantation, plant tea plant, spray fertilizer and pesticides, green leaf pluck and take it to the factory by self management. All the small garden respondents are self managers.

Age and Sex

Age is an important factor at the management respondents who are directly involved in plantation. Because the management level look after the whole garden and give direction to the labourer day long in the field. Besides this, there is a strong relation between age and experience. According to the obtained data, nearly 11% of the respondent's age within 31 to 40 years and around 46% of them ranges between 41 to 50 years respectively. Around 23% of the respondents age between 51 to 60 years. 6% of the respondent's age is above than 60 years and around 6% is less than 30 years. It is mentionable that all of the large tea garden respondents are male. There are no female respondents in the study area.

Figure 9.1: Age Distribution of the Respondents



Source: Field Survey, 2015

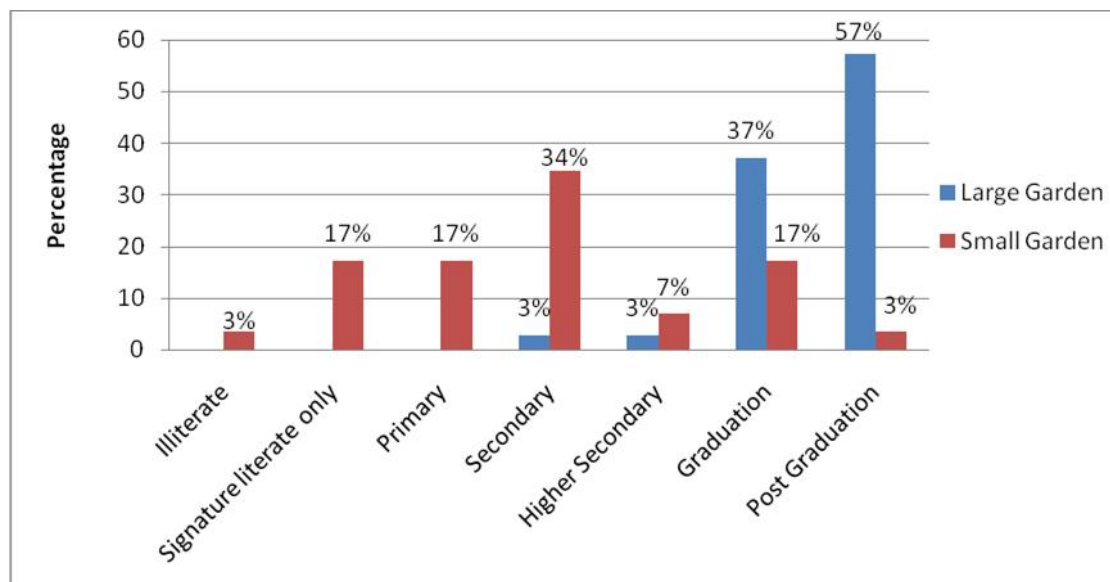
On the other hand, 10% of the small garden respondents are less than 30 years in age. Around 28% of the respondents ages between 31 to 40 years. Rest of the respondents aged within 41 to 70 years of different range. It is remarkable that all the small garden respondents are not male. Above 5% of the respondents are female. The female are trying

to change their economic condition by tea plantation which helps to increase women empowerment. They also work hard both in tea garden and at home.

Level of Education

Figure 9.2 shows that the level of education of large tea garden management respondents is higher than small growers and holders. The garden management respondents get the job as profession. Most of the respondents (57%) of the gardens have post graduation degree from different universities. Nearly 37% of the respondents completed graduation from different institutions. Secondary and higher secondary education completed nearly 6% of the respondents.

Figure 9.2: Educational Status at Management Level



Source: Field Survey, 2015

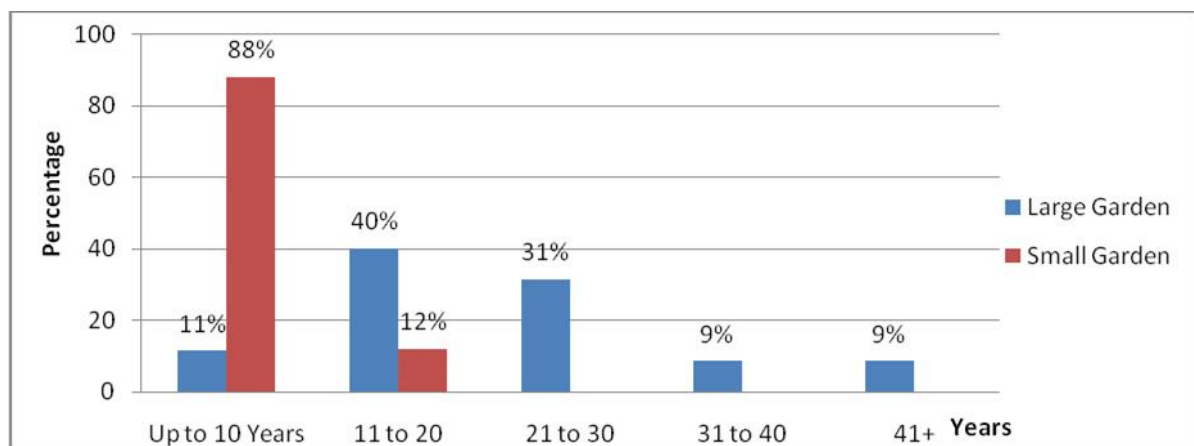
On the other hand, small garden respondents have different level of education. More than 34% of the small garden respondents have completed secondary certificate examination. Around 4% of the respondents are illiterate and over 17% respondents can write their name only and can read a bit. Among the respondents, 17% have completed primary education and 7 percent respondents have completed higher secondary education. 17% of the respondents completed graduation and only 3% achieved post graduation degree.

Those who completed secondary to post graduation degree some of them are involved in different government and non-government services.

9.2 Working Experience

Experience of service has an impact on the management and production efficiency. Among the respondents 40% have 11 to 20 years working experience in tea garden. About 31% of the respondents have 21 to 30 years working experience in tea garden and 11% of the respondents working experience are less than 10 years. Around 9 percent of the respondents have more than 40 years who are known as most experienced planter and they are well known in tea plantation sector. They work after their retirement of regular service and share their experience for the development of tea industry.

Figure 9.3 Working Experience in Tea Garden



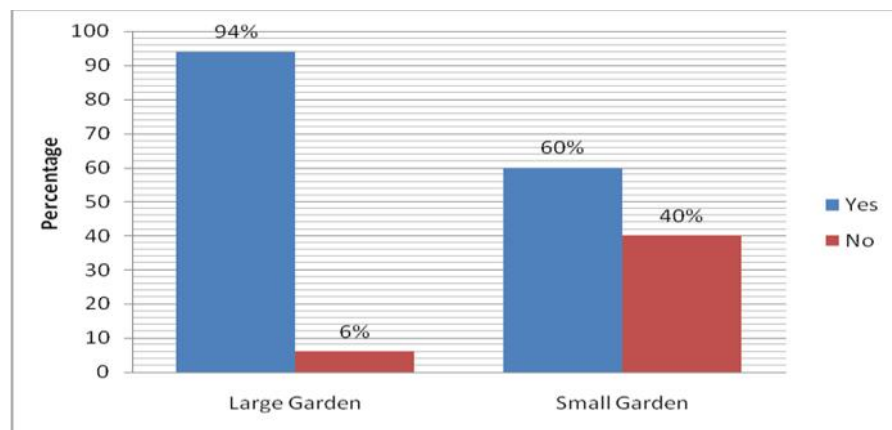
Source: Field Survey, 2015

On the other hand, 88% of the small garden respondents working experience are less than 10 years. Only 12% of the respondents experience range between 10 to 20 years. Actually, the small garden respondents work in tea garden after starting tea plantation in North-western region. The Present position experience of the small garden respondents same as total working experience in tea garden.

9.3 Participation in Training or Courses

To meet the current challenges of tea industry management stakeholder need to be equipped. They should have needed to clear knowledge about tea plantation both at home and abroad. Capacity development can be made through participation in seminar, workshop, training or relevant courses at different stages. Most of the large garden respondents (94%) have attended at training or course. Among the respondents, 6% replied that they have never participated tea related any training programme.

Figure 9.4: Participation of Training and Courses



Source: Field Survey, 2015

On the other hand, around 60% of the respondents of small garden respondents participated in training or short course programme. Rest of the respondents (40%) never participated in training or courses programme. They planted tea just like other agricultural product. Actually most of the small garden respondents have no proper knowledge about tea plantation. They also mentioned that no one inspire or give opportunity them to participate at training or seminar or workshop etc

Simultaneously it was asked to the large garden respondents that where they have participated at training or courses. In response to this question, 81.82% of the respondents said that they get training or course at home through BTB. 9.09% of the respondents participated both at home and abroad. Only 6.06% of the respondents have participated at

foreign training programme. Rest of the respondents has participated in training or courses from other related institutions.

Table 9.1 shows that those who have participated training or short course programme of the small growers and holders, among them 77.14% respondents got training through BTB. 14.29% of the small garden respondents have received training from NGO (Bikas Bangla) and 8.57% respondents have received training from both BTB and NGO.

Table 9.1: Source and Types of Training or Courses

Source of Training/Course	Large Garden (N=33)		Small Garden(N=35)	
	Respondents	Percentage	Respondents	Percentage
At home through BTB	27	81.82	27	77.14
Training at abroad	2	6.06	-	-
At home and abroad	3	9.09	-	-
BTB and NGO (Bikas Bangla)	-	-	3	8.57
Other institution	1	3.03	5	14.29
Types of Training/Course				
Short course/training at BTB	22	66.67	27	77.14
2 Years diploma at BTB and BIM	6	18.18	-	-
Short course at abroad	2	6.06	-	-
2 Years diploma from BTB /BTRI and short course at abroad	3	9.09	-	-
Training from NGO/others	-	-	8	22.86
Total	33	100	35	100

Source: Field Survey, 2015

Table 9.1 depicted has that, most of the large garden respondents (66.67%) got short course or training (1to7 days) under BTB. Only 18.18% of the respondents have achieved 2 years diploma course with collaboration between BTB and BIM. Only 6.06% of the respondents have participated in short course at abroad and 9.09% of the respondents have achieved both 2 years diploma course with short course at abroad. On the other hand, 77.14% of the small growers & holders got training or short course from BTB and 22.86% got it from a NGO and Kazi & Kazi tea garden.

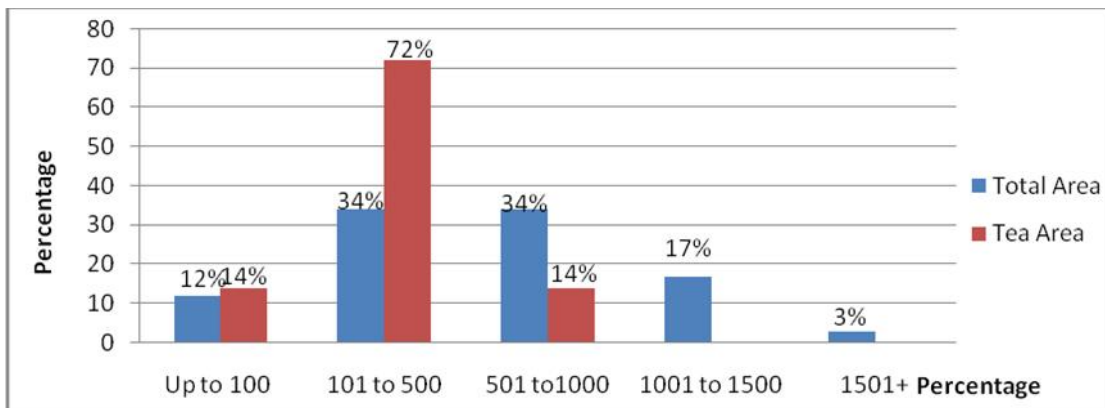
So, the above mentioned statistics shows that the participation in training programme, workshop or different diploma courses is not sufficient for the management level who are directly involved in plantation. Although a number of large garden respondents participated in training or courses at home but their participation and sharing knowledge with other countries is very low. Finally, it indicates that management level needed more participation in training or courses especially abroad where they will be able to exchange their knowledge. Their knowledge and experience application in the field level will increase production and play role to the sustainable development of tea industry. So, the concern authority and company should arrange seminar, workshop or courses both at home and abroad, ensure the effective participation of tea garden management authority and also special concentration of small growers and holders.

9.4 Ratio of Total Area and Tea Area

Total area and tea area of the studied tea gardens is not equal. 11.43% of the studied tea gardens have total area less than 100 hectors. Among the studied gardens, 34.29% have 101 to 500 hectors land and at the same percent of gardens have 501 to 1000 hectors total land. Only 2.86% of the studied gardens have more than 1500 hectors total land.

According to the tradition, there are multiple uses of tea garden land. Traditionally, tea gardens of North-east and South-east region use a proportion of the total land for residence of labourers, staffs and management authority. There is also other use of tea garden land such as plantation of rubber, agricultural land, ponds, office etc. Among the studied gardens, 14.29% have less than 100 hectors tea area. Most of the gardens have 101 to 500 hectors tea land and 14.29% gardens have tea land ranges between 501 to 1000 hectors. The total area and tea area of the large garden is shown in Figure 9.5.

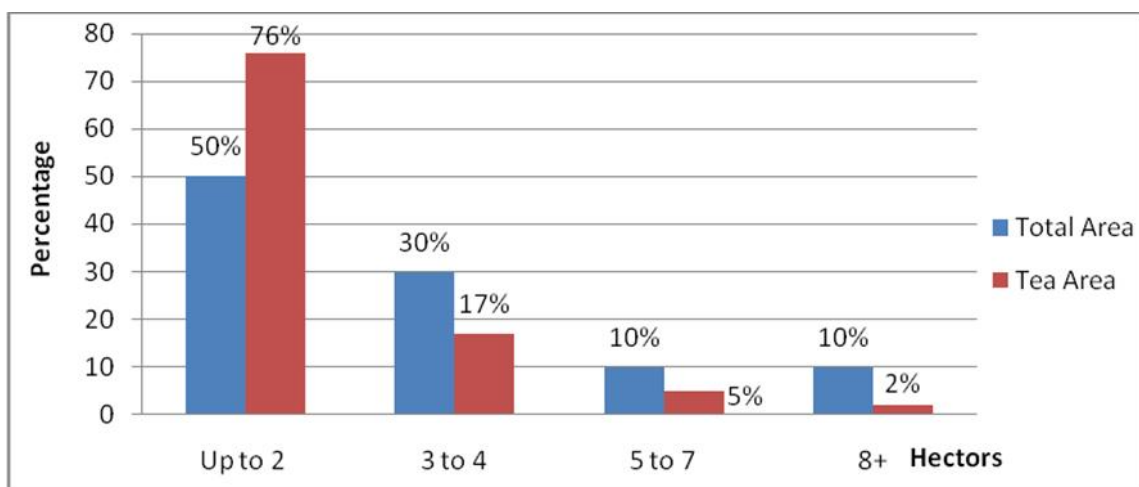
Figure 9.5: Total Area and Net Tea Area of Large Garden (In Hectors)



Source: Field Study, 2015

On the other hand, the small growers total tea land 2.2 hecators and small holders tea land from 2.3 to 8.1 hecators. Figure 9.6 shows the total area and tea area of the respondent's small growers and holders. There is needed to mention that the small garden respondents use their land only for tea plantation. They have no any office or other infrastructure. The small garden respondents use tea land like other agricultural products. Small garden respondents try to increase tea plantation. Tea plantation is more profitable than other agricultural products. In the meantime, a number of small growers turned into small holders and small holder turned into tea garden or estate by increasing tea land and plantation.

Figure 9.6 Total Area and Net Tea Area of the Small garden (In Hectors)

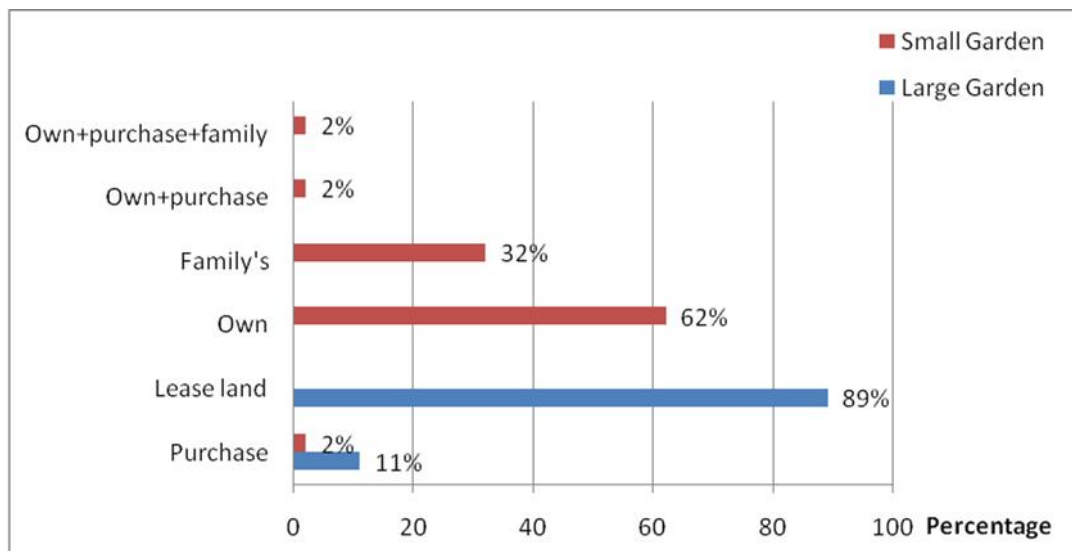


Source: Field Survey, 2015

9.5 Source of Tea Garden Land

Among the studied gardens, around 89% take the land lease from the government. The government gave the land lease for various tenures. At the same time, more than 11% of the studied garden purchased the tea land from local people. There is needed to mention that the all large tea garden purchased the tea land from the local people in the North-western region of Bangladesh. There is no lease land for tea plantation in North-western region.

Figure 9.7: Tenural Status of Tea Garden Land



Source: Field Survey, 2015

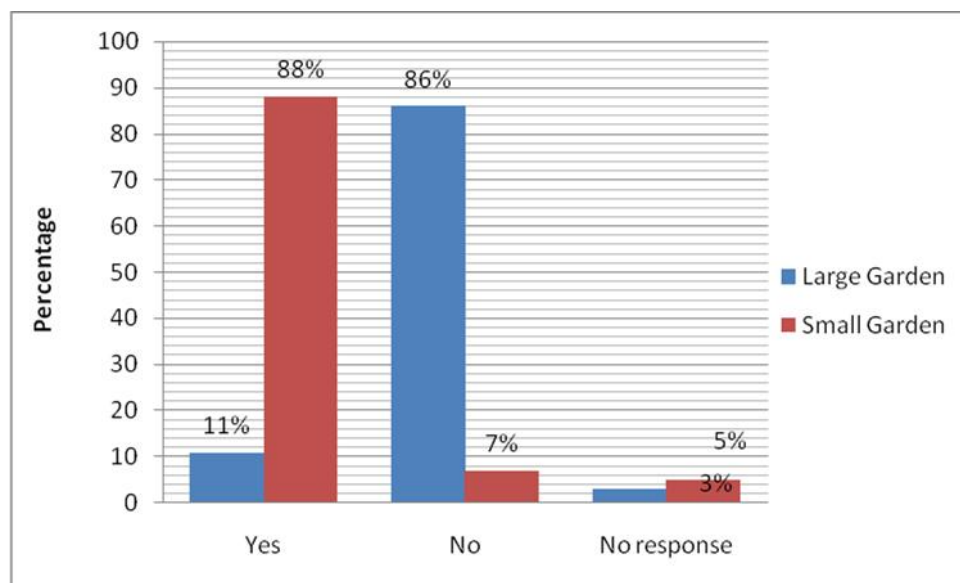
On the other hand, small garden respondents have multiple source of land where they plant tea. About 62% of the small garden respondents mentioned that they planted tea of their own land. Nearly 32% of the respondents said, they planted tea on their family's land. Rest of the respondents mentioned that they get the tea land either purchase or own or all the above mentioned sources.

9.6 Have Any Problem of Land Lease or Purchasing

The respondents who purchased tea land from the local people faces some problems. Such as- some land purchased twice or more than twice times from different persons.

There is also land ownership problem and local politics involved in tea plantation land. The tea plantation of North-western region faced these problems. On the other hand, some of the studied tea garden mentioned that lease procedure is very difficult and various social and political problems prevailed there. They mentioned that a part of the local people also try get the illegally tea land possession which they took lease from the government.

Figure 9.8: Have Any Problem of Land Lease or Purchasing



Source: Field Survey, 2015

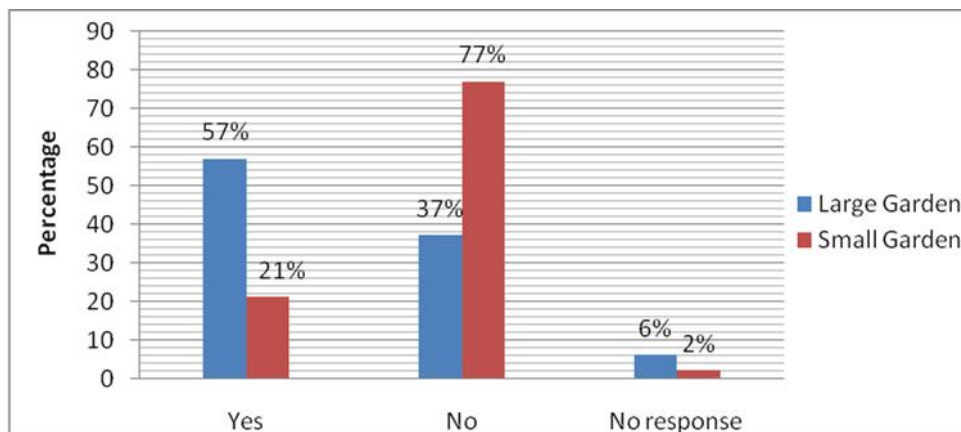
Most of the small garden respondents (88%) mentioned that they have no problems of their tea plantation land. But around 7% of the respondents mentioned that they have land related problem where they planted tea. Among the respondents, more than 5% have no response about this question. According to the study it is mentionable that land ownership is not a major problem of the small growers and holders.

9.7 Whether Borrowed Loan

As a large industry, tea garden needed to invest large amount of capital. Usually in a large garden, there are factory, residence for labourer, office and various infrastructures which

needed large capital for establishment. So, sufficient investment needed to run the industry properly. For these reasons, tea garden authority borrowed loan from bank. According to the field study, most of the studied large gardens (57%) borrowed loan from selected bank by the BTB. Among the 37% of studied large gardens mentioned that their garden owner did not borrow loan. They invested their own capital. Among the respondents, around 6% did not response about this question.

Figure 9.9: Whether Borrowed Loan



Source: Field Survey, 2015

On the other hand, most of the small garden respondents (around 77%) did not take any loan. Among the respondents, around 21% borrowed loan from bank and 2% of the respondents do not respond about this question. Most of the respondents invested very small amount capital for tea plantation. They invested capital just only for tea plant purchase, buying fertilizer and pesticides, labourer wages. So, they hardly feel to borrow loan. Most of the respondents mentioned that borrowing loan is an additional tension for them and they also think that the bank interest rate is higher than their capacity.

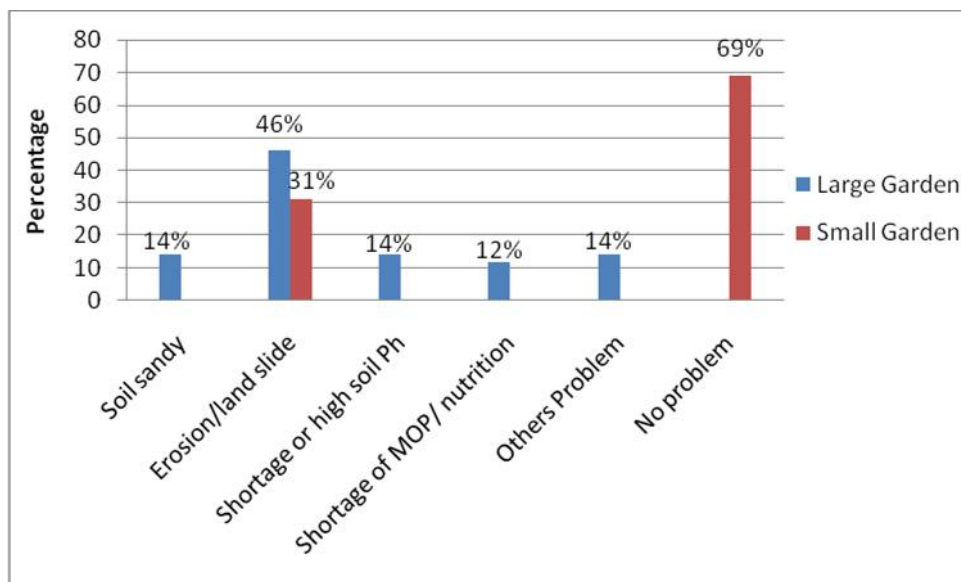
9.8 Whether Face Soil Related Any Problem

The characteristic of tea soil is different from other agricultural land. The traditional tea garden of North-east and South-east region is located in hilly area and new garden of North-western region in plain land. According to the obtained data, there are some soil

related problems both for large tea garden and small garden. As a result, some of the tea plant uprooted and affect on green leaf production.

Figure 9.10 depicted that there are some soil related problems found in the studied tea gardens. About 46% of the large garden respondents mentioned that land erosion and land slide is one of the problems of their garden. 14% large gardens face others problems such as more stony soil. Among the studied gardens, around 14% identified sandy soil as problem. There is also prevailing shortage of soil PH or high PH than requirements, shortage of nutrition etc. The respondents also mentioned that the trend of soil related problem may increase in future due to the over use of chemical fertilizer.

Figure 9.10 Types of Soil Related Problems



Source: Field Survey, 2015

On the other hand, most of the small garden respondents (69%) do not face any soil related problem. Only 31% of the respondents mentioned that soil erosion/land slide is the main problem of their tea garden.

9.9 Types of Soil

Soil is the first important natural feature for tea plantation. The scientists identified that sandy loam soil is suitable for tea plantation. Around 66 Percent studied large gardens

have both sandy and sandy loam soil. 17.14% of large gardens have sandy soil and 8.57% sandy loam respectively. Rest of the studied gardens is sandy, sandy loam and clay or sandy and clay.

Table 9.2: Types of Soil of the Respondents' Garden

Soil Types	Large Garden		Small Garden	
	Number of Garden	Percentage	Number of Garden	Percentage
Sandy	6	17.14	16	27.59
Sandy Loam	3	8.57	13	22.41
Sandy+ Sandy loam	23	65.71	29	50.00
Sandy, Sandy Loam and Clay	2	5.71	-	-
Sandy and Clay	1	2.86	-	-
Total	35	100.00	58	100.00

Field Source: Field Survey, 2015

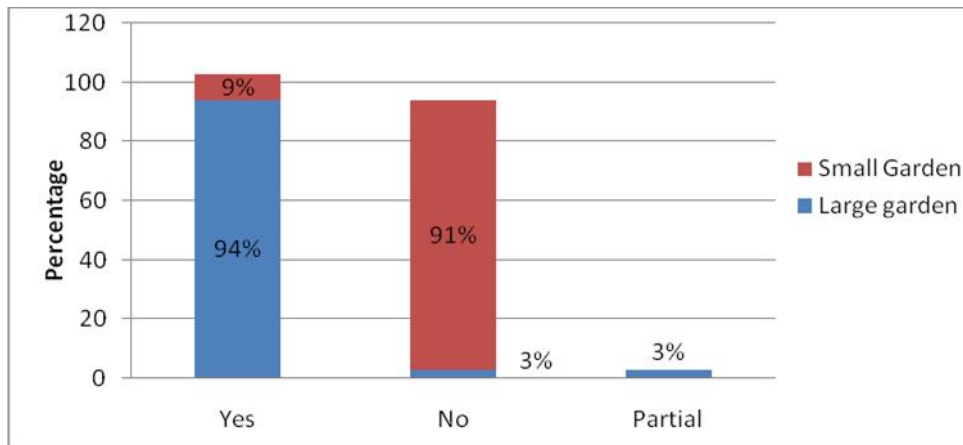
On the other hand, there is diversification of tea soil in North-western region. According to the obtained data, the small growers and holders' tea land mostly sandy and sandy loam. 27.59% of the small garden respondent's mentioned that the soil of their garden is sandy and 22.41% gardens soil is sandy loam. There are some studied large and small garden respondents mentioned that a portion of the tea soil is sandy than tea plantation requirements.

9.10 Soil PH Testing Situation and Levels

PH is defined as the negative logarithm of Hydrogen ion concentration. Soil may be three types in reaction. These are acidic, alkaline and neutral. The reaction of the soil is expressed in terms of PH which is destined as the H⁺ ions concentration. 'P' means weight and 'H' means hydrogen ions. The PH scale goes from 0 to 14. At PH-7, the mid-point of the scale, there are equal number of hydrogen ions and hydroxyl ions and the solution is neutral. Soil PH is closely related to the tea production efficiency. If the soil PH above or less than requirements, the growth of tea plants is reduced to a great extent

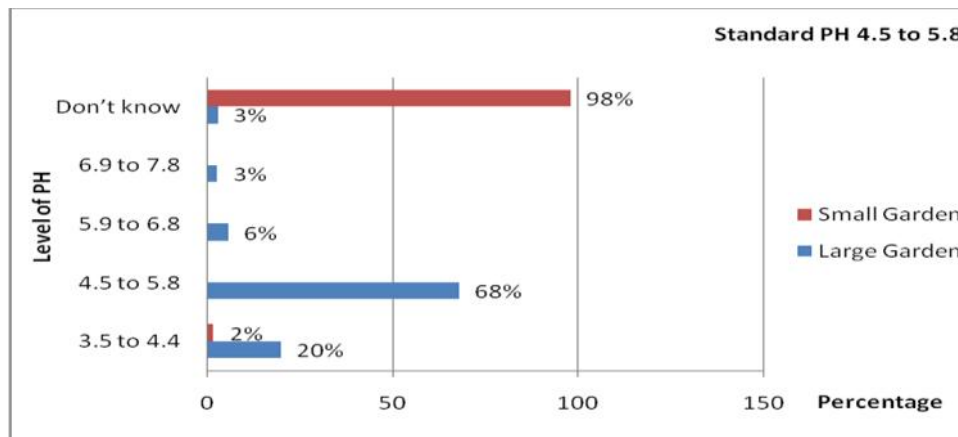
due to deficiency of iron (Rahman, 2006). Among the studied tea gardens around 94 percent tested their soil PH. But most of the studied large garden do not test soil PH regularly. About 3% of the studied garden tested PH partially and 3% garden never tested. The respondents mentioned that their soil PH testing situation is not sufficient. They also mentioned regular soil PH testing is very much important for proper soil management.

Figure 9.11: Soil PH Testing Situation of the Respondents Garden



Source: Field Survey, 2015

According to BTRI, the respected PH value of tea soil is 4.5 to 5.8. Figure 9.12 depicted the level of soil PH of the studied gardens. Most of the studied large tea gardens (68%) mentioned that the soil PH is prevailing according to the requirements. Among of the studied gardens, 20% have 3.5 to 4.4 range of soil PH which is less than the requirements. Around 6% of the studied gardens have soil PH range 5.9 to 6.8 and rest of the gardens have above than 6.9 which are not suitable for tea plantation and affect overall production.

Figure 9.12: Average Soil PH of the Respondents Garden

Source: Field Survey, 2015

On the other hand, only 2% small garden respondents tested soil PH. The soil PH testing situation of the small garden respondents is very unsatisfactory. Only one respondent tested soil PH of his garden and others respondents don't know the value of soil PH.

All the studied gardens both large and small growers & holders tested soil PH through BTRI a concern institution of BTB.

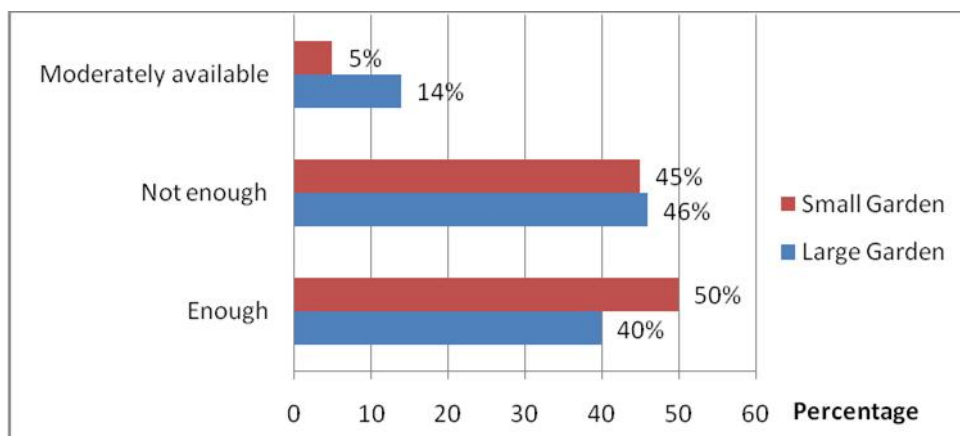
Most of the old tea soils are strongly acidic due to continuous application of ammonium sulphate. This would create a nutrient imbalance and subsequently affect the growth and yield of tea plant. So, it is necessary to correct the PH value by application of lime after assessing the PH value of the soil (Rahman, 2006). It is also very much essential to test the soil PH of small growers and holders.

9.11 Labourer Availability Situation

Tea plantation is a labour intensive industry. But according to the study, nearly 46 percent of the large garden respondents mentioned that they do not get enough labourers for their garden while only 40% of the respondents said that they get enough labourer for their garden. Rest of the respondents mentioned labourer available moderately for their garden.

Those who do not get enough labourers identified some causes. Around 55% of the respondents said that high wages outside of tea garden is responsible for this situation. Nearly 14% of the respondents told that labourer crisis day by day increasing due to the influence of city or town. Working scope outside of tea gardens is also a barrier of labourer availability. Besides these, mobile phone and other technology also influence the labourer to work outside of gardens even abroad of the country. During the survey, it is found that some of the labourers want to change their forefather’s profession for the development of living standard and ensure proper educational opportunity for their children.

Figure 9:13: Labourer Availability Situation of Tea Garden



Source: Field Survey, 2015

On the other hand, 50% of the small garden respondents mentioned that they get enough labourer for their tea garden while nearly 45% of the respondents do not get enough labourer when they need. Only 5 percent of the respondents get labourer moderately in proper time.

Among the small garden respondents those who do not get enough labourers, 91% of them identified high wages outside of tea garden is responsible for labourer crisis. Rest of the respondents mentioned that labourer availability depends on the influences of city/town and seasonal variation. From the above mentioned statistics, it can be clearly

concluded that labourer crisis prevailing in tea gardens which affect the tea plantation and increases cost of production. According to the study, it can be predicted that in future tea industry will be face serious labourer crisis due to the imbalance distribution and other socio-economic factors.

9.12 Skilled Labourer Availability

Skilled labourer is very much essential for tea industry. Among the studied large tea gardens around 57% respondents mentioned that they get enough labourer for their garden while over 17% of the respondents get moderately and 14% of the respondents mentioned technically skilled enough labourer are not available. Rest of the respondents do not get enough labourers both general and technically skilled.

Table 9.3: Skilled Labourer Availability

Labourer Availability	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
Enough	20	57.14	19	32.76
Moderately	6	17.14	4	6.90
Not enough (only technical)	5	14.29	32	55.17
Not enough(general and technical labourer)	4	11.43	3	5.17
Total	35	100.00	58	100.00

Source: Field Survey 2015

On the other hand, most of the small garden respondents (55%) do not get technically skilled labourer. Only 33% of the respondents get sufficient skilled labourer. Rest of the respondents (12%) do not get both general and technically skilled labourer for their garden.

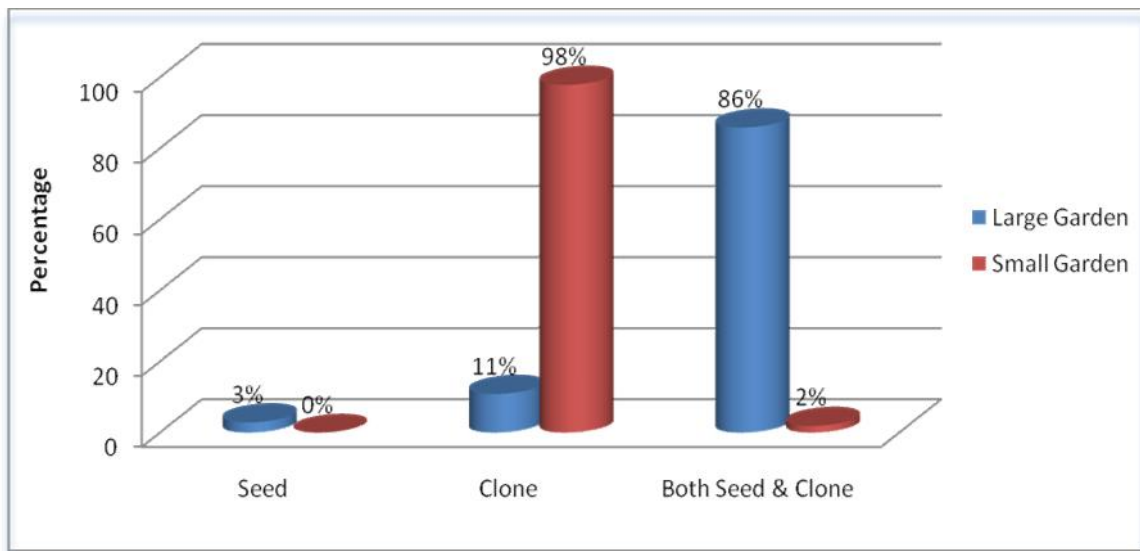
Based on the above statistics, tea gardens have moderately skilled labourer but some of the gardens also suffer from technically skilled labourer. On the other hand, small garden respondents face more crisis of technically skilled labourer. So, it is needed to address

this issue to ensure skilled labourer both for large and small gardens. Training and motivation can make the labourer (both general and technical) skilled to work in garden.

9.13 Types and Ratio of Tea Plant in Garden

In tea garden, there are both seed and clone plant. Most of the old gardens plant seed plant. According to the rules, every tea garden needed to maintain balance between the ratio of seed and clone plant. Among the studied gardens, about 86% large gardens used both seed and clone plant. Most of the respondents mentioned that from the last two or three decades they increased high yield varieties clone plant. Among the 11% of studied gardens used clone plant only. Almost all of the gardens of North-western region of the country are using clone plant. They do not use seed plant because of less production than clone. Nearly 3% studied large gardens used only seed plant which are situated at traditional tea plantation areas. They never used clone plant.

Figure 9.14 Types of Plant Uses in Tea Garden



Source: Field Survey, 2105

On the other hand, 98% of the small garden respondents used clone plant for more production. Only 2% respondents used both seed and clone. Those who used seed plant they started plantation from the beginning of tea plantation in North-western region.

According to the study, there are both seed and clone plant used for new plantation or re-plantation. Seed plant grows from the matured seed. Tea seeds are collected from the selected tea gardens. On the other hand, there are two types of clone plant. These are Bi-clonal and poly-clonal. Bi-clonal seeds are produced by crossing with two compatible generative clones. On the other hand, poly clonal seeds are produced by crossing preferable with 5-7 generative clones. The clones used in such case should be highly cross compatible amongst themselves.

Traditionally, the source of seed is the existing general non-clonal seed baries. The seeds produced from these seed braise are inferior and poor in standard. To obtain standard seed sources the policy and procedure needed to be developed and adopt. At present 10 seed baries are recognized as approved seed baries in Bangladesh.

Ratio of Seed or Clone Plant

Every garden needed to keep balance between the ratio of seed and clone plant. Recently most of the gardens increase clone plant using trend. At the same time, they also mentioned that the sustainability of clone plant is not as seed plant. Clone plantation gives good production around 35 to 40 years but seed plantation gives production 50 to 60 years. Clone trees are attacked by various diseases easily. The sustainable and disease prevention capacity of clone plant is low than seed plant. Seed tree is more capable to tolerate drought, prevention power of disease and long term productivity. Table 9.4 reveals that 82.60% of the respondents of large garden used 60% seed and 40% clone. At the same time, 11.60% of respondents used 80% seed and 20% clone plant.

Figure 9.4: Ratio of Seed and Clone Plant in Tea Garden

Large Garden			Small Garden		
Seed	Clone	Percentage	Seed	Clone	Percentage
20%	60%	2.90	20%	80%	1.72
60%	40%	82.60	-	-	-
70%	30%	2.90	-	-	-
80%	20%	11.60	-	-	-
0%	100%	-	0%	100%	98.28
Total		100.00	Total		100

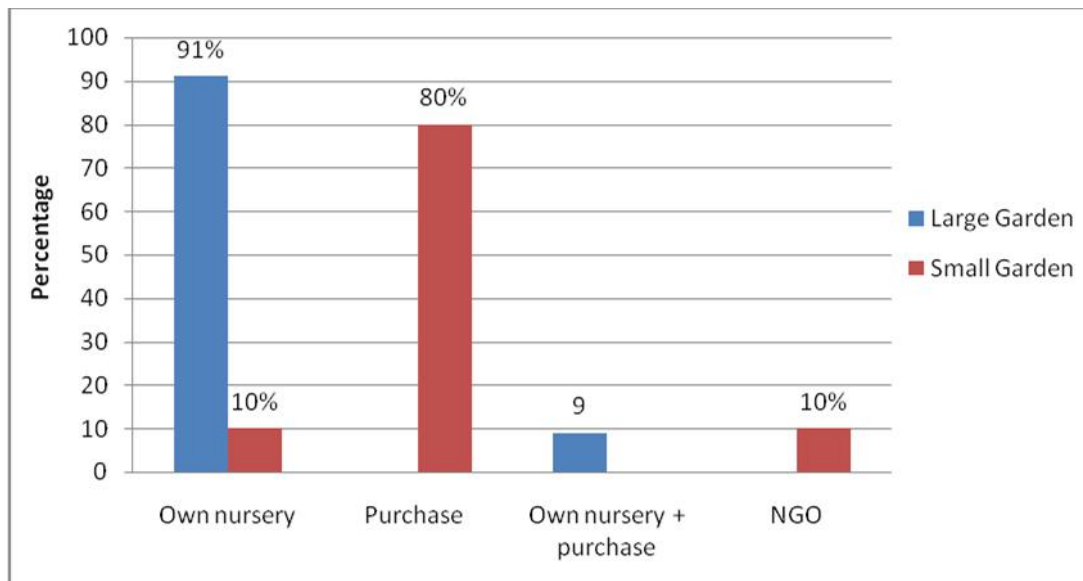
Source: Field Survey, 2015

On the other hand, 98.28% of the small garden respondents used clone plant in their garden. They mentioned that clone plant is better for more production. They also mentioned that seed plant is not available in North-western part of Bangladesh.

9.14 Source and Availability of Tea Plant

Figure 9.15 shows the source of plant of the studied gardens. Over 91% of the studied gardens have own source of tea plant. They have own nursery and a number of labourers involved in nursery. Around 9% of the large gardens purchase plant and they also have own source of plant. At present, most of the nursery is clone and their productivity is more than seed.

Seed or plant availability is very much essential in proper time. Besides this, it is needed to ensure plant quality. Most of the large garden respondents (71.43%) said that seed or plant is available in proper time. 17.14% of the respondents get it moderately in proper time. But rest of the respondents (11.43%) claimed, they do not get seed or plant in proper time. They told during the survey, sometimes quality seed plant is not available because of monopoly trade. Climatic factors are also responsible for unavailability of seed or plant.

Figure 9.15: Source of Tea Plant

Source: Field Survey, 2015

On the other hand, around 80% of the small garden respondents purchase plant for their garden. They have no own nursery. Rest of the respondents (about 10%) have self nursery and more than 10% get plant free from a NGO named Bikas Bangla. At the same time, most of the small garden respondents (95%) get plant in proper time. A number of the local people started nursery as a profitable business in North-western region.

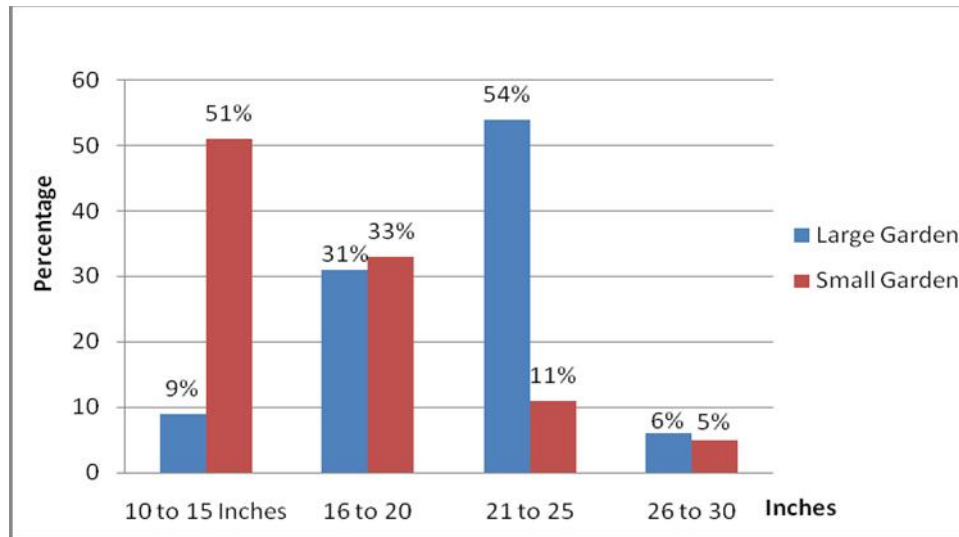
So, from the above discussion, it is accomplished that seed or plant is not a problem for new plantation or re-plantation. According to the respondents, quality seed or plant is a problem for plantation. The tendency of monopoly trade and commercialization of nursery is one of the problems of the tea industry. So, the concerned authority needs to take initiative for ensuring quality plant or seed.

9.15 Average Size and Age of Plant Uses for Plantation

Plant size and age have an impact on the growth and strength of tea plant. The study reveals that more than half (54%) of the large garden respondents use average 21 to 25 inches plant for new plantation, 31% respondents use 16 to 20 inches plant in their

garden. 9% of the respondents use 10 to 15 inches plant while 6% respondents use 26 to 30 inches plant in for new plantation. On the other hand, most of the small garden respondents (51%) use 10 to 15 inches plant in their garden and 33% of the respondents use 16 to 20 inches plant for new plantation.

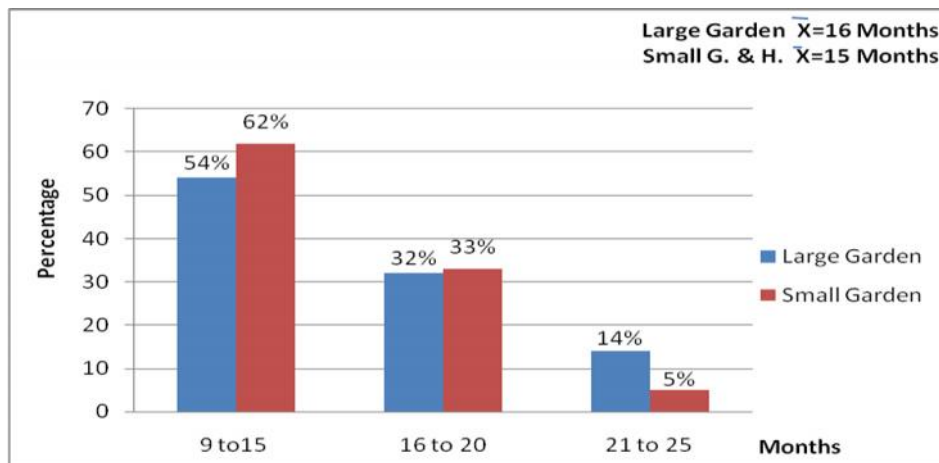
Figure 9.16: Average Height of Tea Plant Use in Garden



Source: Field Survey, 2015

Age is an important characteristic for new tea plantation. Figure 9.17 Shows that 54% large garden respondents' used 9 to 15 month's plant and 32% use 16 to 20 months plant. Among the studied gardens, 14% respondents mentioned that they used average size 21 to 25 month's plant.

Figure 9.17: Average Age of the Plant Uses in Garden



Source: Field Survey, 2015

On the other hand, most of the small garden respondents (62%) use 9 to 15 months plant while 33% respondents use 16 to 20 months plants. Only 5% of the small garden respondents use 21 to 25 months plant.

9.16 Which Plant Better for Production

The productivity of seed or clone plant is not equal. According to the Table 9.5, around 88.57% of the large garden respondents mentioned that clone plant is better for more production in their gardens. Only 2.86% large garden respondents said seed plant is better for more production in their garden. Seed plant is more suitable for high tillah. Seed plant can survive from any kind of disaster. Its tolerance and sustainable capacity is very high. Among the studied large tea gardens 8.57% of the studied gardens mentioned that both clone and seed plant is better for more production in their garden.

Table 9.5: Variety of Plant Used in Garden

Variety of Plant	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
Seed	1	2.86	-	-
Clone	31	88.57	51	87.93
Seed and Clone	3	8.57	1	1.72
Don't know	-	-	6	10.34
Total	35	100.00	58	100.00

Source: Field Survey, 2015

On the other hand, the small garden respondents are not familiar with seed plants. There is no scope for small garden respondents to get seed plant in North-western region. Because, there is no seed bari near to the small garden respondents from where they can collect the seed plant. As a result, 87.93% of the respondents have positive response about clone. 10.34% of the respondents do not know which types of plant they used in their garden. 1.72% of the respondents mentioned that both seed and clone plant is better

for more production in their garden. It is mentionable that these respondents started plantation at the very beginning when tea plantation started in North-western region.

9.17 Fertilizer and Pesticides Using Status and Availability

Fertilizer is one of the important components of tea plantation. The formation of a plant growth is a prior importance to the satisfactory growth of foliage. For this, all of the respondents use fertilizer in their tea garden. There are two types of fertilizer which are used in tea plantation. These are- chemical fertilizer such as Urea, TSP, MOP and organic fertilizer such as cow dung, vermi compost etc.

Around 94% of the studied large gardens use chemical fertilizer in mature trees. Around 3% of the gardens use both chemical and organic fertilizer. These respondents mentioned that they try to turn into organic fertilizer using methods. For this, they increase organic fertilizer using quantity. Among the studied gardens only one garden completely uses organic fertilizer. This garden uses cow dung, vermin compost and various medicinal trees as fertilizer.

On the other hand, all of the small growers & holders use chemical fertilizer. In addition, it requires to mention that the respondents who have own nursery use both chemical and organic fertilizer especially cow dung to their nursery.

Chemical Fertilizer Availability: Table 9.6 shows that most of the large gardens (around 89%) get chemical fertilizer in proper time and about 8% mentioned moderately available. Around 3% of the gardens do not get chemical fertilizer in proper time. Among the large garden respondents, 82.86% purchase fertilizer through BCS. Sometimes they purchase from open market if they do not get timely by the concern supplier. 11.43% of the large garden purchase chemical fertilizer from open market. But a number of the respondents of large garden raise the question about the fertilizer quality. They also mentioned, sometimes the quality of fertilizer is very low than standard level.

On the other hand, all the small garden respondents mostly get fertilizer in proper time. They purchase it from open market. During the survey they mentioned, the quality of chemical fertilizer is not satisfactory which is bought from open market.

Organic Fertilizer Availability: The organic fertilizer is known as environment friendly and also increases the strength and fertility of soil and tea plant. Table 9.6 depicted that among the studied large gardens, 31.43% do not get organic fertilizer when they need. 25.71% of the respondents get organic fertilizer moderately. Sometimes they do not get sufficient organic fertilizer in proper time. Only 42.86% of the studied garden respondents get organic fertilizer in proper time.

Among the studied large gardens, 14.29% arrange organic fertilizer from their own garden. 8.57% gardens collect it from labourer line. Labourer line means where the labourer lives. Most of the large gardens (77.14%) collect organic fertilizer outside of the garden. All the respondents of large garden said that the price of organic fertilizer is high because of increasing production cost.

On the other hand, most of the small garden respondents (63.79%) get organic fertilizer in proper time. The small garden respondents have own source of organic fertilizer. More or less small garden respondents have cow or goat at home. According to the obtained data, 10.34% of the respondents get it moderately. Sometimes they face problems due to delay of supply or high costing. Among the small growers and holders, 25.86% respondents do not get organic fertilizer in proper time. Table 9.6 Shows that 56.90% small garden respondents have own source of organic fertilizer. They purchase from other people of the locality. And 43.10% respondents have purchase organic fertilizer from outside.

Pesticides Availability: Pesticide is an essential component of pest management. Tea pest and tea productivity are two antagonistic factors. The word pest is a collective term for a wide range of organisms like virus, bacteria, algae, fungi, insects, mites, birds and

rodent which are noxious, troublesome and destructive to crops, food supply and human property. So, it is needed to ensure pesticides in proper time to protect tea plant from various pests. Table 9.6 depicted that 94.29% of the large garden respondents mentioned that pesticides are available in proper time. Only 5.71% of the respondents claimed that they do not get pesticides in proper time.

On the other hand, 93.1% of the small garden respondents get pesticides in proper time. Only 6.9% mentioned they don't get it in proper time. But during the survey, most of the respondents claimed that they do not get quality fertilizer. Sometimes they get very low quality fertilizer which affect production efficiency.

From the above statistics, there is found similarities in getting pesticides in proper time between the large and small garden.

Way of Fertilizer and Pesticides Supply in Proper Time: A number of the respondents suggested to ensure fertilizer and pesticides supply in proper time. According to the obtained data, fertilizer and pesticide is not found as a major problem. It is a positive indicator of the industry. But according to the respondents, sometimes quality fertilizer or pesticides are not available. The suggestion of the respondents both large and small garden is given in the last part of Table 9.6. Such as Rapid decision from garden authority, active initiative by BCS and BTB, nearest source for cow dung.

On the other hand, small garden respondents also recommended a number of suggestions. But around 50% of the small garden respondents did not give any suggestion.

Table 9.6: Fertilizer and Pesticides Using Situation and Availability

Fertilizer Using Situation				
	Large Garden		Small Garden	
Use fertilizer	Respondents	Percentage	Respondents	Percentage
Yes	35	100.00	58	100.00
No	0	0.00	0	0.00
If Yes, Type of Fertilizer Use				

Chemical	33	94.29	58	100.00
Organic	1	2.86	-	-
Both	1	2.86	-	-
Chemical Fertilizer Availability Status in Proper Time				
Yes	31	88.57	47	81.03
No	1	2.86	11	18.97
Moderately available	3	8.57	-	-
Way of Fertilizer Purchase				
Through BCS	29	82.86	0	0.00
Open market	4	11.43	58	100.00
Both	1	2.86	-	-
Organic Fertilizer Availability Status in Proper Time				
Yes	15	42.86	37	63.79
No	11	31.43	15	25.86
Moderately available	9	25.71	6	10.34
Source of Organic Fertilizer				
Own source	5	14.29	33	56.90
Purchase from outside	27	77.14	25	43.10
From labour line	3	8.57	-	-
Pesticides Availability Situation				
Available	33	94.29	54	93.10
Not available	2	5.71	4	6.90
Total	35	100.0	58	100.00
Way of Fertilizer and Pesticides Supply in Proper Time (Multiple Response)				
Suggestions	Response	Percentage	Response	Percentage
Active initiative by BCS and BTB	8	20.00	10	13.89
Nearest source for cow dung	15	37.50	9	12.50
Training for how to make compost	6	15.00	8	11.11
Rapid decision from garden authority	6	15.00	-	-
Ensure quality pesticides	5	12.50	-	-
Ensure reasonable price	-	-	5	6.94
Special subsidy for small growers and small holders	-	-	4	5.56
No suggestion	-	-	36	50.00
Total	40	100.00	72	100.00

Source: Field Survey, 2015

Uses of Fertilizer and Quantity per Hector: According to the concern authority BTRI, fertilizer application in mature tea depends on respect of crops. So, the garden management personnel need proper knowledge about fertilizer using methods. At the same time, concern authorities require close monitoring about this. The quantity of fertilizer use is given in the following Table.

Table 9.7: Fertilizer Applications of Young Tea (0-5 Years) and Mature Tea

Applications of Mature Tea			
Year	Quantity of Manure (kg/hector)		
	N	P	K
1st year	100	22	40
2nd year	200	44	80
3rd year	300	44	70
4th year	375	55	100
5th year	450	66	120
Applications of Mature Tea in Respect of Crop			
Crop (Kg/Hector)	N	P	K
1500	90	20	50
2000	110	30	70
2500	140	50	100
3000	160	50	120

Source: Rahman, 2006

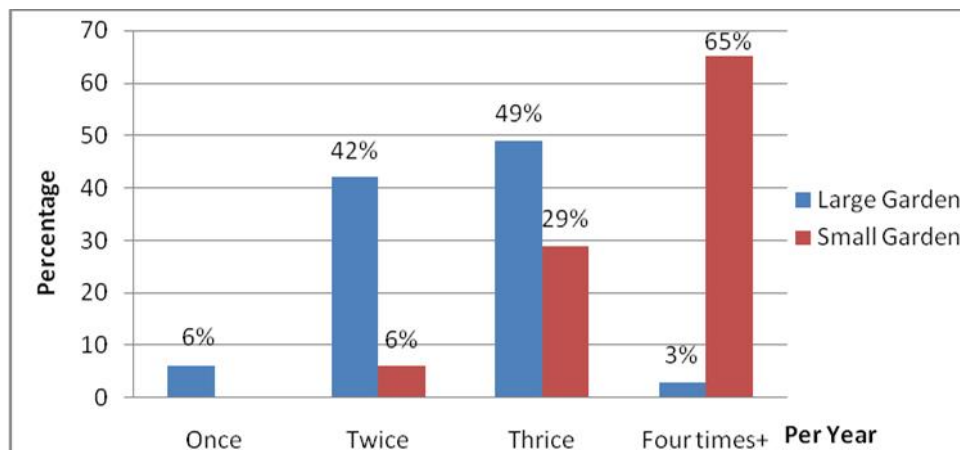
But according to the obtained data, 57.14% of the large garden respondents use fertilizer as per BTRI rules. In the mean time, the respondents mentioned at present they do not get any suggestions from BTRI if not essential. Of the studied gardens, 25.72% use fertilizer to the company's own policy. Among the respondents, 17.14% use fertilizer on yield. They calculate it on the basis of per hector yield.

On the other hand, only 5.17% of the small garden respondents use fertilizer according to BTRI rules. Most of the respondents (58.62%) use fertilizer to their own decisions. Rest of the respondents (36.21%) takes suggestion from fertilizer seller.

The above mentioned data shows that quantity of per hector fertilizer uses varies from garden to garden. But it is very much essential to use the fertilizer according to the requirements for sustainable production and land productivity.

Fertilizer Using Round and Month: It is needed to use fertilizer in tea plantation according to the requirements. Figure 9.18 shows that there is also an unplanned fertilizer using round practice in tea gardens. 42.86% of the large garden respondents use fertilizer twice a round every year. The obtained data shows, 48.57% of the respondents give fertilizer thrice round a year. Only 5.71% respondents give fertilizer once a time each year due to financial insolvency. 2.86% of the respondents give fertilizer more than 4 rounds per year for more production. Most of the gardens (48.57%) use fertilizer during March-April, July-August and September-October. 34.29% of the gardens use fertilizer in the month of March-April and July- August. Rest of studied gardens has no fixed time to use fertilizer.

Figure 9.18: Fertilizer Using Round or Frequency per Year



Source: Field Survey, 2015

On the other hand, most of the small garden respondents use fertilizer an unplanned way. Around 65% of the small garden respondents use fertilizer 4 times or more a year. They give fertilizer for rapid growth of green leaf. Thrice round give fertilizer 29% of the respondents and twice time only 6%. It was seemed during the survey, most of the small garden respondents have no proper knowledge about fertilizer using round. For these, 74.14% respondents have no fixed time to give fertilizer in garden. On the other hand, 22.41% respondents use fertilizer in the month of March-April, July-August and

September-October and 3.45% of the small garden respondents use fertilizer during the month of March-April and July-August.

Table 9.8: Fertilizer Using Month

Fertilizer Using Month	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
March-April	2	5.71	-	-
March-April and July-August	12	34.29	2	3.45
March-April and September-October	3	8.57	-	-
March-April, July-August and September-October	17	48.57	13	22.41
No fixed time	1	2.86	43	74.14
Total	35	100.00	58	100.00

Source: Field Survey, 2015

9. 18 Ways of Pest and Weeds Control

Pest control is an essential function for tea plantation. Because tea plantation is affected by various diseases. Pest management implies the regulation of pest activity by adopting suitable management. There are two types of way for pest control. One is adaptive strategies and another one technological strategies. Adaptive strategies are three types such as- cultural control method, biological control method and pest resistant varieties. And technological strategies are two types such as- mechanical control method and chemical control method. Table 9.9 depicted that 88.57% of the respondents of large gardens use chemical pesticides for pest control. 2.86% of the gardens control pest by cultural practice. Rest of the gardens apply bio-pesticides technology.

On the other hand, all the small garden respondents use chemical pesticides to control pest. According to the respondents, they do not maintain the rules of pesticides quantity due to lack of knowledge. They also mentioned that they do not get any suggestion or instruction about this. In fact, by using more chemical pesticides, the productivity of tea

plant will be hampered in the long run. Because by using more chemical pesticides many useful insecticides can't survive. And also the green leaf contains different germs which are harmful for human health.

Table 9.9: Way of Weeds and Pest Control

Way of Pest Control	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
Chemical Pesticide	31	88.57	58	100.00
Bio-pesticide	3	8.57	0	0.00
Cultural practice	1	2.86	0	0.00
Methods of Weeds Control				
Chemically	4	11.43	7	12.07
Manually	1	2.86	4	6.90
Both manual and chemical	30	85.71	47	81.03
Total	35	100.00	58	100.00

Source: Field Survey, 2015

Weeds Control

Weeds are the unwanted plants growing out of place. In tea plantation, weeds are noxious and perhaps the most vital antagonistic force of tea productivity. Weeds compete with tea plants for space, soil nutrients, moisture and light. Weeds are known to remove as half as much of nitrogen, phosphate and twice the amount of potash from the soil removed by tea plants. So, weeds control is an important component for tea plantation. In tea growing countries, two main weed control practices are in vogue. These are manual weeding and chemical weeding. Manual weeding includes the practices of sickling, chiseling/scraping, forking/hoeing and hand weeding. Chemical weeding means using chemical compounds. Table 9.9 shows that studied large gardens of tea producing regions use both manual weeding and chemical weeding methods. Around 85.71% of the studied large gardens use both chemical and manual method. From the two methods they mostly use chemical for weeds control. Around 2.86% of the studied large gardens practices only manual

methods. They practices sickling, scraping, hoeing and hand weeding method for weeds control. And 11.43% of the respondents mentioned that they use only chemical.

On the other hand, 81.03% of the small garden respondents mostly use chemical and sometimes manual methods. Only 6.90% respondents apply manual method and 12.07% use totally chemical.

During the survey, most of the respondents mentioned that chemically weeds control is cheaper than manual methods. They practices manual method only for nursery and young tea plantations.

9.19 Shading Situation

As requirement of sun light for a tea plant for its optimum growth and development increases with the age, it is necessary to put shade. The plantation of various trees, cover crops and green manuring crops has become the integral component of tea husbandry. Shade trees are essential for modulating the environment of tea ecosystem. It conserves soil, moisture, organic matter, contribute nitrogen in the soil by leaf fall, reduce evaporation loss during dry period, leguminous shade trees contain nodule in its roots which provide nitrogen to tea bush. There are two types of shade tree. These are permanent and temporary shade trees. Permanent shade trees are *Odoratissima*, *Lebbek*, *Derris Robusta* and temporary shades are *Indigofera*, *Crotalaria*, *Tephrosia* etc. These shade species are most common in Bangladesh.

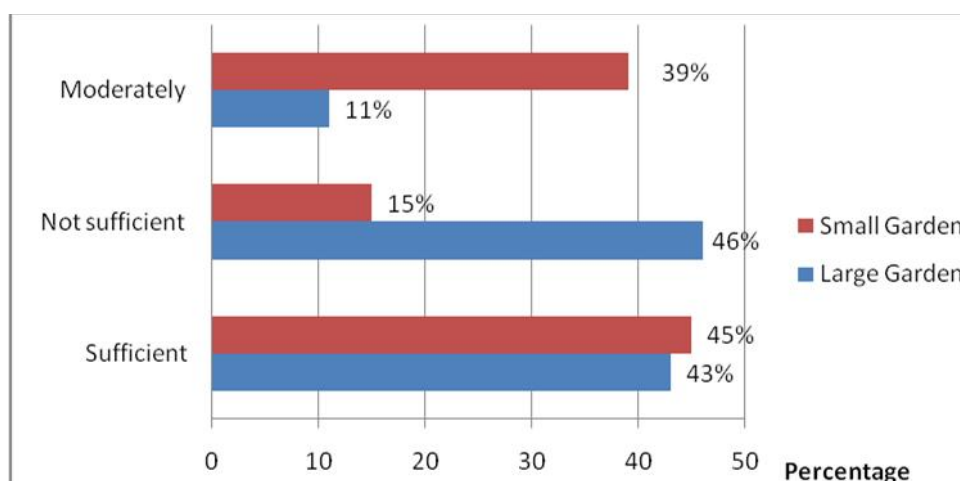
According to the field study, around 63% of the large garden respondents mentioned that they have proper shade in gardens. 20% of the respondents have moderately shade trees and around 11% respondents have no proper shade trees in the garden. Nearly 6% of the respondents have no comments about this.

On the other hand, 55% of the small garden respondents have proper shade and 17% have moderately. 26% of the respondents mentioned, they have no proper knowledge about shade trees in tea garden.

9.20 Sufficiency of Irrigation and Drainage

In tea plantation regions, the average rainfall is about 1650 to 3140 mm per year which is sufficient for plantation. But this rainfall is not equally distributed all the year. Dry season exists in the tea regions like other regions of the country. From November to April exists dry season. The rainy season continues from May to October and above 80% rainfall obtained during June to September. So, in tea garden, dry months are needed irrigation. Figure 9.19 depicted that, nearly 46% of the studied large gardens have no sufficient irrigation while 43% gardens have sufficient irrigation. They give irrigation by deep tube-well, shallow machine etc. Streams or ponds or reservoirs are also important sources of irrigation in tea producing regions. Over 11% of the respondents mentioned that they moderately able to give irrigation in their garden.

Figure 9.19: Availability of Irrigation in Tea Gardens



Source: field Survey, 2015

On the other hand, around 45% of the small garden respondents arrange sufficient irrigation in tea garden. They irrigated by shallow machine or deep tube-well. Most of the

small garden respondents have no own source of irrigation. They irrigate to their tea garden by contractual method (150 to 250 taka/hour). Rest of the respondents give irrigation from rivers.

Drainage: Drainage is defined as the removal of surface as well as the excess water from crop root zone. The efficient drainage system aims at:

1. Removing surface and run off water during excessive rain.
2. Draining the excess water from areas with underlying hard pan or impervious stratum and reducing the water Table to a minimum depth of 1.0 to 1.5 meter during monsoon in flat area.
3. Protects the plants from water loggings and decrease soil erosion. Assure high soil temperature and leaves the plants from disease and pest attack.

From the field study, Over 71% of the large gardens have sufficient drainage system and around 26% garden moderately drainage system. Rest of the gardens have (3%) to some extent drainage facility.

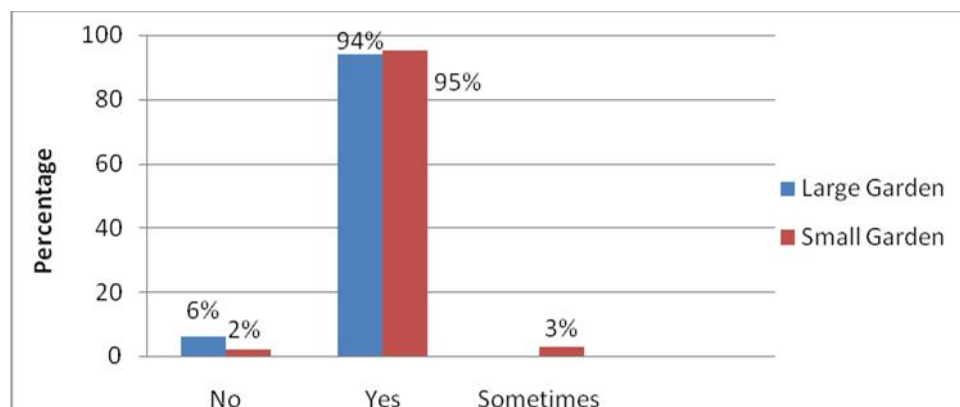
On the other hand, around 88% small garden respondents have proper drainage system. Only 3.45% of the respondents mentioned that they have no sufficient drainage system and 6.90% have moderate drainage system. Rest of the respondents have no proper concept about drainage system.

9.21 Foliar Using Trend and Time

Foliar is the combination of various fertilizers like urea, zink, zink sulphate. It is used for more production in tea bushes before green leaf plucking. But it has a bad impact on human health if it is used an unplanned way in the plant. Most of the respondents of large gardens (around 94%) use foliar before green leaf plucking where mostly use during September to December. As a result, the chemical contains the green leaf which is

harmful for health. 6% of the large garden respondents do not use foliar while only 3% use all the year before plucking green leaf.

Figure 9.20: Foliar Using Status in Garden



Source: Field Survey, 2015

On the other hand, nearly 95% of the small garden respondents use foliar before green leaf plucking. Only 3% respondents use sometimes and 2% never use foliar. Among the respondents, about 86% use foliar all the year before green leaf plucking. The rest of the respondents are using foliar at different times of a year.

Table 9.10: Foliar Using Month

Foliar Using Month	Large Garden (N=33)		Small Garden (N=57)	
	Respondents	Percentage	Respondents	Percentage
March-November	1	3.03	-	-
April-November	4	12.12	-	-
September-December	6	18.18	3	5.26
October-December	18	54.55	3	5.56
November-December	3	9.09	2	3.45
April-May & November-December	1	3.03	-	-
All the year before plucking	-	-	49	85.96
Total	33	100.00	57	100.00

Source: Field Survey, 2015

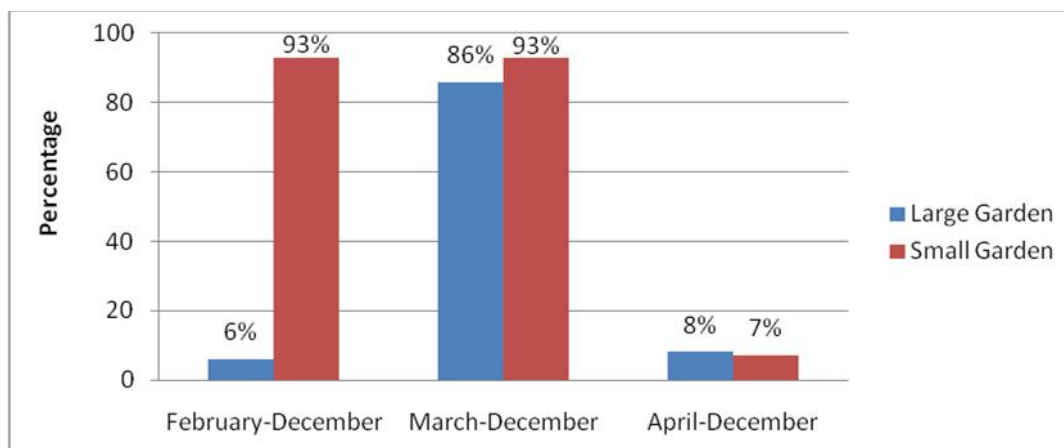
According to BTRI, Foliar can be used only for the deficit of urea, potassium or zink. Urea and MOP can be sprayed 4 to 6 times from April to December. On the other hand, Zink spray 1 to 2 times per month from July to December. But the study reveals that there are no specific practices of using foliar in the garden. The tendency by foliar use of small garden respondents is more than large gardens.

9.22 Green Leaf Plucking Duration

Most of the large garden respondents (about 86%) pluck green leaf from March to December. Rest of the studied garden plucks green leaf from February to December. On the other hand, about 93% of the small garden respondents pluck green leaf from March to December. Rest of the respondents plucks green leaf from April to December.

According to the Figure 9.21, there are similarities of green leaf plucking ending time, but variations prevailing plucking starting time. As a result, some of the respondents pluck green leaf comparatively less than others which affect on total production.

Figure 9.21: Green Leaf Plucking Duration



Source: Field Survey, 2015

9.23 Number of Green Leaf Pluck at a Time and Interval

Green leaf plucking is an artistic job. Tea leaves plucking is crop harvesting. Production of the tea garden depends on plucking accuracy. Wrong plucking leads to crop hammering because of creation of uneven plucking Table due to rough plucking. Fine plucking ensures quality of tea manufacturing. Plucking one leaf and one bud or two leaves and one bud are called fine plucking. Fine plucking requires excessive plucker. On the other hand, plucking three leaves with a bud or more leaves is called coarse plucking. This plucking procedure does not require excessive plucker and does not ensure quality tea manufacturing.

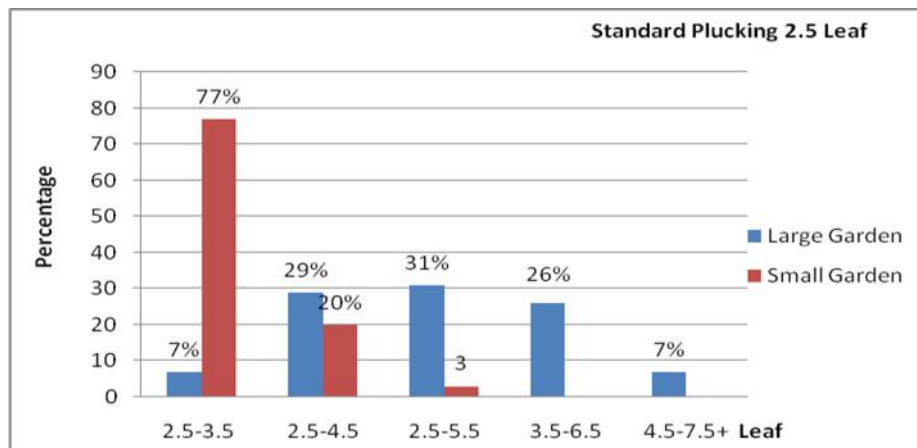
Table 9.11: Chemical Substance of Green Leaf

Size of Tea Leaf	Percentage of Cafechin	Percentage of Caffeine
Bud	26.5	4.7
1 st leaf	25.9	4.2
2 nd leaf	20.7	3.5
3 rd leaf	17.1	2.9

Source: Rahman, 2006

The above Table shows that if the number of leaf increases the percentage of chemical substance of green leaf decreases the percent of Caffeine and Cafechin which affect on tea quality. For this reason, the respondents were asked how many leaves pluck at a time. The responses of the respondents are given in the following Figure 9.22.

Figure 9.22: Number of Green Leaf Pluck at a Time



Source: Field Survey, 2015

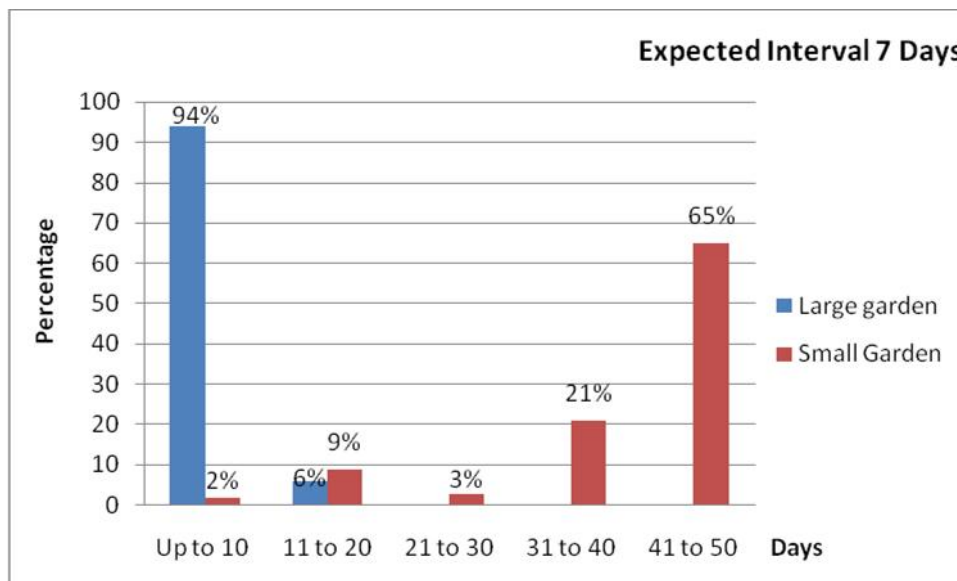
The above Figure shows that around 77% of the large garden respondents pluck 2.5 to 3.5 leaves at a time and 20% of the studied garden respondents pluck 2.5 to 4.5 leaves at a time. Rest of the garden plucks 2.5 to 5.5 leaves at a time.

On the other hand, 29% of the small garden respondents pluck 2.5 to 4.5 leaves and 31% of the respondents pluck 2.5 to 5.5 leaves at a time. Nearly 26% respondents pluck 3.5 to 6.5 leaves. From the above statistics it is clear that most of them do not maintain proper plucking method.

Interval of Green Leaf Plucking

Figure 9.23 shows that over 94% of the large garden respondents pluck green leaf range is within 7 to 10 days interval. About 6% of the respondents mentioned that they pluck green leaf at 11 to 20 days interval.

Table 9.23: Interval of Green Leaf Plucking



Source: Field Survey, 2015

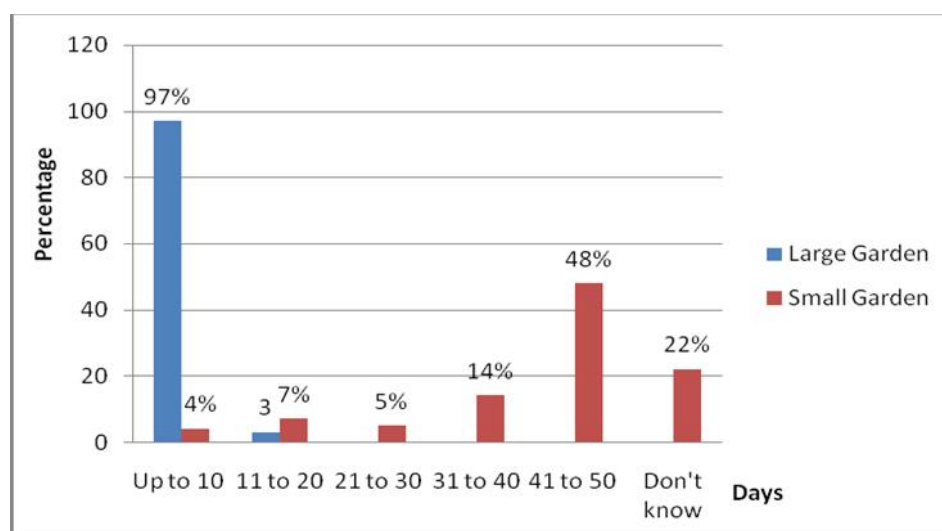
On the other hand, 65% of the small garden respondents pluck green leaf within 41 to 50 days interval. 21% respondents mentioned that they pluck green leaf with the range between 31 to 41 days interval. Rest of the respondents (13%) plucks green leaf from 7 to 30 days interval. As a result, small garden respondents do not get sufficient price for their

green leaf. Because, they pluck more leaf than requirements, these leaves hamper the quality of made tea, affect machineries and also increase production cost.

9. 24 Concepts of Plucking Round and Maintaining Status

Plucking round or cycle is very common term uses which uses in tea garden. Plucking round or cycle means frequency of plucking a particular section or plantation after a certain interval. The standard interval of plucking round is 7 days. The making of high quality tea depends very largely on the fineness of the plucked leaf. The plucking standard has an important influence on the quality of tea.

Figure 9.24: Concept about Plucking Round or Cycle of the Respondents



Source: Field Survey, 2015

Figure 9.24 show that more than 97 % of the large garden respondents said that plucking round means up to average 10 days interval of green leaf plucking from each section of a garden. Around 3% of the respondents mentioned that plucking round consists of more than 11days.

On the other hand, about 48% of the small garden respondents said, plucking round means the interval green leaf pluck from 41 to 50 days in tea garden. 22% respondents do not know about plucking round. Around 14% of the respondents mentioned that plucking

round means green leaf pluck after 31 to 40 days interval. Rest of the respondents said 10 to 30 days interval of green leaf pluck called plucking round. So, it is clear from the above statistics that most of the small garden respondents have no proper concept about plucking round and they do not maintain plucking round.

Plucking Round Maintaining Status

According to the study, 62.86% of the large garden respondents maintain moderately Plucking round and 34.28% fully control plucking round. And 2.86% do not maintain the plucking round. The respondents mentioned that sometimes they can't maintain the plucking round. Labourer crisis, occasional vacation, natural disaster, reduce of production cost are the main barrier to maintain the proper plucking round.

On the other hand, 83% of the small garden respondents do not maintain proper plucking round. It was seemed during field survey that small garden respondents have no proper knowledge about plucking round. Over 12% of the respondents moderately maintain plucking round. They are mostly small holders. And 5% of the respondents can maintain the plucking round.

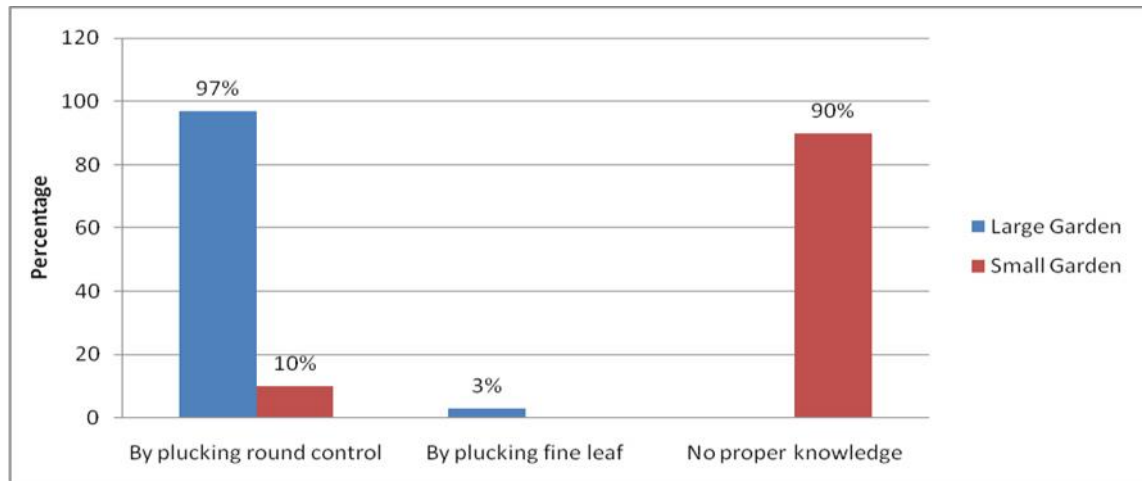
9.25 Way of Maintaining Green Leaf Quality

Green leaf quality depends on various components. Such as- number of leaf, plucking round, component of chemicals etc. Figure 9.25 Shows that 97.14% of the respondents maintain green leaf quality by controlling plucking round and 2.86% respondents control green leaf quality by plucking fine leaf.

On the other hand, around 90% of the small garden respondents have no proper knowledge about green leaf quality. Only 10% of the respondents mentioned that they maintain green leaf quality by controlling plucking round. The above mentioned Table

depicted that there is lacking of knowledge on how to maintain green leaf quality among small garden respondents of new plantation region.

Figure 9.25: Way of Maintaining Green Leaf Quality

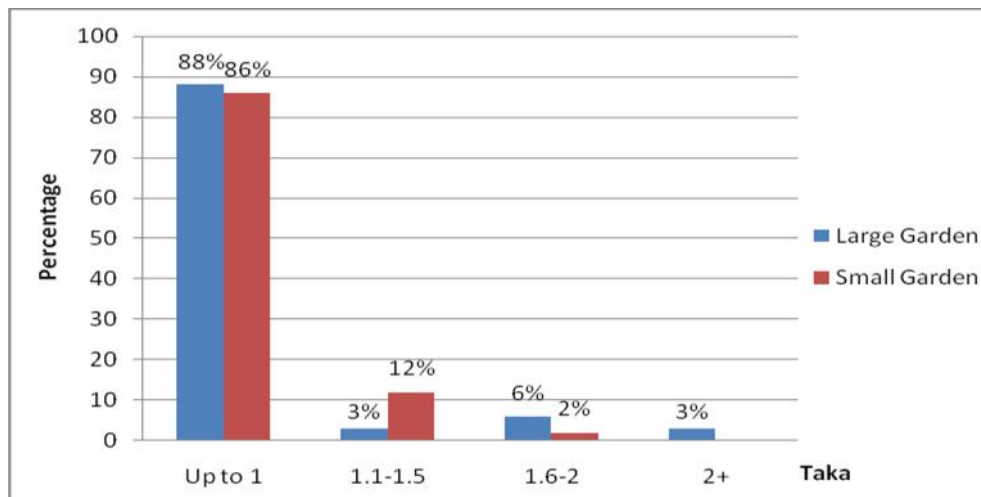


Source: Field Survey, 2015

9.26 Way of Green Leaf Carrying from Field to Factory

There are two ways of carrying green leaves from field to factory. First way, carry green leaves by the labourers. Usually, the labourers carry green leaf from the field to the factory when the distance is short. About 86% studied large garden use trolley/truck for green leaves carrying from field to factory. 11.43% use pick-up and rest of the respondents use truck, trolley, van, or auto rickshaw. According to the obtained data, 91.43% of the studied large gardens have self vehicle and 5.71% gardens carry green leaf both self cost and sometimes factory paid the cost. It is mentionable that such types of gardens are situated in North-western region.

Nearly 88% of the large gardens green leaf carrying cost is below than taka one per kg from field to factory. Among the respondents 9% have ranges from 1.1 taka to 2 taka and around 3% gardens carrying cost is more than taka 2 per kg.

Figure 9.26: Carrying Cost of Green Leaf from Field to Factory (Taka/kg)

Source: Field Survey, 2015

On the other hand, around 78% of the small garden respondents use pick-up for carrying green leaf from field to factory. 12% of the respondents use truck or trolley and 10% use van/auto rickshaw for green leaf carrying. According to the obtained data, 95% of the small garden respondents carry green leaf by self cost and only 5% respondents carry green leaf by factory's cost.

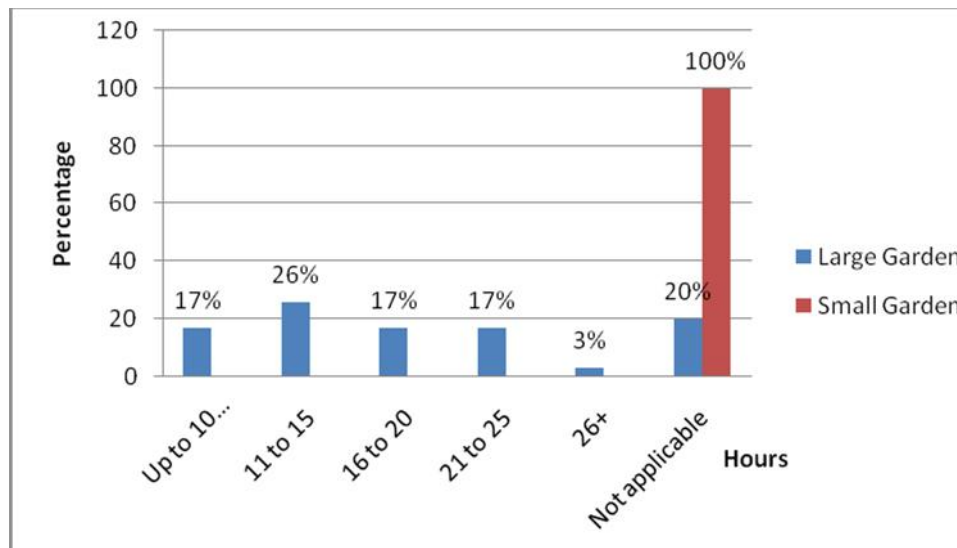
On the other hand, 86% small growers carrying cost is below than taka one from field to factory. Here is needed to mention that small growers & holders have no own factory. They sell their green leaf to other factories.

10.27 Tea Carrying Time and Transport Cost from Factory to Warehouse

The produced tea is sold through public auction in Chittagong and a portion of the produced tea can be sold by the garden authority with the prior permission of BTB. For this, the made tea is sent from factory to the Chittagong warehouse for auction. Around 26% of the large garden respondents mentioned that the carrying time of their made tea is 11 to 15 hours. About 17% of the respondents needed below than 10 hours time for carrying made tea from factory to warehouse. At the same time, 34% of the respondents

mentioned that they needed 16 to 25 hours and 3% respondents took time more than 26 hours. Among the studied gardens 20% of them have no own factory. It is mentionable that small garden respondents have no own factory. So, they did not respond to this question.

Figure 9.27: Average Carrying Time from Factory to Warehouse

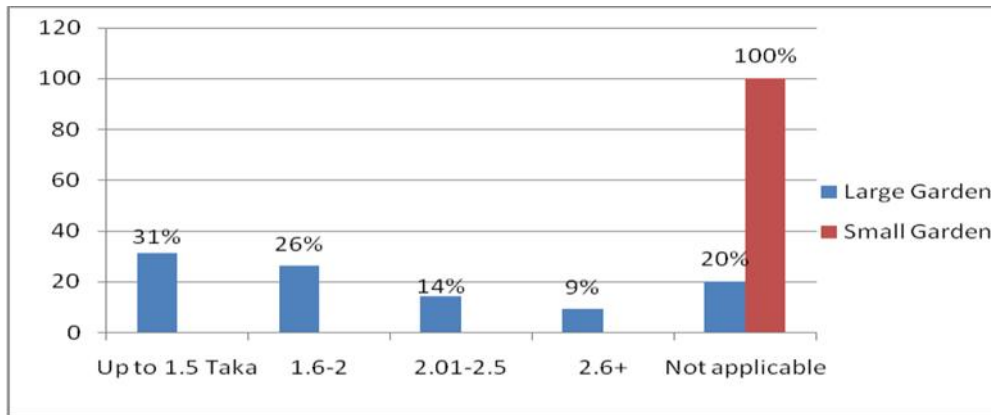


Source: Field Survey 2015

Carrying Cost from Factory to Warehouse: The carrying cost of made tea from factory to warehouse is calculated by per kg. Table 9.28 Shows that 27% of the studied gardens have no own factory. On the other hand, small garden respondents have no own factories.

Among the large garden respondents, more than 31% respondents said that their carrying cost of per kg made tea is less than taka 1.5. Nearly 26% respondents mentioned that their carrying cost taka 1.6 to 2 per kg and 14% respondents spend taka 2.01 to 2.5 per kg.

Transport is very much essential for carrying made tea from factory to warehouse. According to the field study, most of the respondents (25.71%) mentioned that there is no transport problem. 11.43% of the respondents identified that political unrest affect transport system. The respondents also mentioned that high cost, vehicle crisis, vehicle change on mid road and weak link road are the main transport related problem.

Figure 9.28: Transport Cost from Factory to Warehouse (Taka/Kg)

Source: Field Survey, 2015

9.28 Types of Packet Use for Made Tea in Factory

All the respondents who have factory uses pp woven bag for made tea packaging. After packaging they take it to the warehouse for auction. Appropriate packaging is one of the elements to keep quality of made tea. According to the field study, around 68.57% of the respondents mentioned that there is no problem for packaging of made tea. Around 11.43% of the respondents mentioned that they sometimes face problem due to quality of packet. And 20% of the large garden respondents who have no factory have no comment about this.

9.29 Machinery and Spare Parts Availability and Prices

The price of machineries and spare parts depends on government policy. The machineries and spare parts of tea industry are imported from other countries. So, the availability and price depends on international market. According to the obtained data, over 71 % of the large garden respondents mentioned that the machineries and spare parts of factory are available. Around 23% respondents mentioned that moderately available and about 6% respondents mentioned they do not get it easily.

Table 9.13: Availability of Machineries and Spare Parts

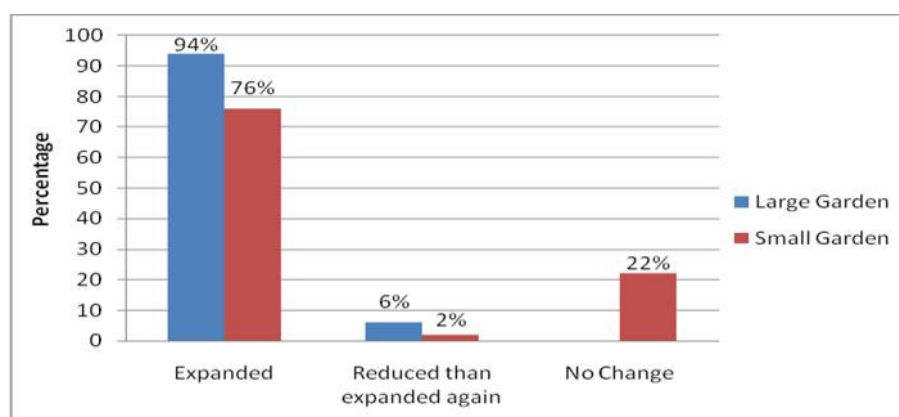
Availability Situation	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
Available	25	71.43		
Not available	2	5.71		
Moderately	8	22.86		
Not applicable	-	-	58	100.00
Total	35	100.00	58	100.00

Source: Field Survey, 2015

On the other hand, around 77.14% of respondents think that the price of machineries and spare parts is reasonable. 20% respondents mentioned as high price and 2.86% respondents think the price is moderately reasonable.

9.30 Whether Expanded or Reduced Tea Area and Future Plan

According to the obtained data, tea consumption is increasing day by day both nationally and globally. So, the tea area must be needed to increase. It is needed to mention that the internal demand is increasing rapidly. Although the tea area is more or less increases yet tea import has been started. Figure 9.29 show that 94% of the studied large garden expanded tea area of their garden. But the trend of expansion is not as the rules of BTB. 6% of the respondents reduced their garden area then expanded because of financial crisis and insufficient production.

Figure 9.29: Whether Expanded or Reduced Tea Area

Source: Field Survey, 2015

According to the Table 9.14, 42.86% of the studied garden will expand their tea area according to the rules of BTB, over 34.29% studied garden will expand tea area according to the company policy. Among the 5.71% of studied gardens will expand tea area if land available. Actually this type of garden is studied in North-western region.

Table 9.14: Future Expansion Plan of the Respondents

Future expansion plan	Large Garden		Small Garden	
	Respondents	Percentage	Respondents	Percentage
Extend according to BTB rules	15	42.86	N/A	-
Extend according to company policy	12	34.29	-	-
Extend if land available	2	5.71	5	8.62
Extend and re plantation	5	14.29		
Extend to own policy	-	-	51	87.93
No plan to extend	1	2.86	2	3.45
Total	35	100.00		

Source: Field Survey, 2015

On the other hand, Figure 9.29 shows that about 76% of the small garden respondents expanded their tea area and around 2% first reduced then expanded again. 22% of the respondents keep stable their tea area what they planted at first.

Table 9.14 shows that around 87.93% of the small garden respondents will extend their tea area according to their own policy. Around 8.62% respondents will extend if land available and over 3.45% respondents have no plan to extend tea area.

Chapter-10

Discussion and Analysis at Labourer Level

10.0 Introduction

Tea industry is apparently known as a labour intensive industry in Bangladesh. From the early of tea plantation the labourer were brought from different States of India such as Assam, Bihar, Orissa, Madras, and West Bangle. They are working in the garden from generation to generation and closely related to the production and development of tea garden in Bangladesh. Almost the whole tea industry depends on traditional labourer except North-western region. More than a century and an half has passed, since tea plantation labourer settled in the labour lines, to which their live and livelihood have been tide ever since they have no choice and entitlement to property. But the labourer of North-western region is not traditional. The local people involve in tea garden. So, their life style is different from other two tea producing regions. The labourer of North-western region has own housing and many of them own property.

It is very crucial to know the actual living and working situation of tea labourer at different region of the country. It is also important to be aware of how the labourer struggled in their lives in order to earn their daily basic necessities, changes of living standard, working environment, involvement in tea garden and what will be the future trend of involvement in tea gardens. The household structure, living condition, length of service, wages, working duration, social discrimination, restriction of free movement of the labourer, basic human needs and rights are considered very important issues in tea gardens. In this chapter the demographic characteristics, working area of household members, involvement trend in tea garden, economic life, types of activity, working experience in tea garden, experience of other jobs and characteristics, outside working situation after tea garden job, nature of employment in tea garden, working hour and

labour law, overtime working situation, other fringe benefit, level of satisfaction, training status, communication trend with other garden labourers, awareness about labour law are elaborately discussed and analysed here. The living standard of the labourers has also been compared with the national level. It is mentionable that the permanent labourers of North-east and South-east region get low salaries than North-western region but get various fringe benefits such as housing, ration, provident fund, education, festival bonus, leave, medical and other facilities from the garden. On the other hand, the labourers of North-western region get only wages but their wage rate is more than other two regions.

10.1 Demographic Characteristics

Major demographic characteristics analysed in terms of gender distribution, age, education, household size, etc. The major demographic characteristic both households and respondents is discussed below.

Gender Distribution

Household Members: The study reveals that the respondents' households constituted with 51% male and 49% female members. A typical gender distribution of Bangladesh where the male-female population remains 50:50 in 2011(BBS, 2013). So, there are almost similarities between the male-female ratio of studied household and national level. According to the obtained data, although the female members are less than male in the study area, they play important role to the household and in tea garden. It is needed to mention that the female labourers work hard and sometimes more than male. The female labourers after finishing their work in the garden they work at home and look after the children. They do all their household chores in the morning before going to work such as brushing the house and the yards, prepare breakfast and tea for every member of household. They also feed their babies before going to work. Most of them prepare their

lunch before going to the work. So, the picture shows that in tea garden women labourers work hard for the development of living standard which has positive impact on the socio-economic life of the labourer and also plays a significant role to the empowerment of women.

Respondents: On the other hand, the survey of labourers comprised on 54.6 percent male where 45.4 percent female respondents.

Age Distribution

Household Members: The majority of the household members of the respondents fall under 45 years. There is significant concentration of particular age group in the household members. They are mostly concentrated at the age group within 35 years. The age distribution of the household members is given in Table-10.1.

Table: 10.1: Age Distribution of Household Members and Respondents

Age (Years)	Household Members		Respondents	
	Number of Persons	Percentage	Number of Respondents	Percentage
Up to 5	192	10.92	-	-
6 -10	207	11.77	-	-
11-15	208	11.82	9	2.34
16-25	464	26.38	87	22.66
26-35	251	14.27	116	30.21
36-45	246	13.99	96	25.00
46-55	138	7.85	59	15.36
56-65	43	2.44	14	3.65
66+	10	0.57	3	0.78
Total	1759	100.00	384	100.00

Source: Field Survey, 2015

The above Table 10.1 shows that over one-third household members' age is up to 15 years. On the other hand, over 26% of the household members ages ranges between 16 to 25 years. Among the 14.3% of the respondents' household members age is between 26 to 35 years and 36 to 45 years only 4% household members. There are over than 10 percent

of the household members aged within 46 to 65 years. Only 0.6% household members age above 65 years.

By analyzing the above mentioned data we can find that the number of household members of the respondents' around 60% able to work as labour force.

Respondents: According to the Table 10.1, different ages of labourers work in tea garden. The study reveals that majority of the respondents fall under 26 to 35 years. And the distribution of age ranges 16 to 25 and 36 to 45 years seems to be almost equal for each class intervals. There is no significant agglomeration of a particular age group in the sample. The Figure also shows that 4% respondents' age ranges between 56 to 65 years and around 1% more than 66 years. These types of respondents mostly work in North-western region of the country. There are also 2% of the respondents less than 15 years who are known as child labourer.

Education

Household Members: Educational opportunity in tea garden area is not equal as other places of the country. Continuation of education in tea garden is a big challenge. According to Table 10.2 higher educational level of the household members is not satisfactory. It is known that levels of education of the head of households are important factor having a direct impact on other members. Parent's education and consciousness is a factor that shows their perception conditions on the children's education. The higher educational level of the household members has been found not satisfactory as like as the respondents. Insufficient of schools or colleges in the premises of tea garden area is one of the major factors for dissatisfactory situation. On the other hand, low level of income and awareness regarding the value of education is also responsible for lack of higher education.

Table 10.2 shows the educational level of household members. Among the household members only 0.46% respondents have completed graduation. Most of the household members can write only name. Around 57% of the household members have no formal education. More than 22 percent of the household population received secondary education. There is a significant proportion of population, who has schooled up to primary level. The study also reveals that 21.07% of the household members are studying at different levels of education.

The respondents mentioned that they try to continue education for all members of the household. But their socio-economic condition is one of the main constrain to continue the education. Apart from that, the opportunity of secondary or higher secondary education is limited in tea garden area due to insufficiency of educational institutions.

Table 10.2: Education of Household Members*and Respondents (7+Years)

Education Level	Household Members		Respondents	
	Number of Persons	Households	Number of Respondents	Respondents
Illiterate	377	24.67	92	24.00
Can write name only	487	31.87	120	31.30
Primary	305	19.96	104	27.00
Secondary	337	22.05	68	18.00
Higher secondary	15	0.98	-	-
Graduation	7	0.46	-	-
Total	1528	100.00	384	100.00

* 21.07% household members studying at different level.

Source: Field Survey, 2015

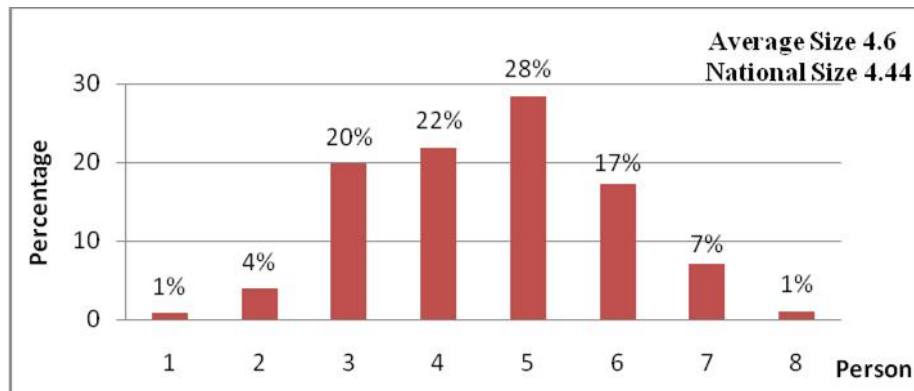
Respondents: On the other hand, with regards to the educational attainments of the respondents over 31% of those can sign only. They have no formal education. At the same time, 24% of the respondents are illiterate. The respondents mentioned that they do not get the opportunity of learning to write even their name. Around 27% respondents have only primary education and 18% have completed secondary level. The proportion of those had higher educational attainments among this sample is very low. The Table 10.2

shows that most of the respondents can sign only. On the other hand, more than one fourth of the respondents did not cross the primary level. According to the obtained data the literacy rate of the respondents is 76% where the national literacy rate (7 years+) 62.3% (Bangladesh Arthanaitik Samikkha, 2015).

Household Size

Nuclear family is the most common type of family among the labourers in the study area. Figure 10.1 Shows that 70% of the respondents have 3 to 5 members in their household. These families consist of husband-wife and their children. Around 5% of the household consisted up to 2 persons only. Among the respondents, 0.8% households consisted of only one person. There are 25% respondents' household have 6 to 8 members. A few joint family of the respondents was seen during the survey which household size 6 to 8 members. The main role in the household's is played by the father.

Figure 10.1: Household Size of the Respondents



Source: Field Survey, 2015

The above mentioned Figure shows that the respondents' household size is 4.6 persons where the national household size is 4.44 persons. So, the household size of the labourer is nearly to the national household size. The study reveals that the labourers are very conscious to keep their household small although some exceptional households are prevailing in the study area.

10.2 Household Economic Life

The labourers of tea garden work hard to keep their economic life moderately effective. But most of them are unable to fulfill their fundamental needs like food, cloth, health. The economic life of the labourers is not smooth as other people of the country. The respondents' household income and expenditure is discussed in below.

10.2.1 Source of Income (Monthly)

Size of income is the best indicator of the economic condition of a person or household. But this indicator cannot reveal the real economic conditions of the labourers properly since a permanent labourer gets many facilities except salary. A permanent labourer gets house including water and sanitation facilities, medical service, ration and agricultural land facilities etc. Besides these, some household has several earning member and some has such earning member who works outside of tea garden. It is remarkable that few numbers of them work abroad. Those who work outside of tea garden their monthly income is more than other tea labourers. As a result, household discrimination prevails of monthly average income. Monthly household income of tea labourers has been estimated taking all the sources of income into consideration.

Income from Salary or Wages

According to the BCS, the daily wages of permanent labourer of Category-A garden is 69 Tk, Category B 67 Tk and Category C 66 Tk. In this study, the daily wages of different category gardens converted into monthly wages.

The Table 10.3 shows the monthly average salary or wages of the respondent's household. Majority of the respondents' household monthly income is very low than others. Around 49% of the respondents' household salary/wages earn range between 3001 to 6000 taka. Among the respondents, 15.36% have household monthly salary/wages is less than 3000 taka. Nearly 20% respondents' household in the sample receive monthly

wages within 6001 to 9000 taka and 8.33% of the respondents' household earn 9001 to 12000 salary or wages. Nearly 4% of the respondents' household monthly earn as salary or wages more than 12001 to 15000 taka. Only 3.65% of the respondents' household monthly earn from salary/wages above 15000 taka. Actually, those families have two or more earning members, their salary/wages moderately too high than other labourers. The salary/wages is not only the source of income in tea garden but also included them who are working outside of tea garden.

Table 10.3: Monthly Income from Salary or Wages (In Taka)

Income Range	Number of Household	Percentage
Up to 3000 Taka	59	15.36
3001 to 6000	188	48.96
6001 to 9000	76	19.79
9001 to 12000	32	8.33
12001 to 15000	15	3.91
15000+	14	3.65
Total	384	100.00
Mean household income (Salary/Wages)=6088 Taka		

Source: Field Survey, 2015

Income from Ration

Ration is one of the major sources of income of the labourer. The permanent labourers of North-east and South-east get this opportunity. It is given to the labourer at a concessional rate. The existing practices of supply ration (rice/wheat) at the concessional rate is taka 1.30 per kg. In this study, the ration of the labourer converted into taka comparing market price.

Table 10.4: Monthly Income from Ration (In Taka)

Monthly Income Ration	Number of Household	Percentage
Up to 400 Taka	51	13.28
401 to 600	62	16.15
601 to 800	45	11.72
801 to 1000	48	12.50
1001 to 1200	31	8.07
1201 to 1400	16	4.17
1400+	21	5.47
Not applicable	110	28.65
Total	384	100.00
Mean household income(Ration)=583 Taka		

Source: Field Survey, 2015

Finding shows that 13.3% of the respondents' household monthly average income is less than 400 taka from ration. At the same time, 16.15% household monthly earn within 401 to 600 taka from ration. 5.5% of the respondents' household income is more than 1400 taka only from ration. Those household has more permanent labourers in tea garden, their ration is more than others. A large number of respondents (29%) have no ration. They work as casual, daily basis or seasonal labourer. According to the rules, casual, daily basis or seasonal labourer have no ration. This is mentionable that the labourers of North-western region do not get any ration. But their wages is more than other two regions.

Income from Agriculture

Agricultural land is one of the important sources of income which is known as khet land in tea garden. It was introduced from the early of starting plantation to support and motivate the labourer in tea garden. According to the tea tradition, a number of labourers cultivate agricultural land instead of ration. They take agricultural land lease from the garden authority. It is mentionable that the agricultural land allotted for permanent labourers are eligible for one crop year. This allotted land is not so much beneficial for labourers. A portion of the agricultural land faces stone pieces which is obstacle for sufficient production. Every garden of South-east and North-east region has some

agricultural land which is distributed to the labourers. Monthly income from agriculture is shown in Table 10.5.

Table 10.5: Monthly Income on Agriculture (In Taka)

Income Range	Number of Household	Percentage
Up to 500 Taka	109	28.39
501 to 1000	63	16.41
1001 to 1500	29	7.55
1501 to 2000	13	3.39
2001+	6	1.56
Not applicable	164	42.71
Total	384	100.00
Mean household income(Agriculture)=432 Taka		

Source: Field Survey, 2015

The above Table 10.5 shows that 28.4% of the respondents' household has earn up to 500 taka income from agricultural land. 16.4% have monthly average income 501 to 1000 taka. Among the sample 7.6% have monthly average income 1001 to 1500 taka and 3.4% have between the ranges of 1501 to 2000 taka from agricultural land respectively. Majority (42.7%) of the respondents' household have no agricultural land from where they can earn money.

Income from Transport Work

The mentioned Table 10.6 shows that a few number of respondents' household have a slight income from rickshaw/van/transport work. Nearly 4 percent of the sample has such types of income. According to the obtained data, nearly 0.78 percent of the respondents' households have monthly up to 500 taka income from transport work. 1.6% household have monthly 501 to 1000 take income from this source and at the same percent household have more than 1000 taka/month. Majority of the respondents' household (96%) have no such type of income. During the field survey, it was observed that the involvement with transport work of the labourer increases day by day.

Table 10.6: Monthly Income from Transport (In Taka)

Income Range	Number of Household	Percentage
Up to 500 Taka	3	0.78
501 to 1000	6	1.56
1001+	6	1.56
Not applicable	369	96.09
Total	384	100.00
Mean household income(Transport)= 40 Taka		

Source: Field Survey, 2015

Income from Handicraft

Handicraft is another minor source of income of the labourer. When the labourers get time, they make various types of hand made things and try to earn some money. Among the respondents, 22.4% have monthly household income up to 500 taka from handicraft. 1.6% of the sample has monthly household income 501 to 1000 taka, while 0.5% household monthly average income 1001 to 1500 taka. Only 0.3% respondents' household per month income above than 1500 taka. Majority of the household (75.3%) have no income from handicraft.

Table 10.7: Monthly Income from Handicraft (In Taka)

Income Range	Number of the Household	Percentage
Up to 500 Taka	86	22.40
501 to 1000	6	1.56
1001 to 1500	2	0.52
1501 +	1	0.26
Not applicable	289	75.26
Total	384	100.00
Mean household income(Handicraft)= 88Taka		

Source: Field Survey, 2015

Income from Other Sources

According to the obtained data, there are some other sources of income of the respondents' households. Other source means overtime, cow/goat, poultry, fruits,

vegetables or fire wood selling etc. Most of the labourer rear cow, goat etc. The tradition of maintaining animals within tea garden is very old. There are many grazing fields within the tea garden area. Many labourers maintain cow to have milk. They sell the milk of the cow or goat and earn some money. They also sell the cow dung to the garden authority which is an important source of organic fertilizer. Some of the labourers also grow chicken and duck. The respondents increase their income by selling milk, chicken, duck egg and cow dung etc.

Some household have one or more other sources of income. Among the respondents' household, 43% have monthly income between 1001 to 2000 taka. 11.5% of the household income is up to 500 taka and 12% have range between 501 to 1000 taka per month. 20.3% household of the sample has 2001 to 3000 taka and 4.2% household income between 3001 to 4000 taka while 5.2% of them monthly income more than 4000 taka.

Table 10.8: Monthly Income from Other Sources* (In Taka)

Income Range	Number of Household	Percentage
Up to 500	44	11.46
501 to 1000	46	11.98
1001 to 2000	165	42.97
2001 to 2500	78	20.31
3001 to 4000	16	4.17
4001+	20	5.21
Have no other income	15	3.91
Total	384	100.00
*Other Source : Over time, cow/goat, poultry, fruits, vegetables, selling of firewood etc.		
Mean household income(Others)=676 Taka		

Source: Field Survey, 2015

Household Total Income

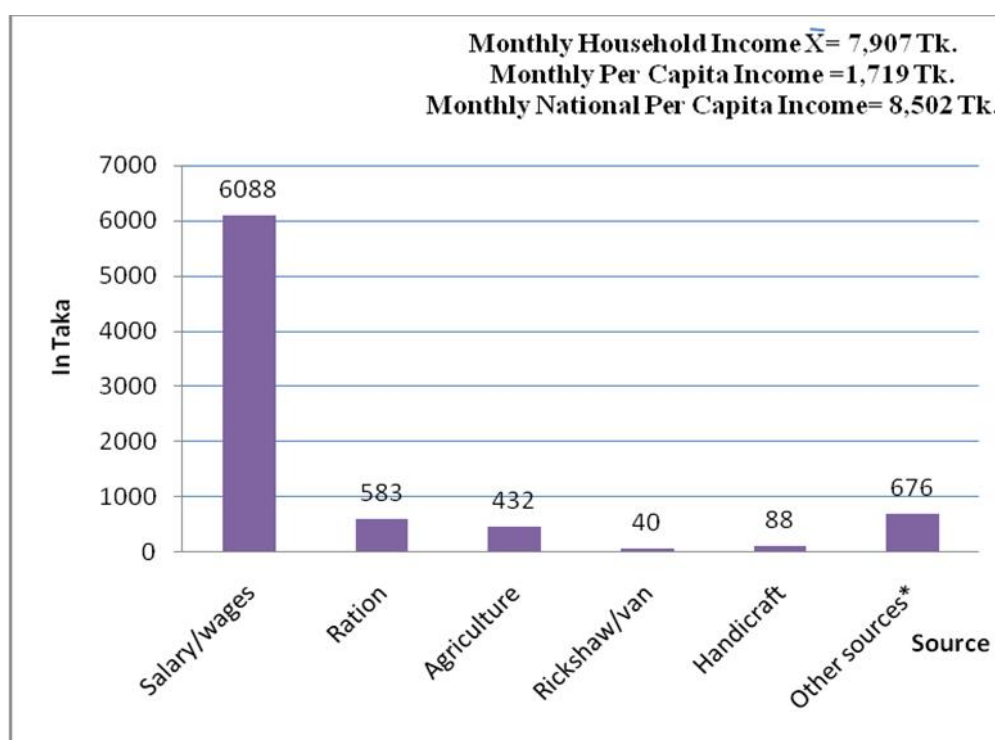
Monthly household average income calculated by summation of all source of income.

Most of the respondent's household has multiple source of income though the amount is

not high. The estimated average income has been presented in the Figure 10.6. The amount of household income varies on the source of income, number of earning person, category of tea garden etc. One of the main reasons, the wage rate of the labourer and facilities of tea garden is not equal in all tea garden.

Figure 10.6 shows that the majority of respondents' household (around 62%) monthly average income 5001 to 10000 taka. After this 21% respondents' household monthly average income 10001 to 15000 taka and 6% earn 15001-20000 taka. Only 1 percent of the samples monthly earn more than 20000 taka. On the other hand, 11% of the respondents' household monthly average income is less than 5000 taka only. So, it can be said that monthly income of the respondents' household varies on source of income.

The national per capita income in Bangladesh stood 1, 02,026 taka in 2014-15 fiscal years (Bangladesh Arthanaitik Samikkha, 2015). According to the obtained data from the field survey, in tea sector per capita income is only 20,627 taka a year. If we divided the yearly average income by 12 months it stood, monthly per capita income of the respondents of tea labourers household members is only 1719 taka where national monthly income 8,502 taka. So, per capita income of tea labourer is only 20.30% of national per capita income. However, it has been pointed out in many discussions that the average income of tea labourer is very low but the obtained data shows that tea labourers increase their economic life by hard work.

Figure 10.6: Monthly Household Total Incomes (In Taka)

Source: Field Survey, 2015

10.2.2 Monthly Household Expenditure

The respondents' household monthly average expenditure has been calculated by the major and other expenditure sectors. But a modest number of the respondents' household face economic deficit every month. They take loan or lend money from lenders. So, they always face deficit of money. Monthly household expenditure of the labourer depends on their household income. The income of the tea labourer depends on their physical work and number of earning members. Those respondents have more than 3 member's involvement in tea garden or outside of garden they live comparatively better than other labourers. Those households earning member 3 to 4 persons they take more or less nutritious food. But those respondents monthly household income is low, their food purpose expenditure is low and they don't get nutrients and sufficient food. During the field survey, majority of the respondents mentioned that they cannot eat two meals a day let alone buy their bare necessities. Due to shortage of food they become extremely weak.

As a result, they are facing various diseases, lost productivity and interest to their work. The respondents' household expenditure pattern is described below.

Expenditure on Food

Food is very much essential to survive a man. It provides energy, nutrition, filling decay and producing heat. So, everybody needs to take sufficient food regularly. The energy in the body depends upon the calories value of the food intake. During the survey, the respondents mentioned that the present rate of wages is not sufficient to purchase meat, fish, egg, milk and other nutritious food. On the other hand, the prices of necessary commodities have increased tremendously. As a result, the standard of living of the labourer is not increasing. A modest number of the respondents mentioned that their living standard is deteriorating gradually.

Table 10.9: Monthly Expenditure on Food (In Taka)

Expenditure Range	Number of the Household	Percentage
Up to 2000 Taka	4	1.04
2001 to 3000	20	5.21
3001 to 4000	77	20.05
4001 to 5000	116	30.21
5001 to 6000	88	22.92
6001 to 7000	53	13.80
7001 to 8000	15	3.91
8001 +	11	2.86
Total	384	100.00
Mean household expenditure (Food)=5151 Taka		

Source: Field Survey, 2015

The Table 10.9 shows that 30% of the respondent's household food purposes expenditure is nearly 4001 to 5000 taka. Monthly food purposes expenditure less than 2000 taka over than 1% of the respondents' household. Around 20% of the respondents' household food purposes monthly expenditure ranges within 3001 to 4000 taka. Around 23% of the respondents' household monthly expenditure ranges between 5001 to 6000 taka on food

purposes. Nearly 3% respondents' household monthly food purposes expenditure is more than 8000 taka.

According to the obtained data it was found that majority of the respondents' household expenditure for food purposes is less than 5000 taka/month. This data shows that the living condition of the labourer is not well occupied. The study reveals that household monthly food purposes average expenditure only 4769 taka which depicted the poor food intake situation than other people of the country. Due to deficit of nutrients food, their health is break down after 40 years which affect production efficiency.

Expenditure on Clothes

According to the obtained data 37.8% of the respondents' household monthly expenditure for clothes purpose is up to 200 taka only. 44.5% of the respondents' household expenditure between 201 to 400 taka and around 16% respondents' household expenditure 401 to 600 taka/month. Only 8% of the samples' clothes purpose expenditure is more than 800 taka. Those who are leaders of the labourer or young in age their clothes purpose monthly expenditure is more than other labourers. But most of the labourers wear very low quality clothes. Their clothes is very old and dirty. Very few labourers wear new clothes. A large number of labourers have only one or two new dresses to go outside of gardens or town or relatives home. They wear new dress occasionally.

Table 10.10: Monthly Expenditure on Clothes (In Taka)

Expenditure Range	Number of the Household	Percentage
Up to 200 Taka	145	37.76
201 to 400	171	44.53
401 to 600	60	15.63
601 to 800	5	1.30
801+	3	0.78
Total	384	100.00
Mean household expenditure(Clothes) =307 Taka		

Source: Field Survey, 2015

Expenditure on Education

Education is one of the major indicators of social status. But education purpose expenditure is very low of the labourers. The major reason of low educational expenditure is economic crisis. Unconsciousness is another barrier to education. On the other hand, most of the children of the respondents dropped out after primary school or secondary level.

Table 10.11 shows that around 17% of the respondents' household education purpose monthly expenditure is up to 200 taka only. Around 14% of the studied household monthly average educational expenditure within 201 to 400 taka and 11.46% have 401 to 600 taka. According to the study, the labourers educational expenditure is very much low than other people of the country. So, the children of the labourers are unable to continue their education.

Table 10.11: Monthly Expenditure on Education (In Taka)

Expenditure Range	Number of the Household	Percentage
Up to 200 Taka	64	16.67
201 to 400	52	13.54
401 to 600	44	11.46
601 to 800	17	4.43
801 to 1000	22	5.73
1001+	21	5.47
No expenditure	164	42.71
Total	384	100.00
Mean household expenditure (Education)=295 Taka		

Source: Field Survey, 2015

The respondents mentioned that poverty is the most important reason for drop out, never enrolment and gender disparity against girls. Various researches find out that there is a strong relation between household socio-economic status and out of schooling. It was observed during the field study that girls are taking care of the younger and cook, especially in the poorer households. The poor labourers work in the garden both husband

and wife. They spent the whole day outside of home for work leaving younger children and the household to the care of the older girls.

Expenditure on Health

If any labourer of tea garden is sick then he gets primary treatment facilities from the garden authority. For this reason, a medical centre or dispensary has been established in the tea garden area. But the medical service is very poor. Some of the respondents mentioned during the survey that they get only Paracetamol, Napa, bandage, Flagyl, Mertil from the medical centre. As a result, medicine is bought from outside by the labourers. Most of the time doctor remains absent in the medical centre. The compounder gives medicine to the patient in the absence of the doctor. According to the respondents, the services given by the doctor in tea garden is totally inadequate.

Table 10.12: Monthly Expenditure on Health (In Taka)

Expenditure Range	Number of the Household	Percentage
UP to 200	268	69.79
201 to 400	87	22.66
401 to 600	15	3.91
601+	5	1.30
No expenditure	9	2.34
Total	384	100.00
Mean household expenditure (Health)=209 Taka		

Source: Field Survey, 2015

The above mentioned Table 10.12 shows that around 70% of the respondents' household monthly health purposes expenditure is up to 200 taka. A significant proportion of the respondents' household health purposes expenditure ranges between 201 to 400 taka per month and nearly 4% within 401 to 600 taka. Only 13% of the respondents' household expenditure is more than 600 taka and 2.3% have no health purpose expenditure. According to the findings, the respondents' household monthly health purpose average expenditure only 209 taka which indicates the poor medical condition.

Expenditure on Recreation

Most of the respondents spend their leisure time by watching television and listening song through mobile phone, radio or tape recorder. Celebration of various social and religious festivals is another way of recreation of the labourers. A large number of the labourers are deprived from various recreational facilities due to economic insolvency.

According to the tea garden culture recreation means habit of taking alcohols, visit to the relative home etc. Traditionally, garden authorities supply alcohol among the tea labourers mainly to keep them confined within the boundary of tea garden. The labourers also prepare alcohol for their own drink which is known as 'Halida' or like these. A large number of male and female labourers drink alcohols. Male labourers drink more alcohol than female labourers. As result, a proportion of their income is spent for alcohol drink purpose.

It was found that alcoholism is a burning problem in the gardens of North-east and South-east region. Very often the male member of the household head is addicted to alcohol. There are cases where both of the parents are addicted to liquor. When the father is under the influence of alcohol, he makes quarrels with the mother. The calm family environment shatters as a result. Often their children are the victims of this process. Sometime the drunken father beats up the children. The fear psyche disturbs the minds of the children and they lose concentration on studies. Since the plantation houses are built in lines, the children are even disturbed by problems in the nearby households.

The field study reveals that recreation scope of the labourers in tea garden is very limited. According to the findings, 43% of the respondents' household recreation purpose monthly expenditure is up to 500 taka. About one fifth of the studied respondents' household, monthly recreation purposes expenditure ranges between 501 to 1000 taka. Over 17% respondents' household of the samples monthly expenditure within 1001 to 1500 taka and

only 3.6% have spent more than 1500 taka while around 17% of the household has no expenditure for recreation purpose.

Table 10.13: Monthly Expenditure on Recreation (In Taka)

Expenditure Range	Number of the Household	Percentage
Up to 500 Taka	165	42.97
501 to 1000	74	19.27
1001 to 1500	66	17.19
1501+	14	3.65
No cost	65	16.93
Total	384	100.00
Mean household expenditure (Recreation) =684 Taka		

Source: Field Survey, 2015

Other Expenditures

The mentioned Table 10.14 shows that the respondents spend a few amount of taka for other purposes like transport cost, refreshment for guest, drink tea or light snacks at hat or bazar etc. The study finds that most of the respondents' household (24.5%) monthly expenditure for other purposes within 401 to 600 taka. At the same time, 601 to 800 taka expenditure of 19.3% studied household and 801 to 1000 taka monthly average expenditure of 19.3% household. 10.4% of the sample monthly expenditure is more than 1200 taka and over 8% respondents' household expenditure is up to 200 taka.

Table 10.14: Monthly Expenditure on Others (In Taka)

Expenditure Range	Number of Household	Percentage
Up to 200 Taka	31	8.07
201 to 400	34	8.85
401 to 600	94	24.48
601 to 800	70	18.23
801 to 1000	74	19.27
1001 to 1200	36	9.38
1200+	40	10.42
No cost	5	1.30
Total	384	100.00
*Others : Transport, refreshment for guest, drinking tea at hat or bazar etc.		
Mean household expenditure (Others purpose)= 785Taka		

Source: Field Survey, 2015

The statistics indicates that other purpose expenditure concentrated within 401 to 1000 taka on the basis of monthly household income.

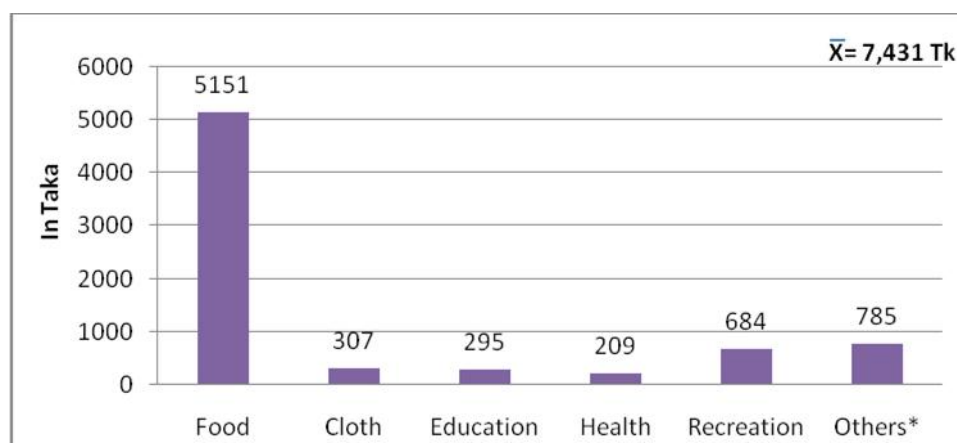
Household Total Expenditure

According to the mentioned Figure 10.7, most of the respondents' household (78%) concentrated monthly total expenditure 5001 to 10000 taka while 12% less than 5000 taka respectively. Among 9% of the respondents' household monthly expenditure is between 10001 to 15000 taka while over than 2% above than 15000 taka.

It is commonly known that the tea garden labourers live from hand to mouth by the wages they receive. Recently the scenario of the labourers has slightly changed whose household members work outside of tea garden or abroad or one more member work hard in tea garden.

A number of the respondents mentioned and during the field study it was observed that the labourers go to the work in the morning drinking tea with dry bread or like these. The labourers mostly carry fried wheat or rice with small amount vegetables or vartas and chilies, most of the labourers eat rice with vegetable. They take fish or meat when they can afford. Usually during festival or wedding ceremony or sometimes when they get wages, cook meat or fish with polao in a labourer household.

Figure 10.7: Household Total Expenditure



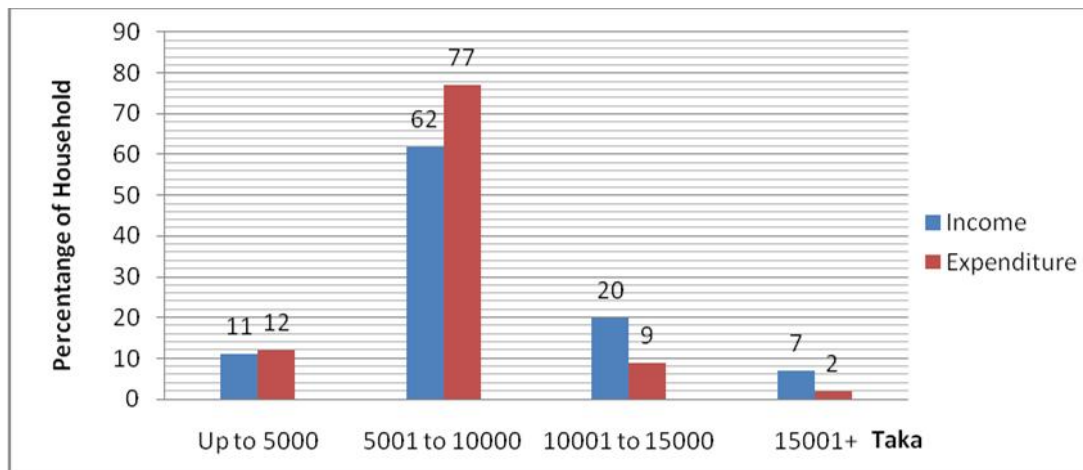
Source: Field Survey, 2015

It was found that the food habit of North-western region is better than other two plantation regions. Their monthly expenditure is more than traditional tea labourer. The labourer takes fish or meat several times in a month. As a result, their health structure is stronger than the labourer of South-east and North-east regions.

10.3 Comparison of Household Income and Expenditure

Figure 10.8 shows the average income and expenditure of the labourer. According to the obtained data, nearly 11% of the household monthly earn up to 5000 taka and around 12% household expenditure is at the same range. The Figure also depicted that 62% household monthly earn between 5001 to 10000 taka where around 77% household keep their household expenditure within the same range. On the other hand, over 20% of the household monthly income within class interval of taka 10001 to 15000. The monthly expenditure of this class interval is only 9% household. The Figure also shows that only 6% household monthly income is more than 15001 taka. This class intervals belongs three more earning members and also work outside of garden both at home and abroad. They also try to save some money every month for their future. At the same time, monthly more than 15001 taka expenditure is only for 2% households. There is needed to mention that some hidden source of income of few labourers (such as stole from forest or shade tree). As a result, some cases it ws seen that expenditure is more than income. Besides these, some labourer always faces economic crisis and take loan from money lender with high rate interest and they are most sufferer labourer. According to the obtained data, there is a strong relation between the income and expenditure of the respondents' households.

Figure 10.8: Comparison of Monthly Income and Expenditure (In Taka)

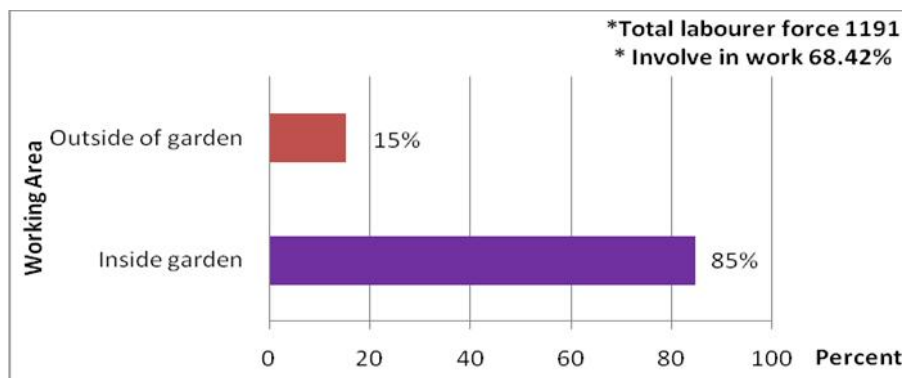


Source: Field Survey, 2015

10.4 Working Area of Household Members

Majority of the household population is economically active. Taken together, 46.33% of the population is actively engaged in economic activities. Over 39.3% of the household members work in tea gardens. At the same time, it is remarkable that 7% household members work outside of tea garden. These categories household members work as labourer, transport worker, barber, garment worker, security guard, factory worker, grocery shop or like other works outside of tea garden.

Figure 10.4: Working Area of the Household Members (15+ Years)



Source: Field Survey, 2015

The above mentioned Figure 10.4 shows that a moderate number of household members (18.87%) are studying. Most of them are studying at primary or secondary level and very

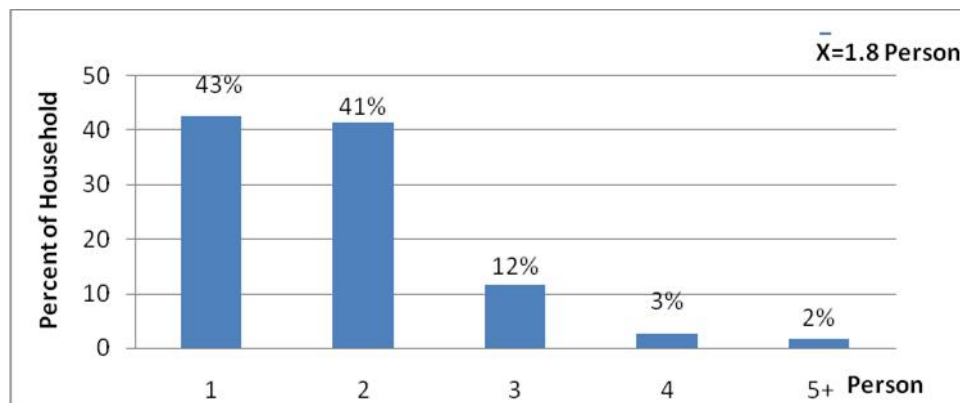
few numbers of them are studying at higher secondary or graduation level. A large number of household members (34.79%) are not involved in work. Most of them are old in age, child, housewife or unemployed etc. Those who work in tea garden they do various types of work which is mentioned at the beginning of the discussion (Table-10.1). The study reveals that the labourers are not bounded in tea garden. They are moving outside of tea garden for the development of living standard. This is the major changes of tea garden labourers regarding working pattern.

10.5 Household Involvement in Tea Garden

The Figure 10.5 shows the trend of involvement in tea garden that in future tea industry will face a serious labourer crisis. The obtained data depicted that labourers are interested to work outside of tea garden. The labourers think that the wages is lower in tea garden than outside, although wages increased several times through the BCS. According to the field study, the involvement of household members in tea garden is only 1.8 persons.

The study reveals that household members of the respondents, interested to work outside of tea garden and they also try to change their forefather's occupation which seemed at the time of field data collection and the above statistics also shows this. So, in future it will be needed to reorganize the labourer system in tea garden.

Finding shows that most of the respondents' household (42.71%) has single involvement in tea garden. 41.41% of the respondents' household has 2 members involvement in tea garden. At the same time 3 members involvement of 11.72% respondents' household and 4 members of 2.6% household. Only 1.56% respondents' household has 5 members who work in the tea garden.

Figure 10.5: Household Involvement in Tea Garden

Source: Field Survey, 2015

According to the above mentioned Figure, the trend of respondents' household member involvement in tea garden is very low. Day by day involving trend is decreasing which is alarming for tea industry. Among the tea growing regions the South-east region faces serious labourer crisis. The tea gardens of South-east region do not get enough labourer. So, they collect labourer outside of garden and spent a large amount wages every day. As a result, production cost increasing day by day. After South-east region the tea garden of near to Sylhet sadar face labourer crisis. They manage labourers outside of garden and pay them more wages than other labourer of the garden.

10.6 Designation/Types of Activities

There are many types of work in tea garden. According to the work type, the designation of the labourer is different. Although their designation or work type is different they are all known as labourer in tea garden. The study was conducted on different types of labourers of three tea plantation regions in the country. The designation or work types of the respondents are presented in the following Table- 10.15.

Table 10.15: Designation/Types of Activities of the Respondents

Designation/ Work Types	Number of Respondents	Percentage
Leaf plucker	149	38.80
Nursery worker	47	12.24
Weeds/cutting man	11	2.86
Factory worker	52	13.54
Transport worker	8	2.08
Sardar	8	2.08
Choukider/guard	14	3.65
Banglow worker	8	2.08
Peon/messenger	10	2.60
Dresser in hospital	4	1.04
Car Painter	2	0.52
Sprayer	13	3.39
No fixed work	58	15.10
Total	384	100.00

Source: Field Survey, 2015

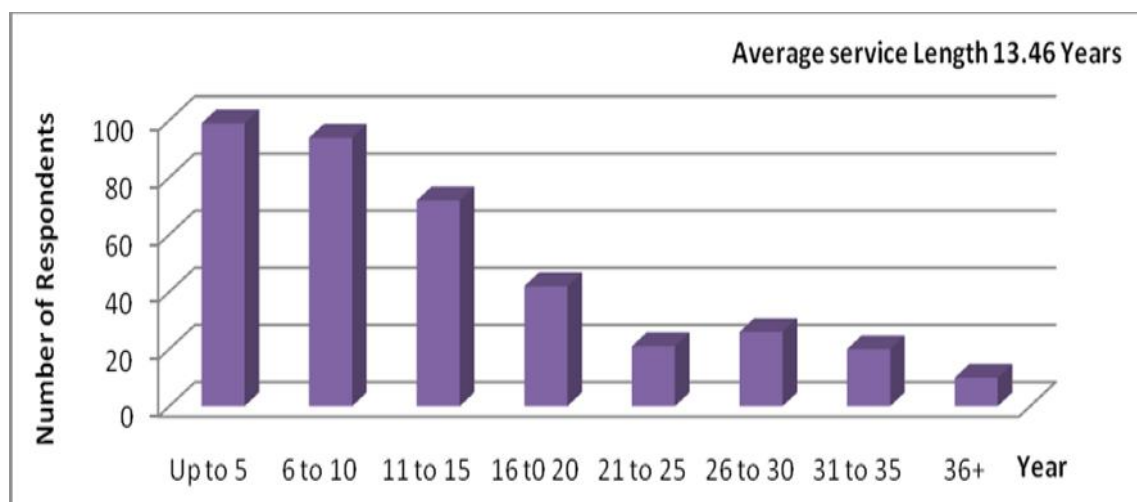
The above mentioned Table shows that 38.8% of the respondents are involved in green leaf plucking. Leaf plucking is the major work of every garden. As a result, a large number of labourers need to pluck green leaf. Over 12% respondents work in tea nursery is to prepare plant for new plantation or re-plantation. Around 14% of the respondents work in tea factory. The factory labourer work to process green leaf and produce made tea by finishing various manufacturing process. The above mentioned Table shows that among the respondents there are sardar, choukider, guard, cutting man, banglow worker, messenger, peon, dresser in hospital, car painter etc. About 15% of the respondents have no fixed work in tea garden. They do various work which need for the garden. Actually, all of the labourer work in tea garden but there is diversity of work type or designation. All types of labourers play important role to the development of tea garden and production. They work from land preparation to finishing made tea.

10.7 Working Experience in Tea Garden

The duration of working experience of the respondents are categorized into eight groups to easily interpret the information. Figure 10.9 reveals the working experience of the labourers in tea garden. More than half of the respondents' working experience is less than 10 years. Among the respondents 25.8% are working up to 5 years. 18.8% of the respondents working experience range between 11to15 years category in tea garden. Around 11% respondents have experience between 16-20 years. Only the 21 to 25 years category occupy nearly 7 percent of the sample, while 36+ years experience group fall below 3 percent of the sample.

Figure 10.9 indicates that if working experience increases number of respondents decreases. But working experience has a direct bearing on the productivity of labourers. A study conducted by Sivaram (1996) mentioned, a good plucker must have over 20 years of experience. According to the obtained data, only about 26% of the respondents have this long experience of work in the tea garden in Bangladesh.

Figure 10.9: Service Length of the Respondents



Source: Field Survey, 2015

The Figure also indicates that most of the respondents are young who has enough working energy and productivity. It is mentionable that labourers work hard from morning to afternoon for the development of tea garden.

10.8 Other Jobs Working Experience, Types and Duration

Majority of the respondents (81.77%) had no experiences to work outside of tea garden. More than 16% of the respondents work outside of garden before this present job. These labourers temporarily work as labourer or other related work outside of tea garden. When they get opportunity to work in garden, they come back in tea garden for work. Because their household members live in tea garden and work there from generation to generation. Only 1.6% of the respondents work sometimes outside of tea garden. Those who work outside of garden, most of them are young in age. But who get moderate salary outside of tea garden they do not come back in tea garden. They work outside and earn money to help their family. Only 0.5% respondents did not respond about this question.

Table 10.15: Work in Other Job before the Present Job

Worked Outside	Number of Respondents	Percentage
Regularly	62	16.15
Sometimes	6	1.56
No response	2	0.52
No	314	81.77
Total	384	100.00

Source: Field Survey, 2015

Previous Profession of the Respondents

The profession of the respondents who work outside of tea garden is not found multiplicity. 36.76% of the respondents were day labourer. Among the respondents, 8.8% respondents were household labourer and 8.8% of respondents were transport worker. Nearly 3% of the samples worked at small industry and same percent of respondents were NGO school teachers who came back into tea garden as labourer. It is very surprising and

miserable that who work in NGOs school come back in tea garden work. Around 6% of the respondents work as salesman in various shopping centers. Among the respondents, 25% have working experience in other tea garden. Most of them come in tea garden due to the link of marriage with studied garden.

Table 10.16: Previous Profession of the Respondents (N=68)

Types of Profession	Number of Respondents	Percentage of Respondents
Day labourer	25	36.76
Household worker	6	8.82
Transport worker	6	8.82
Small industry worker	2	2.94
Sales man	4	5.88
NGOs school teacher	2	2.94
Tea labourer	17	25.00
Others	6	8.82
Total	68	100.00

Source: Field Survey, 2015

Working Experience Outside of Tea Garden

Most of the respondents have no experience of working outside of tea garden. But those who have experience outside of tea garden 63.24% of them work up to 5 years. Over 22% of the respondents work 6 to 10 years and 14.71% work more than 11 years. According to the obtained data, average previous working experience of the respondents around 5 years.

Table 10.17: Working Experience Outside of Tea Garden (N=68)

Experience length	Number of Respondents	Percentage
Up to 5 Years	43	63.24
6 to 10	15	22.06
11+	10	14.71
Total	68	100.00
Average working experience=4.545 Years		

Source: Field Survey, 2015

If Work Outside, Working Hour/Per Day

According to the field study, 22.06% of the respondents work from 9 to 11 hours outside of tea garden and 8.82% respondents work more than 12 hours per day. Most of the respondents (69.12%) work outside of tea garden according to the labour law. From the mentioned data it was found that those who work outside of tea garden work as tea labourer.

10.9 Working Situation Outside of Tea Garden

Among the respondents, 4.7% of them work outside of tea garden after their regular job in tea garden. Sometimes work 3.6% of the respondents after regular job. It is noticeable that most of the respondents (91.7%) do not work after tea garden job.

During the survey it was seemed that the respondents eager to work outside of garden because of high wages than tea garden. According to the respondents' speech, day by day the trend of working involvement outside of tea garden increases. As a result, tea garden will face a negative impact which is alarming signal for this industry.

Those who work outside of tea garden after their job they work as day labourer (56.3%).
The

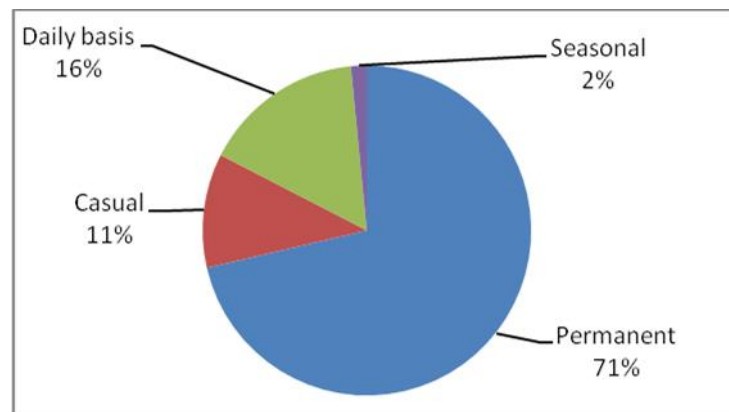
Female respondents work household activities. Around 22% of the respondents work at grocery shop and 6.3% are transport worker respectively. And 6.25% of them work as salesman in grocery shop outside of tea garden.

10.10 Nature of Employment in Tea Garden

The data in the Figure 10.10 reveals that there are four types of labourer in tea garden. These are permanent, casual, daily and seasonal. Most of the respondents (71%) are

permanent⁶ labourer. 11% of the respondents work as casual⁷ labourer who are later converted into permanent labourer. During the survey, many casual labourers claimed that the authority do not make them permanent only deprives them from bonus, provident fund and other relative facilities. Among the respondents 16% work as daily⁸ basis in tea garden and only 2 percent work at different seasons they are known as seasonal⁹ labourer. They work basically during the green leaf plucking time.

Figure 10.10: Nature of Employment in Tea Garden



Source: Field Survey, 2015

Daily basis and seasonal labourers mostly work in the North-western region of the country. But some of them are seen in South-east and North-east regions due to labourer shortage. These types of labourers get high wages than other labourers of tea garden. It is mentionable that the casual, daily and seasonal labourers do not get any other facilities from the garden except wages but get overtime wage.

10.11 Working Hour and Labour Law

Normally working hour of tea labourer followed by government rules. The Labour Law 2006, ensures that every labourer will work 8 hours every day. According to the study, 99.2% of the respondents mentioned that they normally work 8 hours per day. Only 0.3%

⁶ Permanent labourer means a worker who has been engaged on a permanent basis or who has satisfactorily completed the period of his probation in the shop or the commercial or industrial establishment

⁷ Casual labourer means a worker whose employment is of a casual nature.

⁸ Daily basis means if the labourer work they will get the wages.

⁹ Seasonal means work as different seasons particularly in small growers garden.

labourer work 9 hours per day. They mentioned that this additional working one hour they do not get any wages. 0.5% of the respondents did not respond about working hour because of no proper concept about labour law. From the data of field study, average daily working hours has been estimated at nearly 8 hours. Here is needed to mention that the tea labourer activities, plucking requires the longest working hours and it is labour intensive. Factory activities also take the longest time. Other activities of the garden like weeding, pruning, fertilizer and pesticides spray are not so labour intensive. Here is noticeable that the tea labourers who are involved in the field can't do anything without sunlight. But the labourers who work in factory they can work at night and they sometimes do by receiving overtime wages.

Table 10.18: Working Hours of the Labourers per Day

Working Duration (In Hours)	Number of Respondents	Percentage
Up to 8	381	99.22
9+	1	0.26
No response	2	0.52
Total	384	100.00

Source: Field Survey, 2015

10.12 Overtime Working Situation

According to the Bangladesh Srama Ain, 2006, "An employer who may require an employee to work overtime shall pay him, in respect of the overtime work, an allowance in accordance with the provision of section 108." Overtime is one of the major sources of income of tea labourers in garden. According to the rules, overtime means when a labourer works more than 8 hours, the additional time count as overtime. In tea garden 27.6% of the respondents regularly work overtime. 37.7% respondents work sometimes overtime when they get opportunity. Only one percent respondents occasionally work overtime. A modest number of respondents (34.4%) never do overtime because of limitation of opportunity, babies, work outside of garden, grocery shop in tea garden etc.

only 0.3% respondents did not response because of lacking of knowledge about overtime. Overtime mostly depends on garden category, labourer sufficiency etc. Where labourer crisis prevail in that garden, overtime opportunity is more than others.

Table 10.19: Overtime Working Situation in Tea Garden

Work Overtime	Number of Respondents	Percentage
Regularly	106	27.60
Sometimes	141	36.72
Occasionally	4	1.04
No response	1	0.26
No	132	34.38
Total	384	100.00

Source: Field Survey, 2015

Income from Overtime

The overtime wage is very much essential for the labourer of tea garden to survive their livelihood. Because the wage they get for regular work is not sufficient to maintain their household demand. A modest number of household (251 household) earn overtime wage more than regular wage.

Among the respondents, who work overtime majority of them (49.8%) earn monthly wage up to 1500 taka. Around 40% of the respondents earn between 1501 to 2100 taka while 8.4% within 2101 to 2700 taka per month. Only 2% respondents earn monthly overtime more than 2700 taka. Basically the labourers earn overtime wage during the plucking pick season. Because during the pick plucking season it is needed to maintain the plucking round which is very much essential for quality green leaf. Plucking round means leaves pluck every section after 7 days.

10.13 Other Fringe Benefit Gets from Garden except Salary

The permanent labourers get some other benefits from the garden authority except salary. Wage rate for the labourer is fixed by an agreement between the Bangladeshio Cha

Shangsad and Bangladesh Cha Sramik Union. This agreement is revised every two years. Wage rate in tea plantation sector is very low in comparison with other industries even with agricultural labourer. For this, the tea garden labourers get various fringe benefits, which add to their wage. It is mentionable that tea labourers are employed round the year. They have a regular income all over the year. But wage rate of tea labourer is low even after all these facilities are taken into consideration. The fringe benefit of the labourer is discussed in the following.

According to the findings, the permanent labourers get the facilities of housing, ration, festival bonus, provident fund, annual leave, agricultural land, medical services and overtime. And the casual labourers get overtime facilities, medical services.

Housing, Water and Sanitation Facilities

Tea authority of traditional garden provides housing facilities for each permanent labourer. The labourer lives in this house with his family. Labourer have a right by tradition or convention to live in house as a finely unit and use the surrounding courtyards as a part of their job. The labourers live in a small room with their family. They also get a kitchen room. It was observed when the survey conducted that cows or goats are reared in a corner of the same room by building a partition. It was also observed that most of the doors and windows are very small. Most of the garden provides the labourer mud walls, a straw roof. Recently several tea garden build new houses for labourer with sufficient space. A number of the respondents mentioned that during rainy season rain water enters into the room due to lack of maintenance. The housing and water supply facility of North-east and South-east region is shown in Table 10.20.

Table 10.20: Housing and Water Facilities

Housing Facilities		Water Facilities		
Pucca House	Kutchra House	Hand Tube Well	Surface Well	Deep Tube well
16, 565	51, 979	6950	7001	279
Total =68,544		Total=14,230		

Source: BTB, 2015

Besides housing the labourers get water and sanitation facilities. The condition of water and sanitation of the labourer is mostly unhygienic, unhealthy and insufficient. The concern authority did not take sufficient initiatives for supplying pure drinking water. At the same time, the tube wells are not geographically equally distributed. As a result, a large number of labourers face pure drinking water crisis. On the other hand, sanitation system is also unhygienic. Most of the latrines are katcha.

It is needed to mention that the labourer of North-western region live at their own home in the locality. So there is no housing facility except one garden. A garden of this region started labour line and they arranged 35 Santal's family who live in labour line.

Ration

Ration is given to the labourer at a concessional rate. According to the respondents they get ration per kg only 1.5 taka and it is applicable only for permanent labourer. They get the ration in a fixed day of the week. It is one of the major sources of income of the labourer. Food grains such as rice or wheat is given as ration to the permanent labourer of South-east and North-east region. The permanent labourer of tea garden get ration weekly basis. A permanent labourer gets 3.270 kg rice per week. Besides, adult dependent gets 2.450 kg and for child dependent gets 2.225 kg rice every week. The garden authority gives ration to a dependent child up to the age of 12 years. If both husband and wife are permanent labourers they get 3.270 kg of ration each. If a permanent labourer has only one child, he/she get ration only for that child. If one has more than 3 children, he/she get ration only for 3 children, not for all children.

Provident Fund

As per Bangladesh Labour Act 2006/2013 (section 265 to 272) after retirement/death of a permanent labourer tea garden authority pay the fund after completing necessary official procedure. Each month 7.5% of the total basic is deducted from salary/wages. During the retirement the permanent labourers get double of deposited money with bank interest. But during retirement the labourer do not get any lump-sum amount. Gratuity is also given to the labourer as per Labour Law 2006/2013.

Festival Bonus

The permanent labourers get festival bonus every year. The Hindu labourer gets bonus during Durga Puja and Dol Jatra and the Muslims get it during Eid-UI-Fitar and Eid- UI-Azha. They get bonus of only one month basic salary. This bonus is distributed in two festivals. The casual, daily or seasonal labourers do not get any bonus.

Festival Holidays, Sick and Annual Leave

Every permanent labourer gets 14 days festival holiday with pay in each calendar year. The holidays are on the following occasions only. The labourer has weekly holiday but without pay. The casual, day and seasonal labourer do not get any casual or annual leave. The festival holidays of the labourer is given in Table 10.21.

Table 10.21: Festival Holidays of the Labourer

Name of Festival	Day
Shaheed Day (21 st February)	1 day
Independence Day (26 th March)	1 day
May Day (1 st May)	1 day
Victory Day (16 th December)	1 day
Bengali New Year's Day (14 th April)	1 day
National Mourning Day (15 th Aug.)	1 day
Eid-ul-Fitr	1 day
Eid-ul-Azha	1 day
Lal Puja	1 day
Durga Puja	3 day
Shab-e-Barat	1 day
Pous-Sankeranti/Christmas Day	1 day
Total	14 days

Source: Labour Agreement between BCS and BCSU

The permanent labourer get 20 days sick leave. If any labourer is sick more than 20 days, than he/she is not supposed to gets a wage for that excess period. On the other hand, a permanent labourer gets 1 day leave for every 22 days of work as per Bangladesh Labour Act 2006/2013.

Maternity Leave

The pregnant labourers are entitled for maternity leave. The maternity leave is 4 months. They get full wages for this leave. This wage paid on weekly like all other labourer of garden.

Education

Most of the traditional tea garden provides education for the labourer's children. For this purpose, most of the traditional garden has established school in garden premises. But a large number of children do not go to school. Many children dropped out before completing primary education. The number of educational institutions and students of tea garden in North-east and South-east region is given in the following Table.

Table 10.22: Number of Educational Institutions and Student

Management Pattern	Number of School	Number of Student
Garden Owned	114	11,535
Govt. & Non Govt.	28	6,882
NGO	536	12,838
Others	46	3,535
Total	724	34,789

Source: Uddin, 2010

The Table shows that the number of schools is not sufficient for the labourer's children. The above Table also depicted that there is no college in tea garden. The number of teachers who work in this school is shown in Table 10.24.

Table 9.23: Number of Teachers

Types of Institution	Number of Teachers
Primary Govt. and Non Govt.	908
Junior High School (Up to Class Eight)	12
High School (Up to Class Ten)	69
Total	989

Source: Uddin, 2010

Medical Facilities

Table 10.24 shows the medical facilities of the labourers in tea garden. There are only 67 hospitals out of 166 gardens. According to the respondents, most of the medical centre has no doctor when the labourer needs treatment. Even most of the medical centres do not have sufficient medicine or necessary equipment. In North-western region, there is no hospital in tea garden but primary treatment given by the garden authority.

Table 10.24: Medical Facilities in Tea Gardens

Types of Facilities	Number
Hospital	67
Dispensary	147
Beds	687
Creche	278

Source: BTB, 2015

Day Care Centre

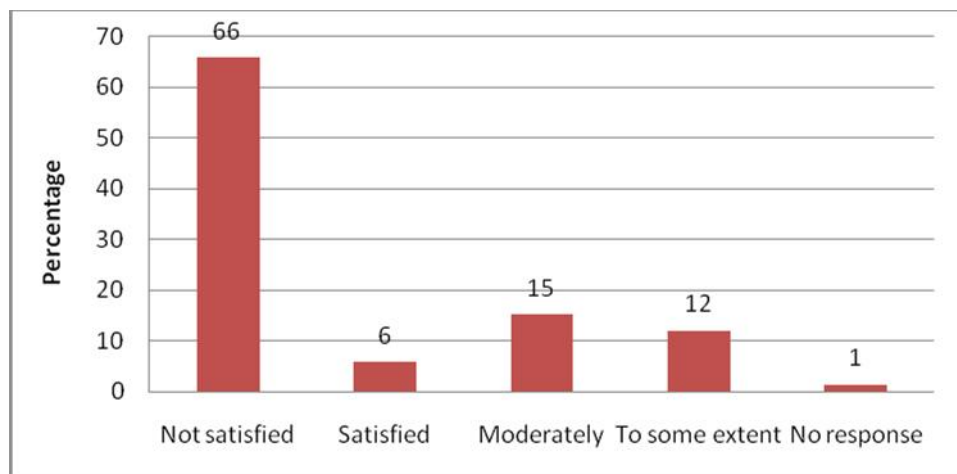
Some of the tea gardens where the study conducted, the garden authority/company established day care centre for the children. The woman labourers leave their children here on their way to work and pick up them on their way back home. The authority appointed one or more nurses to look after the children. In some of the day care centre, there are some toys to play for the children.

10.14 Level of Satisfaction about Salary/Wages

It is commonly established that a satisfied worker is more productive than a dissatisfied worker. Findings show that most of the respondents (66%) both male and female tea

labourer are not satisfied about their salary or wage. The respondents found to be dissatisfied both to their living, health, sanitation, drinking water, medical facilities and also working environment. Housing is one of the dominant factors of dissatisfaction. Because most of the living room of the labourers is very small, unhealthy, lack of proper repairment and insufficient air. Among the respondents, only 5.7% are satisfied about their salary/wages and over 15% of the respondents are moderately satisfied. Nearly 12% of the respondents are satisfied to some extent because they have no alternative job. 1.3% of the respondents have no response. These respondents have no proper concept and they work only to take two meals food.

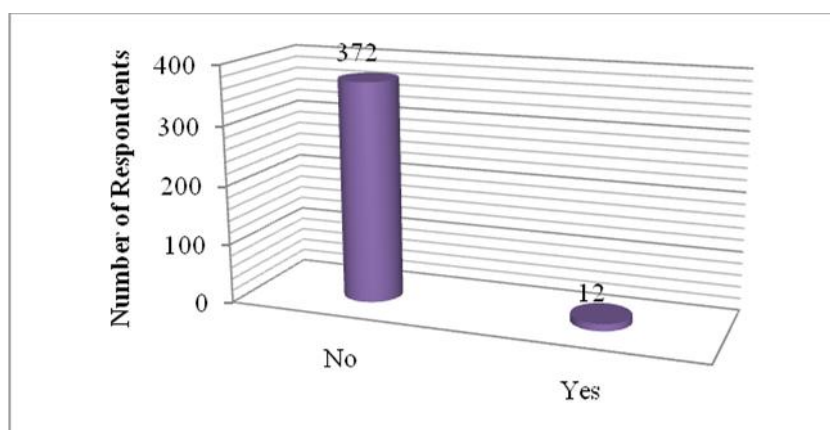
Figure 10.11 Level of Satisfaction about Salary/Wages



Source: Field Survey, 2015

10.15 Training Receiving Status

It is reportedly known that training increases the productivity of a labourer. It is an important element of every specialized sector. The Figure 10.12 reveals that training situation of tea labourer. In tea garden, nearly 97% respondents never get any training. Only 3% respondents mentioned that they get training from garden management, NGO or government organization. As a result, the labourer work as traditionally and they are not conscious about many things.

Figure 10.12: Training Received Situation of the Respondents

Source: Field Survey, 2015

According to the above mentioned Figure, in tea garden training programme should be arranged for skill development of the labourer. There are various sides to provide them training. Such as- rules of green leaf pluck, pruning process, how to spray pesticides and fertilizer, health, sanitation, childcare, maternity health etc.

If Yes, Name of Institution: Among the respondents 50% received training from garden management and 33.3% respondents from NGOs. Only 16.7% of the respondents received training from government organization.

Table 10.25: If Yes, Name of Training Receiving Institution (N=12)

Name of institution	Number of Respondents	Percentage
Garden Management	6	50.00
NGO	4	33.33
Government organization	2	16.67
Total	12	100.00

Source: Field Survey, 2015

The above mentioned Table shows that it is needed to take initiatives from the garden management, government organization or NGOs to organize training programme for the development of skill of the labourer.

10.16 Communication with other Labourer and Mobile Phone

The study finds that 49% of the respondents have regular communication with other garden labourers. They communicate with other labourers through mobile phone or hat-bazar or going their homes. Among the respondents, 83% have mobile phone either own or at home or both and 17% have no mobile phone. The trend of mobile phone using is increasing gradually in the garden area. Around 16% of the respondents communicate sometimes with other garden labourers if they need. In these cases household's relation plays an important role. 3.4% of the respondents communicate with other garden labourers occasionally. These are religious festival, marriage ceremony or national festival etc. The respondents who communicate regularly with other tea garden labourers are mostly related to sramic union or labourer leader or religious leader or conscious about local politics and involve in politics.

Table 10.26: Have Communication with Other Gardens Labourer

Have Communication	Number of Respondents	Percentage
No	119	30.99
Regularly	188	48.96
Sometimes	62	16.15
Occasionally	13	3.39
No response	2	0.52
Total	384	100.00

Source: Field Survey, 2015

The labourer also mentioned that they are trying to discuss their problems and possibilities to their community. They also discuss their legal rights, implementation of rights, families or social problems, social judicial system etc. They also communicate just only to maintain social formalities. There is needed to mention that their community unity is very strong and they also abide by the garden management orders and in case of big clashes with management or any movement against gardens authority.

10.17 Awareness about Labour Law

Around 51% of the respondents know that Labour Law is prevailing. But most of them do not know about labour right. They only heard the name of Labour Law. A few number of sramik leaders know few rules of the Labour Law. Actually, lacking of education and awareness is responsible for this situation. On the other hand, nearly half of the respondents (49%) never heard the name of Labour Law, they just only go to the work and get wages from the authority.

Figure 10.13 Whether Aware* about Labourer Law



* Aware means just know or don't know that labour law prevailing for the labourers.

Source: Field Survey, 2015

10.18 Have Any Problem in Tea Garden

According to the findings, around 70% of the respondents mentioned that many problems are prevailing in their garden. 29% of the respondents reply that there is no major problem in their garden and 1% respondents do not know about their problems in tea garden.

The field study reveals that the labourers face various problems in tea garden. The respondents mentioned multiple problems. The Table 10.27 shows that the major problems in tea gardens are low wage, housing/living room, water, sanitation and medical facilities. The major problems are given which are identified by the respondents.

Table 10.27: If yes, Type of Problems (N=269, Multiple Responses)

Problems	Response	Percentage
Low wages	188	11.76
Housing /living room	230	14.39
Insufficient ration	158	9.89
Water	225	14.08
Sanitation	192	12.02
Electricity	61	3.82
Medical facilities	184	11.51
Higher education	209	13.08
Early marriage	24	1.50
Hard work & lack of nutrition	41	2.57
Fire wood	24	1.50
Social security	35	2.19
Limited scope of overtime	35	2.19
Limitation of new employment	11	0.69
Delay of service permanent	14	0.88
Insufficient recreation	29	1.81
Roads communication	28	1.75
Alcohol/Drug	36	2.25
Labourer unrest & dissatisfaction	39	2.44
Lack of consciousness & social status	23	1.44
Total	1598	100.00

Source: Field Survey, 2015

The above Table shows that there are a number of problems of labourers in tea garden. It was observed during the survey that most of the houses are dilapidated in the tea garden areas and the size of houses are very small, living more people than accommodation capacity.

10.19 Suggestion for Better Life

From the response of the labourer it is clear that they try to improve their living standard. And also want to fill up their fundamental requirements. For this, they work hard from morning to evening. According to the Table 10.28 the respondents gave multiple suggestions for better life. Most of the respondents suggest for increasing their wages. They have also suggested providing them sufficient and quality ration, well housing

opportunity, adequate tube well, sanitation, medical facilities, educational opportunity etc.

The recommendations of the respondents are presented in the following Table.

Table 10.28: Suggestion for Better Life of the Labourer (Multiple Responses)

Suggestions	Response	Percentage
Increased wage	369	18.02
Sufficient & quality ration	193	9.42
Well housing opportunity	238	11.62
Adequate tube well	224	10.94
Sanitation	211	10.30
Better treatment	237	11.57
Educational opportunity or allowance	225	10.99
Employment opportunity of unemployed	26	1.27
Ensure electricity for all	44	2.15
Stop early marriage	12	0.59
Supply nutritious Tiffin	29	1.42
Increases productivity of labourer	12	0.59
Rapid promotion & permanent service	22	1.07
Control drug	42	2.05
Development of labourer livelihood	32	1.56
Playground	16	0.78
Festival bonus	15	0.73
Provident fund	17	0.83
Training	48	2.34
Opportunity of labour union	15	0.73
Develop consciousness & strong panchayet	21	1.03
Total	2048	100.00

Source: Field Survey, 2015

10.20 Suggestion for the Development of Tea Garden

The respondents aware of the development of their tea garden where they working. They think that tea garden provide them house, food, cloth, medical facilities etc. So it is their responsibility to work for the improvement of tea garden. Most of the respondents have suggested to increases production, uses of fertilizer and pesticides as per requirements, increase tea area and re-plantation, proper work and management training for labourers etc. The suggestions of the respondents are mentioned in the following Table 10.29.

Table 10.29: Suggestion for the Development of Tea Garden (Multiple Responses)

Suggestions	Response	Percentage
Increased production	251	19.25
Uses of fertilizer and pesticides as per requirement	187	14.34
Increase tea area	114	8.74
Re plantation	43	3.30
Proper work and management	157	12.04
Sufficient irrigation	89	6.83
Control pest and disease	85	6.52
Weeds control	29	2.22
Use high yield plant	79	6.06
Ensure electricity and gas supply	45	3.45
Training of labourer	26	1.99
Subsidy for weak garden	19	1.46
Solution of labourer crisis	19	1.46
Increase made tea price	16	1.23
Develop well relationship between management and labourer	103	7.90
Develop law and order situation	24	1.84
Development of labourer living standard	18	1.38
Total	1304	100.00

Source: Field Survey, 2015

10.21 Regional Variation of Labourer in Three Regions

There are differences among the labourer of three tea producing regions in Bangladesh.

There are almost similarities between the labourer of North-east and South-east region.

But the labourer of North-western region is different. The differences of labourer of three regions is shown in table 10.30.

Table 10.30: Regional Variation of Labourer in Three Regions

Types of Variation	Traditional Labourer of North-east Region	New Labourer of North-western Region	Traditional Labourer of South-east Region
Origin	The traditional labourer of North-east region brought from different States of India. Such as-Assam, Bihar, Madras, Orrisa.	Local people work in tea garden. Some Santal families brought from neighborhood district Dinajpur.	Shifted from North-east region who are brought from India.
Language	Most of the labourers don't recall their forefather's language. A number of the labourers talk a short of distorted Hindi. The labourers also talk in a mixed language of Orissa which is called "Deshali".	The new labourers talk in Bengali. But the Santal labourers talk both Bengali and their own language. The Santals native language is rich with songs, stories and histories but mostly in oral form.	As same as North-east region. At the same time, a few labourer talk with the local language of Chittagong.
Religion	Dominant religion Hindus. Some Muslim and other religious labourer work in garden.	Majority of the labourera are Muslim. Some other religious labourers work in garden	Mostly Hindus. Recently some local people started to work in tea garden due to the labourer shortage.
Family title	Various title uses of the labourer. Such as-Munda, Bakti, Baraik, Bunerjee, Kairi, Nayek, Oraon etc.	No specific title.	As same as North-east region. Such as-Ghatuar, Gour.
Monthly wages	Monthly wages varies on garden category. According to BCS, garden category A=2070 Tk, category B=2030 Tk and category C=1980 Tk.	Monthly wages 3500-5500 Tk. But the wages of small growers and holders garden varies on different crop season.	As per North-east region. But the labourers who are not traditional, their month wages around 4000 to 6000 Tk.
Types of	Forefather's profession	New profession	Forefather's

profession			profession. But recently some labourer included from the locality.
Alcohol drinking status	Most of the labourers take alcohol as traditionally. It is also a part of daily life of the labourer. The garden authority inspires as to keep them concentrated to work in tea garden.	No traditional habit of drinking alcohol of the local labourer. But the Santal labourers sometimes take it.	As per as North-east region.
Housing	Housing facilities provided by garden authority. But most of the house is not suitable for live. There is no sufficient space for passing air. The doors and windows are very small. Pucca: 16,204 Katcha: 47,377 Total: 63,581 Ratio of housing and labourer is 1:76.	New labourer have own housing and live in the locality. Recently a large garden established labour line where 35 Santal families live. Pucca= 0 Katch= 35 Total= 35 Ratio of housing and labourer is 1:2.	Comparatively poor than North-east region and not sufficient. Pucca: 365 Katch: 4602 Total: 4947 Ratio of housing and labourer is 1:54.
Per hector labourer distribution	2.16 labourer/hector. But some garden recruited a number of labourer from outside of garden on pick season.	1.19 labourer/hector. (Approximate)	1.73 labourer/hector. But some garden recruited a number of labourer from outside of garden on pick season.
Ration	Permanent labourers get ration facilities from garden authority with concessional rate.	No ration facilities in tea garden.	As per as North-east region.
Provident fund	Permanent labourers get	No provident fund	As per as North-east

	provident fund facilities. But casual or other labourers have no provident fund facilities.	facilities.	region.
Festival bonus	Permanent labourers get one month wages equal festival bonus which divided into two festivals.	No fixed festival bonus. Sometimes give share, lunge or others in large garden. But in small growers and holders garden have no festival facilities.	As per as North-east region.
Maternity leave	Permanent women labourers get 4 month maternity leave with wages.	No maternity leave with wages	As per as North-east region.
Leave	14 days leave facilities with wages.	No leave facilities with wages.	As per as North-east region.
Medical facilities	Either medical centre or dispensary facilities for all labourers. But mostly insufficient doctors and medicine supply.	Primary treatment for all labourers in large garden. Small growers and holders' garden have no facilities.	Not sufficient. Crisis of doctors and medicine.
Land ownership	Traditional labourers have no own land ownership. But, recently few respondents try to purchase small block land outside of tea garden.	Labourer have minimum own land for housing. Some of the labourers have own agricultural land.	No land ownership.
Educational facilities	Government or non government educational institutions established in garden area. But no highest educational institutions in garden. Such as- college. Teacher crisis is also prevailing.	Educational opportunity with main stream institutions.	There are no highest educational institutions in garden area. Such as- college. Teacher crisis is also prevailing.

Water	All garden provides water through hand tube well, surface well and deep tube well but not sufficient.	A garden provided water in labour line. On the other hand, other labourers live in locality.	Most of the labourers of different garden face problems for pure drinking water.
Overtime	All labourer get overtime facilities if work.	All labourer get overtime facilities if work.	All most as per North-east regioimen. But some cases get more overtime wages than North-east region due to the labourer crisis.
Plucking system	Hand plucking practices the labourer from generation to generation. More or less all labourers have concept about plucking system.	Hand plucking practices large garden the labourer but most of the small holders and growers garden labourer practices course plucking.	Traditional labourer involves in plucking system but some cases general labourer involve in plucking.
Working freedom	Bounded to work in tea garden. Recently changing this trend with small scale.	Not bounded to work in tea garden. The labourers can work everywhere.	As same as North-east region. But the trend is changing with a small scale. Such as- motorcycle driving as commercial transport by paying fair in the locality.
Involvement in tea garden	Traditionally involve in tea garden work.	Involvement in tea garden depends on self willingness.	Traditionally involve in tea garden work.
Living habit	Habituated to live in tea garden.	Not habituated to live in tea garden.	Habituated to live in tea garden.

Chapter-11

Discussion and Analysis at Consumer Level

11.0 Introduction

The purpose of this chapter is to explore the countrywide tea drinking behaviour of the consumer. For this, a questionnaire survey was conducted to explore the tea drinking behaviour. It is reportedly known that the tea consumption market is very wide in Bangladesh. The people started drinking tea from very early ages and many of the people take tea several times a day. As a result, tea economy plays an important role to the national economy. It is very much important to know the respondents' characteristics, how much monthly expenditure for tea consumption purpose and contribution to the national economy and what will be the future trend of the tea economy. To investigate these points in the study also investigated which beverage will be the future competitor of tea. Finally, the study depicted a realistic picture by portraying tea drinking behaviour of different regions of the country. In these perspectives, the sample has been collected from different regions to represent the scenario in the country.

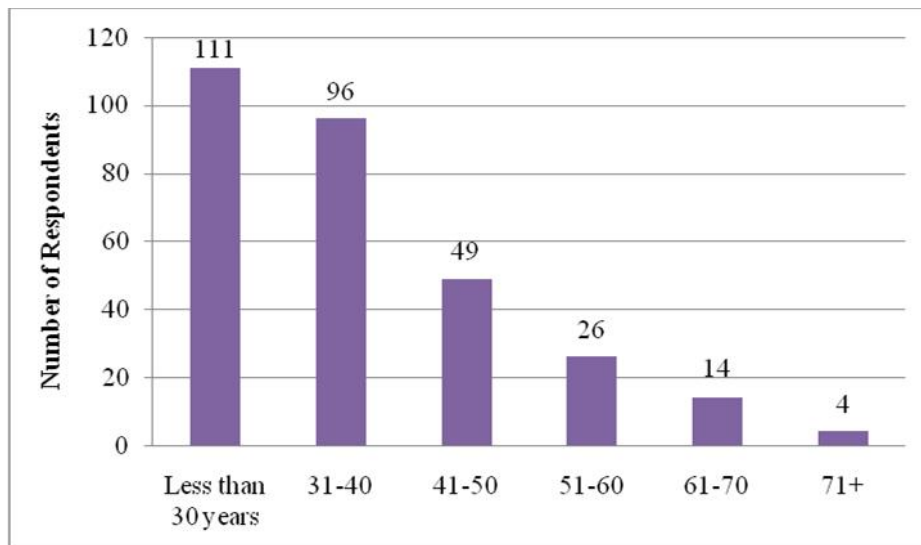
The number of tea drinking respondents was 300. They were selected from four study areas (Map11.1). The sample collected from village unit, upazilla town, district town and divisional town. Data has been collected from each region through purposive random sampling method. There were 75 respondents for each sample unit. The respondents' characteristics and tea drinking behaviour discussed and analysed below.

Map 11.1 : Study Areas at Consumer Level

11.1 Respondents Characteristics (Sex, Age, Education, Occupation)

The study was conducted on both male and female respondents. There were 76 % male and 24% female respondents in the survey. To serve the purpose, data has been collected from different ages of the respondents. Age of the respondents is an important factor of tea drinking habit. Figure 11.1 show that 37% of the respondents were less than 30 years in ages. 32% of the respondents were 31-40 years and over 16% of the respondents within 41-50 years. 13% of the respondents were above than 61 years those who known as senior citizen. The age distribution of the respondents is shown in the following Figure 11.1.

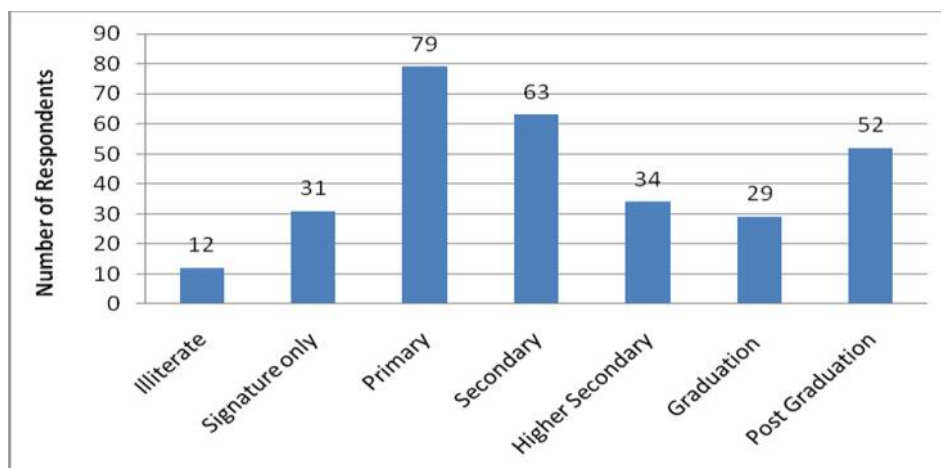
Figure 11.1: Age Distribution of the Respondents



Source: Field Survey 2015

Education: The level of education is a contributory factor of social status. Figure 11.2 shows the interviewers educational background. It is quite evident that 26.33% of the respondents completed primary education. As the Figure depicts, among the respondents 21% have completed secondary education. According to the obtained data, 10.33% of the respondents have higher secondary education and nearly 10 percent respondents completed graduation degree. Around 17 percent of the respondents have post graduation. There were 10.33% of the respondents can sign only and over 4 percent respondents totally illiterate.

Figure 11.2: Education Level of the Respondents



Source: Field Survey 2015

Occupation: The respondents of the study area were involved in different occupation. There was also diversity of the occupation. Table 11.1 shows that 16% respondents were involved in business. Nearly 16% of the respondents were day labourer. Among the respondents, 15% were government service holder and 13% worked in private sector. Survey reveals that 10.33% of the respondents were housewife and 3% self employed. Some 8.33% of the respondents were students and 8.67% of the respondents were involved in teaching. Only about 4 percent of the respondents were unemployed in the sample.

Table-11.1: Occupation Pattern of the Respondents

Occupation	Number of Respondents	Percentage
Private Service	39	13.00
Govt. Service	45	15.00
Teaching	26	8.67
Day Labourer	47	15.67
Housewife	31	10.33
Business	48	16.00
Student	25	8.33
Transport Worker	17	5.67
Self Employed	9	3.00
Others	13	4.33

Source: Field Survey 2015

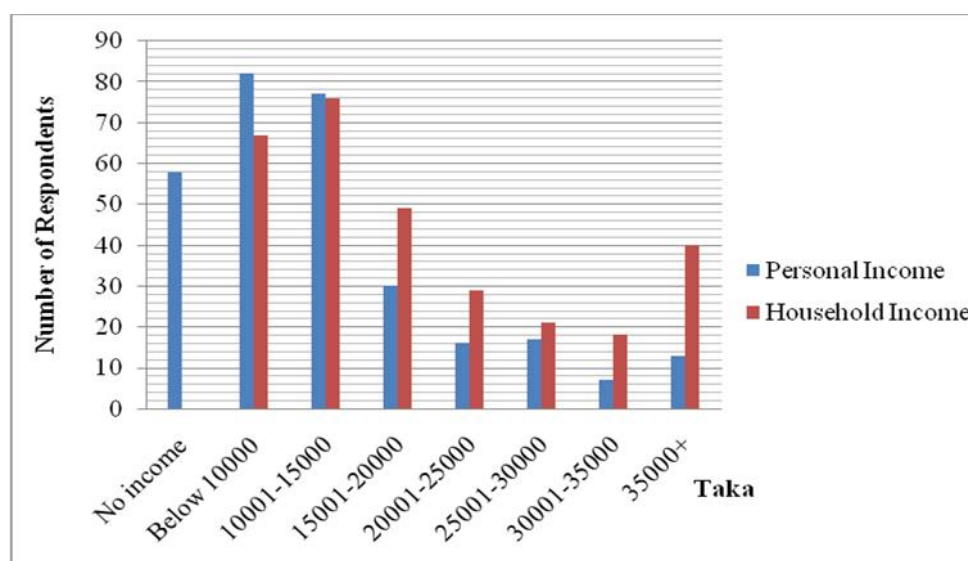
11.2 Personal and Household Income of the Respondents

Monthly personal and household income is considered important indicator to realize the social structure. To know the economic structure, both personal and household income included in the questionnaire. According to the field study, nearly one fifth of the respondents in the sample received monthly income taka. 10001 to 15000. Figure 11.3 shows that maximum respondent's monthly income less than Taka 10,000 where 25.67% respondents personal income between the ranges of taka 10001-15000. And 10% of the respondents' monthly income taka 15001-20000 and only 4.33 percent respondents

monthly income above than taka 35000. Among the respondents 19.33% have no personal income. They depend on family's income. They are mostly student, housewife or old in age. According to the study, those who live in city or town, they work in various organization both government and non-government or businessman and their monthly income comparatively more than the respondents of rural areas.

On the other hand, to know the household income of the respondents besides personal income is an important indicator of social structure. For this purposes, the respondents asked about their household income. Though it is a sensitive issue, the respondents willingly told their monthly household average income. It was found in the study that monthly household income of the respondents varies on source of income, the number of earning member and the diversified occupational sectors. Figure 11.3 shows that the household income of the respondents more than their personal income. To the obtained data, 22.33% of the respondents' household monthly income is less than Tk 10,000 and 25.33% of the respondents' household monthly income within Tk 10001-15000. The Figure 11.3 shows that over 13% of the respondents' household income is above than Tk 35,000. It was found that household income of city area is more than rural area.

Figure 11.3: Comparison of Personal and Household Income (In Taka)



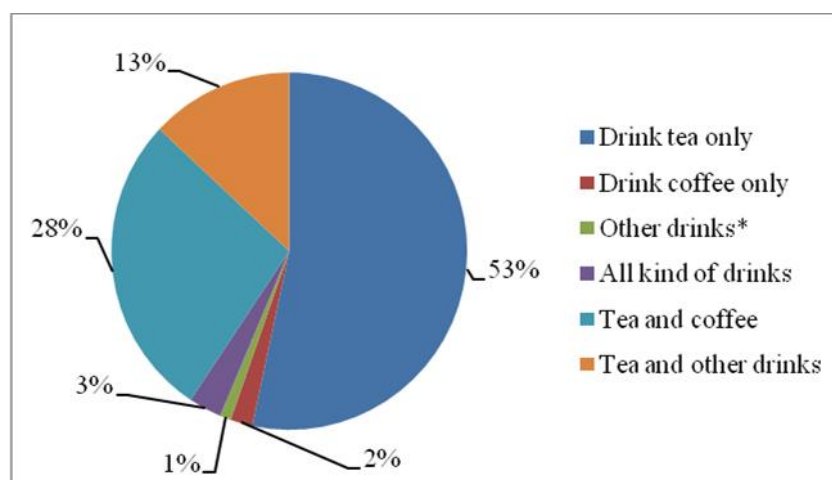
Source: Field Survey 2015

According to the above Figure 11.3, it was found that a large number of the household living standard below than others due to the insufficiency of income. Most of the villager's depend on daily wages. They work hard from morning to evening to fulfill their fundamental demands like food, cloth, medicine, education etc. Mostly the household income of upazilla or district or divisional level respondents is more than village level. According to the obtained data, there are all income group respondents in the study. At the same time, economic discrimination also prevailed in the divisional household respondents with others.

11.3 Choice of Drinks

It is commonly known that tea is very popular and common beverage in the world. It is also common beverage in Bangladesh. According to the field survey, 97 percent of the respondents take tea and other drinks. Most of the respondents (53.33%) drink only tea. They never take other kind of drinks or beverage in their life. All kinds of drink take only 3% of the respondents. Both tea and coffee drink 27.67% of the respondents and 2% respondents take only coffee. Both tea and other drinks take only 13% respondents and only 1% respondents drink other drinks like coca cola, 7up, Sprite, Mirinda etc.

Figure 11.4: Choice of Drinks of the Respondents (N=291)



*Other drinks=Coca Cola, 7up, Sprite, Mirinda, Tiger etc.

Source: Field Survey 2015

According to the obtained data, respondents of village unit have little habit about coffee. Most of the respondents of the village never heard the name of coffee. But the respondents of upazilla or district level more or less heard the name of coffee and a number of them take it. On the other hand, the respondents of the divisional town know about coffee and a modest number of them sometimes take it. Coffee is not as much popular as tea but the trend has been changing gradually. Besides these, tea is available all over the country. It is mentionable that coffee drinking habit is also related to the household income and social culture.

11.4 Whether All Family Members Drink Tea at Home

Table 11.2 present the distribution of family members tea drinking pattern. According to the field survey, 81% of the respondents' family members drink tea regularly. Sometimes take tea 8.67% of the family members and occasionally take only 1.33% respondents' family members. The Table shows that all family members of 9% respondents do not take tea. So, according to the field survey, tea is a common beverage of all respondents' family. There is no restriction to take tea which influences the tea consumption trend.

Table 11.2: Whether All Family Members Drink Tea at Home

All Member Take Tea	Number of Respondents	Percentage
Regular	243	81.00
Sometimes	26	8.67
Occasionally	4	1.33
No	27	9.00
Total	300	100.00

Source: Field Survey 2015

11.5 Whether Women Members of the Family Takes Tea

Tea drinking habit of women member of the respondents' family is near to the male member. Table 11.3 shows that 75.67% of the respondents' women family members

drink tea regularly. 15% of the respondents' women family members drink tea sometimes and 2.33% occasionally drink tea. Only 7% of the respondents' women family members never take tea.

Table 11.3 : Whether Women Members of the Family Takes Tea

All Women Member Take Tea	Number of Respondents	Percentage
Regular	227	75.67
Sometimes	45	15.00
Occasionally	7	2.33
No	21	7.00
Total	300	100.00

Source: Field Survey 2015

The above statistics shows that tea is popular not only to the male but also to the female members. There is no social discrimination between male and female about tea drinking habit. The social pattern has been changing and women are getting equal rights.

11.6 Whether Serve Tea for Guest

The people of Bangladesh have reputation for hospitality. If guests come at home it is common feature to give them tea with light snacks. According to the obtained data from the field survey, 95.33% of the respondents serve tea if guest come at home. Among the respondents, 3% serve tea sometimes and only 1.67% respondents never offer tea to the guest. It seems from the obtained data, the ratio of the respondents who never serve tea to the guest is very low. The study reveals that tea drinking habit is not only a family tradition but also a part of social culture. It seems from the obtained data, all classes of respondents take it as social culture.

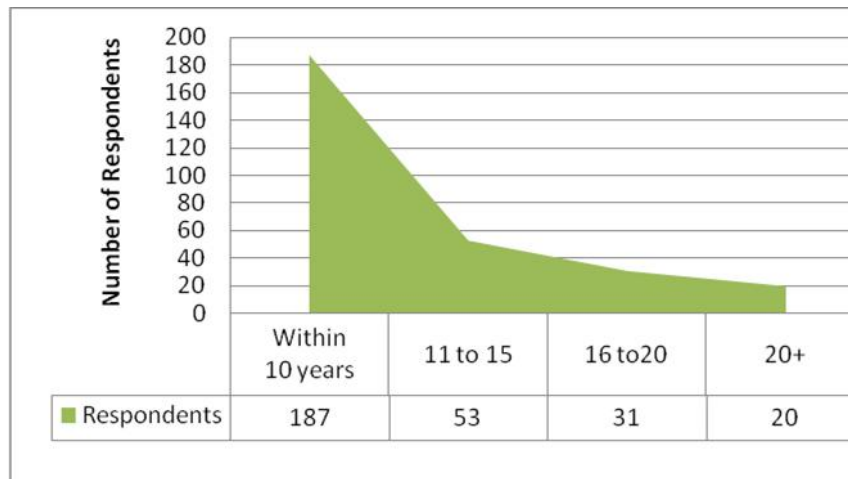
11.7 Starting Age for Drinking Tea

Tea is a common type of beverage where age is not an important factor. From the obtained data, it is remarkable and astonishing that 64.26% of the respondents started tea

drinking at the age within 10 years. Most of the respondents first take tea with family members as just only as a beverage. After this tea drinking practices turned into regular habit. 18.21% of the respondents tea drinking started at the age of 11 to 15 years. Among the respondents, 10.66% tea drinking started at the age of 16 to 20 years. Only 6.87% respondents tea drinking started at the age after 20 years.

According to the obtained data, tea drinking average ages of the respondents only 12 years. The respondents of the village unit tea drinking started very early than other sample unit. The respondents of the village have limited scope to drink other beverage. At the same time, the guardians of the respondents give their children to drink tea just only curiously.

Figure 11.5: Starting Age for Drinking Tea (N=291)



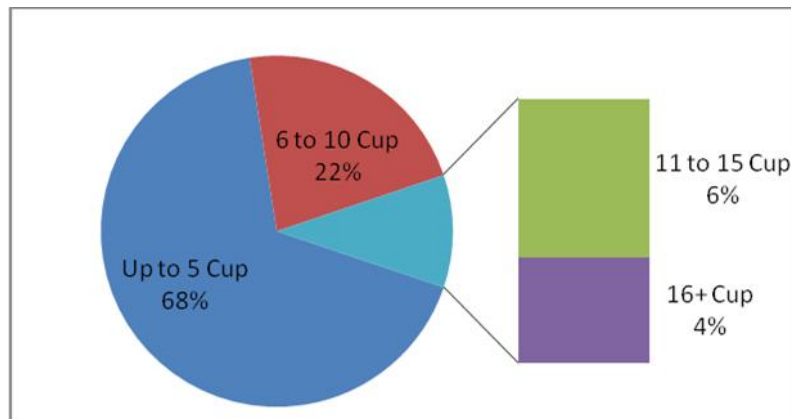
Source: Field Survey 2015

In addition, age and cultural background are also important factors that have been found influencing tea drinking motivations in this study. The respondents drink tea for reasons of delaying sleeping time, following cultural traditions, interests in tea culture and family tradition. This information could be implied in tea marketing whereby drinkers need not only good taste and energy but also cultural elements in tea drinking.

11.8 Number of Cups of Tea Takes per Day

Most of the respondents had tea up to 5 cups per day. While more than 22% tea drinks 6 to 10 cups per day. Above 6% of the respondents drink tea range within 11 to 15 cups per day. On the other side, more than 4% tea drinkers had tea more than 16 cups which almost is unbelievable.

Figure 11.6: Number of Cups of Tea Takes per Day (N=291)



* Per Person Average Tea Drink =6 Cup/per day

Source: Field Survey 2015

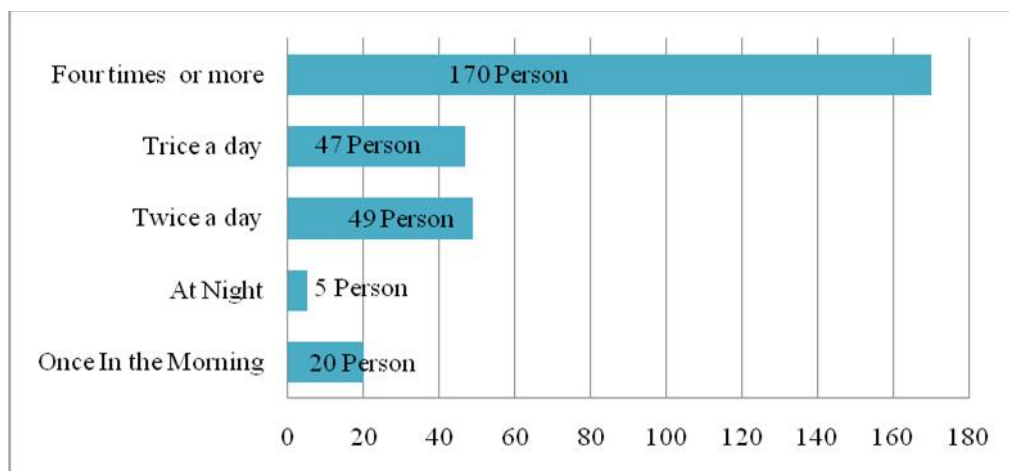
During the field survey it was observed that the respondents who are transport worker, day labourer, grocery shopper, self employed or same related profession they drink tea more than other categories professionals. These types of tea drinker have no fixed time-Table to take tea. But the housewife, student, senior citizen, serviceman more or less maintain the tea taking time.

11.9 Frequency of Taking Tea per Day

According to the study, most of the respondents (58.42%) take tea four or more times per day. There are some respondents who take tea more than 10 times per day and they known as chain tea drinker. As the same time, who drink more than four times they don't have any fixed times. But the major time of these types tea drinker is in the morning, noon, afternoon, night. They take tea at the time of gossiping with others or at any time from morning to late night. 16.15% of the respondents take tea thrice a day. They drink

tea usually in the morning, afternoon and noon or at night. At the same numbers tea drinker take tea twice a day. They usually take it in the morning and afternoon. Only 6.53% of the respondents take tea once in the morning. They usually take tea after their breakfast in the morning.

Figure 11.7: Frequency of Taking Tea per Day (N=291)



Source: Field Survey 2015

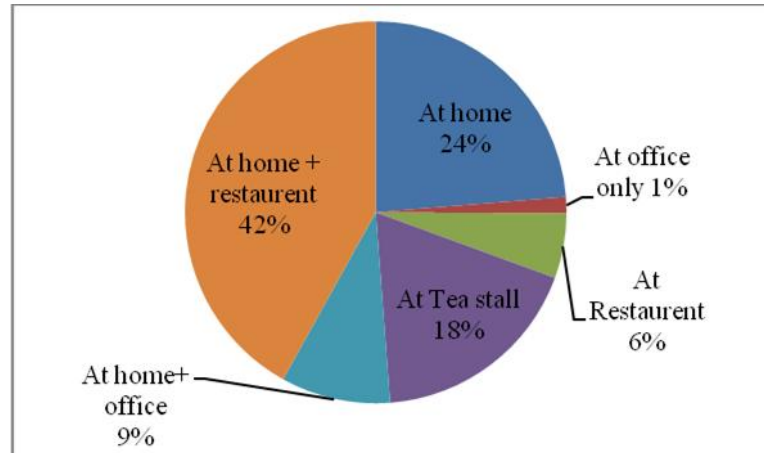
To the obtained data, those who take tea upto three times a day, they more or less maintain the tea drinking time. But who are chain tea drinker they have no fixed but the prime time of tea taking are morning, noon, afternoon, evening, night and late night.

11.10 Places Where the Respondents Take Tea

Tea is available at all places all over the country. So, everyone can take it everywhere they fell. Figure 11.8 shows that most of the respondents had tea at home and restaurants. On the other hand, a large number of respondents take tea (24%) at tea stalls or restaurants. They don't take tea at home because most of the time spent outside of home. They go to the working place early in the morning and come back at late night and some respondents stay in bachelor mess where no scope to drink tea. 24% respondents take tea at home, they are mostly housewife or students or old in age or unemployed. 9%

respondents take tea at home and office, only 1% respondents take tea at offices just as formalities.

Figure 11.8: Places Where the Respondents Take Tea (N=291)



Source: Field Survey 2015

To analysis the above data it is found that 75% of the respondents take tea commonly at on home with other places.

11.11 Location Preference for Liking Tea

The respondents take tea different places. But the taste of all places tea is not equal. As a result, most of the respondents like only homemade tea. According to the study 62.20% of the respondents think that homemade tea is better than other places. 20.27% of the respondents like most to take tea both at home and restaurant. Among the respondents, 19% like to take tea at restaurant and 8.93% respondents like to take tea all above the mentioned locations. Only 1.37% of the respondents like tea at office who never takes tea at other places. They take it just only official formalities.

According to the Table 11.4, it is clear that most of the respondents like to take homemade tea because sufficient tea, sugar and milk mixed with tea. At the same time, boil the tea more or less appropriate time at homemade tea.

Table 11.4: Location Preference for Liking Tea (N=291)

Location	Number of Respondents	Percentage
Homemade tea	181	62.20
Office made tea	4	1.37
Restaurant tea	18	6.19
Pavement stall's made tea	3	1.03
All the above Mentioned	26	8.93
At Home and Restaurant Tea	59	20.27
Total	291	100.00

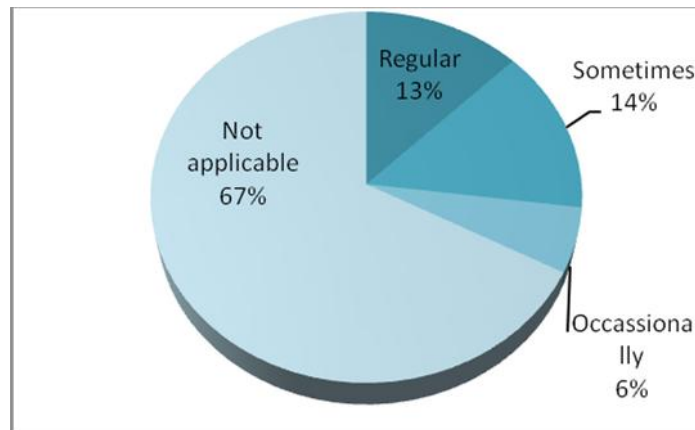
Source: Field Survey 2015

11.12 Comments on the Quality of Bangladeshi Tea

Most of the respondents (84.33%) made comment that our tea quality is good and 12.67% made comment that tea is very good. Only 3% of the respondents who never take tea they had no comments on tea quality. The obtained data shows that most of the respondents were satisfied about our tea quality. During the study it was found an important reason to satisfy that most of the tea drinker didn't habituate to take other countries made tea. The tea gardens of Bangladesh supply sufficient made tea for internal consumption. Besides these, Bangladesh import modest quantity tea from different countries and blended with our home made tea. There is another reason for positive comments on tea quality that the tea drinking behaviour is a common culture in the country. So the drinkers think that our tea quality is good.

11.13 Coffee Drinking Status

Figure 11.9 reveals the coffee drinking status of the respondents. Among the respondents around 13% drink coffee regularly. Around 14 percent respondents take coffee irregularly and 6% of the respondents take occasionally. Around two-thirds of the respondents (67%) do not take coffee.

Figure 11.9: Coffee Drinking Status of the Respondents

Source: Field Survey 2015

The above Figure depicted that coffee is not popular as tea. But the study shows that the coffee drinking trend is increasing day by day. If this trend goes on, coffee will be a competitor of tea. As a result, a large amount of currency will be spent for coffee import which will be affect the national economy and foreign earnings. According to the BCS statistics, in 1991-92 there was 624.55 hectors coffee area under production. But at present, coffee production statistics is not mentionable.

11.14 Coffee Drinking Habit in Years

The market of coffee is not as wide as tea in Bangladesh. But the modernization of living standard coffee drinking pattern is going to be a culture, particularly elite class people practice it. According to the obtained data, only a few numbers of respondents take coffee two decades ago. The Figure shows that only 3.33% respondents started coffee drinking before 21 years. 10% of the respondents started coffee drinking up to 5 years. 6.33% of the respondents introduced to drink coffee between 11 to 15 years ago. Nearly 8 percent respondents take coffee between 6 to 10 years. Actually coffee was at first introduced in the capital or divisional town, then district and upazilla level respectively. Recently coffee drinking practices reached to the rural areas with a small scale.

Table 11.5: Coffee Drinking Habit of the Respondents (In Years)

Coffee Drinking Habit	Number of Respondents	Percentage
Up to 5 years	35	11.67
6 to 10	23	7.67
11 to 15	19	6.33
16 to 20	11	3.67
21+	10	3.33
Not applicable	202	67.33
Total	300	100.00
Average age of coffee drinking habit 9 Years		

Source: Field Survey 2015

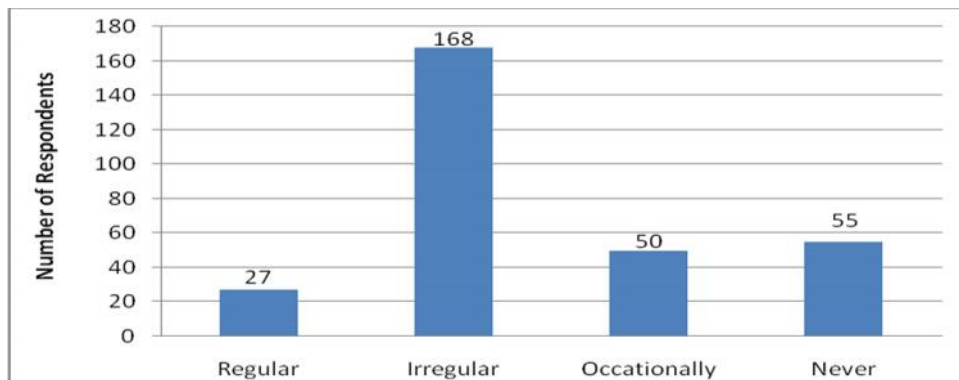
Most of the coffee drinkers do not take coffee regularly. They take it sometimes or occasionally. So, at present coffee is not a strong competitor of tea. But in future coffee will be a competitor of tea. So, we should have needed to take initiative for increasing coffee production.

11.15. Other Beverage Drinking Status

There are other some beverages like coca cola, 7up, sprite, mirinda, tiger which are popular more or less to all ages of people. It is noteworthy that young generation usually takes it with friends and this trend increasing day by day. According to the study, only 9% of the respondents drink coffee regularly. 56% of the respondents take coffee sometimes. Nearly 17 percent take it occasionally such as religious festival or after taking rich foods. And around 18 percent of the respondents never take it in their life.

Figure 11.10 reveals that other beverage is more popular than coffee. A portion of the respondents take it for digesting food. And young generations take it to maintain their social status and enjoy it. The above Figure depicted the tea drinking trend will be influenced by the other beverage. These beverages will be taking a possession of tea market.

Figure 11.10: Other Beverage Drinking Behaviour

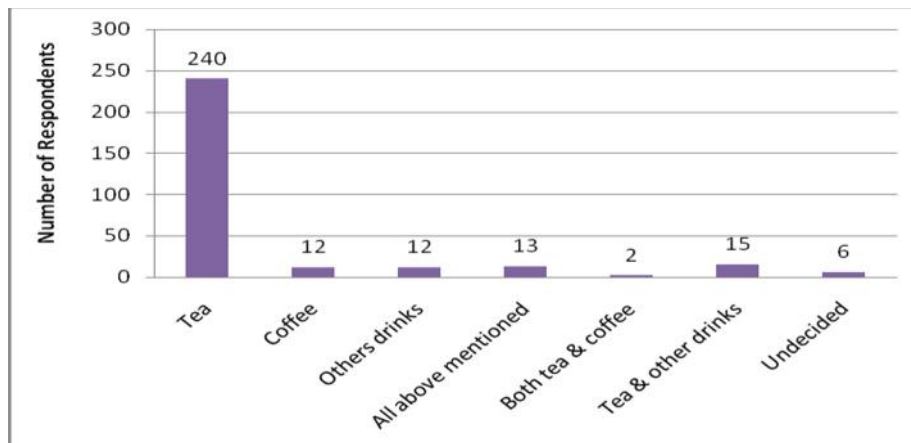


Source: Field Survey 2015

11.16 Which Drinks the Respondent Likes Most

Although there are a number of beverages such as tea, coffee, coca cola, 7up, sprite, mirinda, tiger but the respondents of the study area like most tea. From the obtained data, 80% of the respondents like most tea. 4% of the respondents like most coffee and the same number respondents like most other drinks such as coca cola, 7 up, mirinda, sprite etc. Basically the young generation likes other drink. Around 4% of the respondents like tea, coffee and other drinks. According to the obtained data, those who involve in various jobs they more or less like all kind of drinks. They take these types of beverage both at home or office. Both tea and coffee like most less than one percent of the respondents. 2% of the respondents are undecided which drink they like most.

Figure 11.11: Which Drinks the Respondent Likes Most

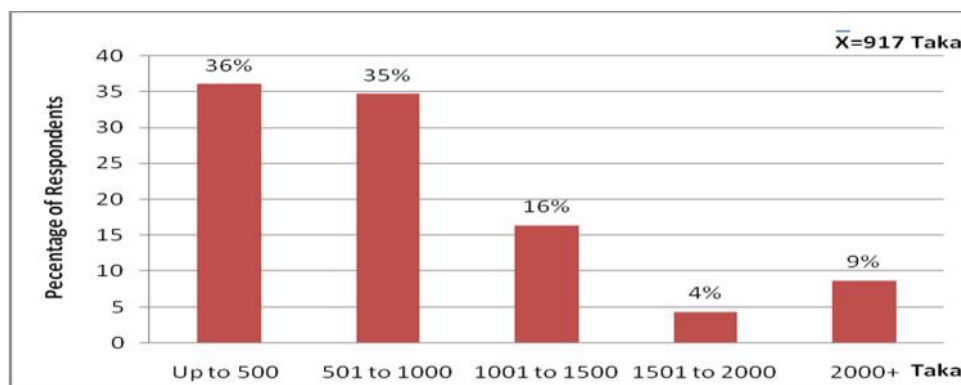


Source: Field Survey 2015

11.17. Household Monthly Average Cost of Tea Consumption

To explore the countrywide tea purposes expenditure is an important indicator to know the industry potentialities. It is an important finding that household tea purposes expenditure shows the national scenario. According to the field study, 36% of the respondents' household expenditure for tea purposes upto 500 taka/month. Nearly 35% of the respondents' household tea purposes monthly expenditure range between 501 to 1000 taka. Among the respondents' 16.33 percent household spend taka 1001 to 1500 monthly. Around 9% of the respondents' household monthly cost more than 2000 taka. It is needed to mention that transport workers monthly tea consumption expenditure is high than others.

Figure 11.12: Household Monthly Average Cost of Tea Consumption



*Monthly household tea consumption average expenditure 917 Taka.

Source: Field Survey 2015

11.18 Probable National Annual Expenditure on Tea

Figure 11.12 shows that household tea purpose monthly average expenditure Tk 917. If we multiply household tea purpose monthly expenditure by 12 months of a year, the expenditure stands-

According to the field study,

Household tea consumption monthly expenditure = 917 taka

∴ Household tea consumption yearly expenditure = 917×12

= 11,004 taka.

So, household tea consumption yearly expenditure 11,004 taka.

According to the census 2011 there are 3,21,74,000 household in Bangladesh. If we multiply the frequency of household by average household yearly tea consumption expenditure 11,004 taka, then we find that

Household tea consumption yearly expenditure = 11,004 taka

$$\begin{aligned}\therefore \text{Countrywide Household tea consumption yearly expenditure} &= 11,004 \times 3,21,74,000 \\ &= 354042,696,000 \text{ taka.}\end{aligned}$$

Or 35,404 crore or 354,040 million taka.

So, the countrywide probable tea consumption average expenditure 35,404 crore or 354,040 million taka.

According to the Bangladesh Arthanitik Samikha (2015), in 2014-15 fiscal year total GDP was 15,13,600 crore taka. Now we calculate the percentage of tea expenditure of GDP.

According to the obtained data,

$$\begin{aligned}15,13,600 \text{ crore taka} &= 100\% \\ \therefore 1 \text{ taka} &= \frac{100}{15,13,600} \\ \therefore 35,404 \text{ crore taka} &= \frac{100 \times 35404}{15,13,600} \\ &= 2.33\%\end{aligned}$$

So, tea consumption purpose probable expenditure 2.33% of total GDP.

According to BTB, if this consumption trend goes on, internal tea consumption demand will be reached at 110 million kg in 2041.

Chapter-12

Summary of Findings

Introduction

Tea is a common beverage of the people of all ages in Bangladesh. It has been developed an agro-based and export oriented industry over the last 160 years. Tea industry has an economic significance for the country. The industry employs more than 133 thousand people. Tea gardens of the three regions supply tea for the internal consumption market and provide a small quantity of it for export. Although, Bangladesh was one of the major tea exporters before 1990s. Tea export is now gradually decreasing in the country. In this regard, the present research was conducted on tea industry of Bangladesh. The broad objective of this research is to study the tea industry in Bangladesh in its totality. There are five specific objectives of the study. These were developed on the basis of major goals of the study. The study explores the present scenario of tea industry in Bangladesh. In tea industry, there are number of crucial factors involved in the overall production system which are related to the tea garden management. This research finds out the acute scenario and factors at various levels of production.

The research is based on a conceptual framework is developed on the basis of major goals. The conceptual framework considers tea industry clusters of economic activities elaborately described as to how the industry runs and supply chain works the smoothness of the industry functioning. Concept of tea garden was described as the structure of tea industry in Bangladesh. The production concept identified factors in the production system. The regional pattern identified the tea produced regions and their physical and

social characteristics. The regional variation established among the three regions were also depicted and analysed.

Chapter -2

In this chapter, tea industry related various researches were. The key points of the reviewed literature are factors affecting tea production, component of tea quality, tea plantation labourer, educational obstacles at garden, tea industry cluster and supply chain, tea culture and tea drinking behaviour of consumers.

The studies show that age of tea plant, chemical component of green leaf, labourer, physical and climatic factors, plantations methods also affected on production. On the other hand, the quality of tea is determined on its grading, colour etc. The labourer who are directly involve in plantation, their economic life and living standard is poor than other labourers. The education level of the labourers and their children is very low and this has been considered as barrier to the development of tea garden.

The tea drinking habit of consumers is also a part of culture. There are both hot and cold drink culture in the world. The demographic and motivational factories also influences on tea culture and behaviour.

Chapter 3

Research methodology have been analysed in this chapter. This is an empirical study comprises data from primary and secondary sources. The secondary data have been collected from public documents, research report, published materials, official documents, unpublished thesis and other documents. And the primary data have been collected at garden level of three tea producing regions. These are North-east region, South-east region and North-western region. Primary data collected from the management level through indepth interviews to explore the management pattern and factors at garden level. The sample of the management level was selected through purposive stratified

random sampling method. At the same time, questionnaire survey conducted on the labourers who are directly involved in production. The sample of the labourer selected through Guilford and Fruecher's theory. On the other hand, questionnaire survey also conducted on the consumers who are the forward linkage of the industry. The consumer level respondents were selected by using purposive random sampling method.

Finally, the collected data were arranged in tabular form and also shows graphiccaly. In the study, qualitative data were used with limited quantitative data analysis. The obtained data were analysed with the help of different statistical methods.

Chapter 4

The evolution of tea plantation is a long history. Chinese legend Shen Nung discovered tea in 2737 BC (Sana, 1989). The first written reference found in a poem entitled "The lament of the Discarded Wife" in the 5th century. In 600s, Chinese character Cha meanings teas come into use. In the 8th century tea spread as a common beverage in China. After China, Japan is one of the oldest tea producing countries in the world. The first tea seeds were brought by a priest within 805 to 806s by Kukai in Japan. The tea ceremony of Japan was introduced in the 15th century.

In Indian sub continent, Robert Bruce was found the wild tea in Assam in 1923. Assam is the biggest producer of quality tea in India. Darjeeling was started tea plantation in 1841 which is famous for its quality in the world. Sri Lanka is another quality tea producer first started tea plantation in 1860. Kenya was first introduced tea in 1903 and at present one of the dominating tea exporting country in the world. However, the evolution and history of tea plantation in the world is continuing from few hundred years.

On the other hand, the evolution and history of tea plantation in Bangladesh is contemporary with the Indian tea plantation history. The first experimental tea plantation started was in Chittagong of South-east region in 1840. But commercial tea plantation

started in 1857 at Malnicherra in Sylhet of North-east region. After 150 years tea plantation has started in Panchagarh district of North-western region in Bangladesh. The labourers who are working in North-east and South-east region brought from India. The culture, socio-economic life of the labourer is different from other people of the country. They live in the labour line of tea garden from generation to generation. On the other hand, the labourer of North-western region is new in this profession and their culture and socio-economic life is same as other labourers of the locality.

Chapter 5

Bangladesh is formed by a delta and its alluvial soil is highly fertile for agricultural production. However, the hills of South-east and North-east region are congenial to tea plantation. Besides physiography and topography, climatic factors are also favorable for tea plantation in the hilly areas.

The topography of North-western region is plain but sandy with rocks and rubble underneath. The drainage capacity of this soil is well. The climatic factors determine the success of tea production. Rainfall and temperature play a significant role in the growth and production. Tea plantations need an average rainfall of 287 inches a year. But the rainfall variation is seen in the tea regions of the country. Such as Chittagong region get average rainfall 187 inches in 2014 which is double than 2003. As a result, Chittagong region has better per hector yield from 928 kg to 1233 kg between the compare year 2003 and 2014.

Tea is cultivated best in temperatures ranging between 12.7°C to 28°C. Photosynthesis and respiration of plants are influenced by temperature. Temperature becomes highest in April and May. After November to February, diminishes the temperature gradually in the country. At Srimangal, an important area of tea production, have average minimum temperature was 19°C and maximum 30°C in 2014 which was minimum 19°C and

maximum of 31°C in 2014. The temperature shows that it is almost similar between the compared two years which is congenial for tea production. On the other hand, drought is a natural factor which influences on production. The tea plantation regions get surplus water during rainy season but November to April raised water deficit. As a result, December to February production almost stopped in Bangladesh. Another physical factor, storm and high wind blowing over tea plants increases loss of moisture by evaporation from the leaf may suffer permanent damage. Proper drainage is essential for tea plant because tea plant cannot tolerate water logging. The efficient drainage removes surface and runoff water during excessive rain. Shade tree and tea disease also key influencing factors of tea plantation region.

Labourers and other social factors such as capital, market, transport, plantations methods and materials, governance and industrial policy also influences on tea plantation.

Chepter-6

There are more than forty tea producing countries in the world. India, China, Sri-Lanka, Kenya, Indonesia, Japan and Bangladesh are the dominant tea producing countries. China is the largest tea producing country in the world. But Kenya is the first in export. China belongs 55% of the tea land and India 15%, Sri Lanka 5% where Bangladesh has only 2%. China produced 39% of the total production in the world, while India produced 23%, Sri Lanka 7%, Indonesia 3%, Turkey 3%, Vietnam 3%, Japan 2%, Bangladesh 1% and other countries produced 19%. It is remarkable that China expanded both tea area and production, more than double within last fifteen years. But yield per hecter in China only 751 kg in 2013 where in Argentina, yield was 2338 kg/hecter, Kenya 2106 kg/hecter, Uganda 2039 kg/hecter, India 1690 kg/hecter, Sri Lanka 1684 kg/hecter and Bangladesh is only 1325 kg/hecter. At the same time, China is the highest green tea producer where Bangladesh produce only 0.2 million kg in 2014.

There are consumption variations in the world per person. During the period of 2012-14, per capita tea consumption of Turkish people was 6.87 kg where Bangladesh consumes only 0.4 kg, India 0.69 kg, Sri Lanka 0.52 kg, Kenya 0.47 kg and China 0.82 kg. Among the tea exporting countries, Kenya is first in position where Bangladesh held 10th in position. On the other hand, Asian countries are the highest quantity of tea importer in the world. Bangladesh is also included in the tea importer countries.

However, China, India, Kenya, Sri Lanka dominates in the tea export market in the global context. Cylon tea of Sri Lanka and Darjeeling of India is famous brand for quality and flavour. They sell their tea using their own brand, where Bangladesh cannot make her own brand to get access to the global market.

Chapter 7

Variation of Tea Garden, Total Area and Tea Area: The distribution of tea garden is not similar in three regions. North-east region belongs to 134 Large tea gardens; South-east region 23 and North-western region contain 9 large gardens. Beside large gardens, North-western region belong to 291 small growers and holders. At the same time, total area and tea area of North-east region is more than those other two regions. In the North-east region, the total area is 98027.24 hectares and tea area 514195.68 hectares. In South-east region, total area is 15636.63 hectares while tea area is 6599.92 hectares. North-western region belong to 2049 hectares in total with 1513.83 hectares tea area.

Variation of Tea Land Source: There are similarities of tea garden land source between North-east and South-east region. But the large tea garden of North-western region established by purchasing from the locality. At the same time, small gardens of North-western region planted on own land or family's land or purchased land. The lease of land of North-east and South-east region were taken given for various tenures such as 95 years, 40 years, 35 years, 30 years, 20 years and 5 years.

Variation of Produced Tea: Among the three tea producing region, North-east and South-east region produced mostly black tea and some produce green tea. On the other hand, the North-western region produced both black and green tea and one garden produces organic tea. This is an international brand namely 'Teatulia'.

Production and Yield Variation: Among the three regions, North-east region produces the highest quantity of tea. In 2014, North-east region produced 55.77 million kg out of total 63.86 million kg. The South-east region produced 6.65 million kg and North-western region produced only 1.44 million kg.

In terms of per hector yield, North-east and South-east region performed almost equal in 2014. Per hector yield of these two regions was 1238 kg in 2014. But there was large difference of yield between the two regions in 2003. In this year per hector yield of North-east region was 1321 kg and South-east region was only 971 kg/hector. Among the two regions, production capacity of South-east region is gradually increasing while North-east region. At the same time, per hector yield is increased in North-western region is still lagging behind. In 2003, per hector yield was only 300 kg which was reached 952 kg in 2014.

It is to be mentioned that management wise variation yield exists in tea industries. In 2003, the yields of sterling companies were 1543 kg/hector which was reached at 1224 kg/hector in 2014. The management of Finlay Companies has been changed from sterling companies to Bangladeshi companies. The yield of Bangladeshi companies and proprietors was 1064 kg/hector in 2003 which was reached 1241 kg/hector in 2014. According to the obtained data, per hector yield of Finlay was 1598 kg in 2014 which is the highest. The lowest yield was found in the government owned company National Tea Company was only 941kg/ hector.

Variation in production was found at district level of three regions. Per hector yield is the highest in Chittagong district and the lowest in Rangamati. The tea garden of Chittagong was produced 1261 kg/hector while Rangamati produced only 267 kg/hector in 2014.

Performance Variation at Different Ages Plant: The production performance of different ages' of plants exists. According to the obtained data, the performance of matured tea is highest of all ages' plant. The performance of matured tea (11-40 years) was 1758 kg/hector which is 839 kg/hector of old tea plant (41-60 years) in 2003. And the performance of very old tea (above 60 years) was only 505 kg/hector, young tea (4-10 years) yield per hector was 1169 kg.

Variation of Consumption: Tea consumption is increasing rapidly in Bangladesh. In 1960, the internal tea consumption was increased to only 3.13 million kg which was 5.78 million kg on the Independence of Bangladesh. In 1980, internal consumption was 9.06 million kg. After 1990s, internal consumption rapidly increased. In 1990, internal consumption was only 18.1 million kg which was reached more than double in 2000. In 2000, tea consumption was 38.7 million kg which increases up to 2014. At present, per capita tea consumption is 0.4 Kg.

Chapter 8

The tea industry clusters depict how tea these run functionally and supply chain shows the smoothness of such clusters. The study reveals that there are five stages of supply chain in tea industry. Firstly, some backward linkage factors which is essential for producing raw materials. The factors are physical factors, labourers and some other social factors. Labourers play significant role in raw material production. After that, collecting and transportation of green leaf and send it to the factory for finished product. Next, procesing the green leaves in factory. After that, grading and packaging made tea in the factory. Finally, send the made tea for auction in Chittagong.

On the other hand, in tea industry clusters there are some backward and forward linkages, institutions, associations, governance, transport and acute factors of garden management. The backward linkages are physical factors, labourer, green leaf, fertilizer, pesticides, irrigation, capital, machineries and spare parts, factory, packaging and warehouse. Bangladesh tea board is the mother institutions of tea industry. The main function of BTB is to regulate, control and promote tea plantation. BTRI is the research wing of BTB which introduced BT-1 to BT-18 high yield varieties.

Management training centre auction and brokerhouse, financial institutions, export promotion bureau and ministry of commerce, ministry of land, ministry of labour and manpower, ministry of agriculture and ministry of finance are involve in this industry. So, there are multi institutions involve which makes it functions complex. At the same time, there are a number of bargaining associations in tea industry. Such as Bangladesh Tea Association, Bangladesh Cha Sramik Union, Small Tea Growers Association, Tea Traders Association and Bangladesh Tea Estate Staff Association operates their function to run the industry. At garden level, there are many acute factors in plantation which maintain the management authority. Transport use for carrying green leaf and other materials from one place to another. But sometimes, tea industry faces transport problem which is affected on tea quality. At the same time, gas and electricity needed at factory. But this industry has frequently face gas and electricity crisis. As a result, the authority use farness oil which is affect tea quality and mechineries. Finally, the industry infuneced by the government policies and strategies. Bangladesh has a large local consumption market as well as global market.

Chepter 9

At garden level there are many acute factors for proper plantation which are maintained by the management authorities. This chapter reveals that how the acute factors influence

on tea production and industry. The management authorities of the large and small garden were selected for this. Among the respondents, there are assistant manager to general manager of large garden and small growers & holders of small garden.

Most of the large gardens respondents (57.14%) completed post graduation. But the small gardens respondents (34%) concentrated at higher secondary. The average working experience of large garden respondents are 22 years where small garden respondents only 7 years. The participation of training/courses/diploma programme is found not satisfactory. Study shows that, 94% of large garden respondents participated in training or courses. Among them, only 27% respondents get 2 years diploma on tea plantation management. Rest of the respondents participated at different short course or training. Only 15% respondents participated on training or short courses abroad. On the other hand, only 60% small garden respondents participated at short course or training programme although they are new in tea plantation.

Among the studied large garden, the tea area is concentrated from 101 to 500 hectores land. Small gardens concentrated within 2 hectores. The land of large garden of South-east and North-east region is on lease land from the government. But the large garden of North-western region is on purchased. Small garden established on self source or families or purchesd. Most of the respondents both large and small gardens mentioned that they did not face any problems for lease or purchasing process.

Loan Borrowing Situation: Most of the studied large gardens borrowed loan for garden management. But most of the respondents did not take any loan. They hardly fell to borrow loan for their garden.

Soil Characteristics: At garden level some soil related problems prevailing which is affecting production. Such as more sandy, land slide/erosion, shortage or high of PH, shortage of MOP/Nutrition's etc. Both the large and small garden, majority of the garden

is sandy and sandy loam. The tea soil requires PH value 4.5 to 5.8. According to the obtained data, 68% large garden have standard value of soil PH where only 5% small garden tested soil. Most of the old tea soils are acidic due to continuously application of ammonium sulphate. This would create imbalance and affect on the growth of plant and yield.

Labour Availability: The distribution of labourers is not equal among the tea producing region. As a result, 40% of the large garden and 45% of small garden do not get enough labourers for their garden. For this situation, the large garden respondents identified influence of city, mobile phone technology, working scope outside of garden. The small garden respondents mentioned seasonal variation and influence of city or town responsible for labourer crisis. On the other hand, most of the large gardens (57.14%) get sufficient skilled labourer. But the small gardens face more crisis of skilled labourer.

Nature of Tea Plant: The large garden use both seed and clone plant in their garden. The ratio of seeds and plant varies from garden to garden. On the other hand, almost all the small gardens use clone plant except only 2%. Almost all the large garden have own nursery but only 10% small garden have own nursery. 54% large garden use 21 to 25 inches plant and 51% small garden use 10 to 15 inches plant. At the same time, most of the large garden use 9 to 15 months aged plant. Both the large and small garden respondents mentioned that clone plant is better for production in their garden. But the sustainability of clone plant is less than seed plant.

Fertilizer and Pesticides: Fertilizer and pesticides are essential components of tea plantation. Fertilizer is used for the growth of foliage. 57.14% of the respondents of large garden use fertilizer as BTRI rules. Rest of the respondents mentioned as their own or company policies. Fertilizer and pesticides are mostly available but quality is a factor. A number of the respondents both large and small garden mentioned that sometimes they do

not get quality fertilizer and pesticides. The tea garden of North-western region, fertilizer purchase from the open market but the large garden of North-east and South-east region purchase it through BCS. The respondents of large garden (49%), use fertilizer three time a year where small gardens use more the 4 times to 10 times. So, unplanned fertilizer uses decrease the fertility of soil and destroy the useful insects.

Pest and Weeds Control: Mostly of the large and small garden control the tea pest using chemical methods except a large garden in North-western region which is known as organic tea. Around 9% of the large garden use partiality bio-pesticides. On the other hand, the large garden control weeds both manually and chemically. Small gardens use only chemical methods.

Sufficiency of Shading, Irrigation and Drainage: Most of the large garden respondents' (96%) have sufficient shading system. On the other hand, 55% small gardens have proper shading but 26% have no concept about this. The lacking of rainfall has covered by irrigations in tea garden. In these perspectives, 43% large garden respondents mentioned that they have sufficient irrigation and 46% have not sufficient irrigation. So, irrigation is a major problem which affect on per hector yield. On the other hand, 16% small gardens have no sufficient irrigation. At the same time, 71% large garden respondents have proper drainage system and 6.90% have moderately drainage system in their garden. 88% small garden respondents mentioned that they have proper drainage system.

Foliar Using Trend: Foliar is the combination of various fertilizers which is spray on green leaf before plucking for rapid growth. The unplanned use of foliar is harmful for health which is contains chemical. According to the study, 94% large garden respondents use foliar mostly September to December for rapid growth of green leaf. On the other hand, 95% small garden respondents use foliar all the year before plucking green leaf.

Number of Green Leaf Pluck at a Time and Interval: Number of green leaf is one of the major components of tea quantity. About 97% of the large garden respondents complete a round within 10 days. But 62% small garden respondents complete a round from 31 to 50 days and 22% respondents have no concept about this. If the plucking interval or round do not maintain the quality of made tea must be hampered.

Made Tea Carrying Time and Cost: Made tea carrying time and cost depends on distance from factory to warehouse of Chittagong. It is found that most of the large garden respondents carry the made within 15 hours from factory to warehouse. 34% respondents needed 16 to 25 hours. The studied gardens which are situated in North-western region they have needed more time than North-east and South-east region. The carrying cost of all respondents who have factory with the ranges of 1.5 to 2.6+ taka/kg.

Machinery and Spare Parts: Most of the large garden respondents mentioned that the machinery and spare parts of factory is available and reasonable in price. The small gardens have no own factory. So, they have no concept about this.

Expanded or Reduced Tea Area: Most of the large garden (94%) expanded their tea area and 6% reduced than expanded. On the other hand, 76% small garden expanded tea area and 2% reduced instead of expansion. 22% have no changes their tea area. Most of the large and small garden have plan to expansion of tea area which is increases production.

Findings at Labourer Level

Tea industry is commonly known as labour intensive industry. Their living standard and working environment considered as important issues for a long time. Although the labourers of North-east and South-east region work in tea garden more than 160 years, they have little changed their living standard lastly few years. The changes of the

countrywide economic development influenced the economic life of the labourer of North-east and South-east region. On the other hand the labourer of North-western region involve in tea plantation just only 16 years ago. The local people of North-western region involve in plantation. So, their living standard is same as other labourers of the locality. There are more than 133 thousand labourer involve in tea industry. At the same time, around 665 thousand people depend on this industry for their livelihood (BTB, 2015).

Demographic Characteristics: The study shows that the male-female ratio of the respondents' household is 51.49:49.51 where the national ratio 50:50. So, there are almost similarities between the male-female ratio at national level and study area. On the other hand, respondents' household size is nearly equal to the national size. The respondents' household average size is 4.6 person where national household size 4.44 (BBS, 2013). According to the findings, most of the respondents' household (70%) consisted with 3 to 5 person. There are very few joint family found in the study area. It is remarkable that the literacy rate of household member is more than national literacy. The national literacy rate is 62.3%, where the respondents' household members' literacy rate is 75% (7+years). But the higher educational level of the respondents' household members is very frustated. It is very much difficult for the labourers to continue their child's education due to the economic insolvency, lacking of sufficient institutions and teachers, unconsciousness and other related factors.

Involvement in Economic Activities: The involvement of respondents' household members in economic activities is 68% (15+ years). Although 32% labour forces of the respondents' household members is not involve in work. Among 32%, most of them are housewife who are not want to work in tea garden or no need to work and also some students who are studying at different classes. The field study shows that the household members work in tea garden and some of them work outside of tea garden. The study also

reveals that those who are involve in work among them, 85% household members work in tea garden and 15% work outside of garden. This is the major changes of traditional labourer of North-east and South-east region to involvement in work outside of tea garden. The study found that a number of the labourers do not want to keep their life bounded in tea garden. They want to changes their forefathers' profession where they work from generation to generation.

Involvement Trend in Tea garden: The study reveals that 43% respondents' household has single involvement in tea garden and 17% of the respondents' household has 3 to 5 person involvement in tea garden. It is very alarming that the involvement trend of household members in tea garden is low than requirements. As a result, some large garden face labourer crisis during pick season. In future, if this trend goes on, tea industry will face serious labourer crisis and will be create deficit between the demand and supply.

Household Economic Life: The economic life of the labourers mostly depends on the income of tea garden. The study reveals that a number of the respondents' household income is not only limited in tea garden. They also earn from the outside of tea garden. The wages/salary of the labourer is less than other agricultural or industrial labourer. A permanent labourer of North-east and South-east region gets only 1980 to 2070 taka/month on basis on garden category. But the labourers get some other fringe facilities such as-housing, ration, provident fund, festival bonus, medical services etc. On the other hand, a labourer of North-western region gets wages 3500 to 5500 taka/month on the basis of garden category. It is needed to mention that the wages of small garden labourer varies on different crop season.

The labourers of North-east and South-east region have some other source of income such as agricultural land, transport work and handicraft, cow or goat, poultry etc. The respondents' household monthly average income from different sources only 7,907 taka.

According to the obtained data from the field survey, in tea sector per capita income is only 20,627 taka a year where national per capita income was 1,02,026 taka in 2014-15 fiscal year (Bangladesh Arthanaitik Samikkha, 2015).

Productivity of Labourer: It is mentionable that the distribution of per hector average labourer was 1.92 in 1970 which stood 1.68 in 2010 (BCS 1982 and 2010-2011). After 40 years, the productivity of the labourer changed a little. Although, the country has been developed in every sector such as technology, economy and also increased capacity of tea research activities.

Experience of Other Job: The study found that 82% of the respondents have no experience working other job. Those who have experience in working with other job they are mostly live in North-western region and worked as day labourer or other related work. The study also reveals that 4.7% respondents work after present tea garden job and sometimes work 3.6% respondents of the study area. The trend of work after present job is increasing gradually. If this trend goes on, the labourer must be feels more interest to work outside of tea garden to bring their professional multiplicity.

Nature of Employment: The employment pattern of the respondents is permanent (71%), 16% daily basis, 11% casual and 1% seasonal. The labourer of North-east and South-east region is mostly permanent. There is a large number of daily and seasonal labourers work in tea garden of North-western region. Recently, some of the garden of North-east and South-east region including daily basis labourer from outside due to the labourer shortage. In tea garden, working hour more or less followed by the labour law. If the labourers work more than 8 hours, they mostly get overtime wages. 27.6% respondents regularly work overtime and sometimes work 36.72% respondents.

Level of Satisfaction: The wages or salary of the labourer is lower than other industrial or agricultural sector. The study shows that 66% of the respondents are not satisfied with

their wages/salary. As a result, an unsatisfactory situation is prevailing in tea garden which affected productivity of the labourer. It was found that some of the respondents interested to work outside of tea garden due to the high wages.

Training Status: The study also reveals the training receiving situation of the labourers. It is known that proper training makes a labourer more productive than others. But the training giving and receiving situation in tea garden is very frustrated. Only 3% of the respondents received training at different categories. But there are many related issues to provide training such as planting methods, plucking procedure, health, sanitation, Childcare, maternity health etc.

Communication and Mobile Phone Using Scenario: The communication level of the labourer with other gardens labourer is increasing gradually. It is mentionable that 49% of the respondents have regular communication with other gardens labourer. Their unity is very much strong due to the communication other related factors. They also abide by the order of the garden authority. Among the respondents, 83% have own or familys' mobile phone. But 17% have no own or familys' mobile phone.

Awareness about Labour Law: About half (51%) of the respondents know that labour law is prevailing for them but no concept about law. 49% of the respondents never heard the name of Labour Law. So, they are not conscious about this. They only work in garden and get wages.

Finally, Most of the labourers (70%) of the respondents mentioned they face various problems in tea garden. The major problems are low wages, housing, insufficient ration, water, sanitation, medical services, education, early marriage, deficiency of nutrition, firewood, roads communication, alcohol or drug, law and order situation etc. Their desire and earnest appeal to the authority to solve this problem. They also want the development of garden, increases production and economic solvency of the least developed tea garden.

The findings depicted the respondents' household demographic characteristics, living standard, working experience both inside and outside of garden, involvement trend in tea garden, changing forefathers' profession trend, labour law implementations situation, level of satisfaction, awareness of labour law and training status. The study also depicted the problems directly from the respondents which is the labourers face in tea garden and collected the valuable opinion for the development of tea garden.

Chapter 11

The field study reveals that Bangladeshi people take tea as common beverage like other people of Indian Sub-Continent. The study at consumer level of 4 regions which situated at different part of the country depicted the probable tea drinking behaviour scenario of the whole country. According to the study, tea industry takes a place of large market and economic position in the country.

The study shows that the respondents' tea drinking average age only 12 years in the country. There is no restriction of taking tea among all classes of people both men and women. But the number of cups of tea taking trend of women member of a family is less than men. Tea drinking habit is not only family culture but also it turned into social culture. Most of the people serve tea to the guest at home. The findings shows that number of 6 cups tea take per day by the respondents. Among the respondents, a number of them take tea more than water that are known as chain tea drinker. After tea, 13% of the respondents take coffee regularly. Here is mentionable that 67% of the respondents never take coffee. Besides tea, other beverage like sprite, coca cola, mirinda, tiger etc. drinking trend is also increasing day by day.

This study also reveals that the people of Bangladesh expend every year around 354,040 million taka for tea consumption. This economic dynamic influences the national

economy and plays an important role. At the same time, tea has a big global market where Bangladesh can compete. So the prospect of tea industry is very glorious.

Chapter-13

Conclusion and Policy Implecations

Tea industry of Bangladesh is gradually going to fulfill of its target by increasing yield and production although facing a numerous limitations. To compete in the global and local market, Bangladesh is needed to raise production of low price and high quality tea to meet the increasing demand and to increase tea export. Beside these, proper economic use of tea land and market oriented policy to make the tea industry again export oriented.

Objectives 1: Evolution and the history of tea plantations in the world are very old and historically significant as a beverage. Chinese Legend Shen Nung discovered tea in 2737 BC. In 600s, Chinese word C'ha meanings teas come into use. After China, Japan is one of the oldest tea produceing countries in the world.

In the Indian Sub-continent, Robert Bruce was found the wild tea in Assam in 1823. In Bangladesh the first experimental tea plantation was started in Chittagong of South-east region in 1840 where the present Chittagong Club is situated. But for commercial purposes, tea plantation has been started at Malnicherra in Sylhet of North-east region in 1857. After 150 years, tea plantation started in Panchagarh of North-western region in 2000.

The labourers who are working in North-east and South-east region brought from different States of India. Their culture, socio-economic life is different from other people of the country. They live in the labour line of tea garden from generation to generation. On the other hand, the labourer of North-western region is new in this profession and their culture and socio-economic life is the same as other labourers of the locality.

Objective 2: In the tea industry, there are numerous key factors both physical and social which influence on tea production. There are variations in the physical and social factors by various tea producing regions. The tea garden of North-east and South-east region is

situated in the hilly area. But the tea garden of North-western region is situated in the plain land which is known as Himalayas piedmont plains. The topography of tea land of North-east and South-east region is tillah, high tillah and low flat. On the other hand, the topography of North-western region is plain but sandy with rocks and rubble underneath. The soil of North-western region is well drained and free from normal flood.

There is also rainfall, temperature variations of three tea producing regions.

Tea industry is apparently known as labour intensive industry in Bangladesh. Among the social factors, capital, planning, methods and materials, transport, market and marketing system, utility services (gas, electricity) influence on tea plantation in different regions in Bangladesh. The study reveals the differences of social factors between traditional and new gardens of three regions.

Objective 3: The research reveals that the temporal variation of growth and production of tea from 1960 to 2014. There is difference of distribution of tea gardens between the traditional garden of North-east and South-east region although plantation was started at the contemporary period. North-east region belongs to 134 tea gardens; South-east region to 23 gardens and North-western region have 9 gardens. Beside large garden, North-western region belong 291 small gardens.

Among the three tea producing region, North-east and South-east region produced mostly black tea and a small quantity of green tea. On the other hand, the North-western region produced both black and green tea but a garden produced organic tea which makes an international brand namely 'Teatulia'.

Among the three regions North-east region produced highest quantity of tea. In 2014, North-east region produced 55.77 million kg tea out of 63.86 million kg where South-east region produced 6.65 million kg and North-western region produced 1.44 million kg. On the other hand, per hector yield was almost equal in 2014 between North-east and South-

east region. Per hector yield of these two regions was 1238 kg in 2014. But there was large difference of yield between two regions in 2003. In this year yield per hector of North-east region was 1321 kg and South-east region was only 971 kg/hector. Between the two regions the performance of South-east region is increasing gradually than North-east region. At the same time, per hector yield is increased in North-western region. In 2003, per hector yield was only 300 kg which was reached 952 kg in 2014.

Objective 4: In tea industry cluster, there are some backward and forward linkages, institutions, associations, governance, transport and acute factors at garden management. The backward linkages are physical factors, labourer, green leaf, fertilizer, pesticides, irrigation, capital, machineries and spare parts, factory, packaging and warehouse. The study found that among the factors of cluster, sometimes the system of the cluster do not work properly. Such as- gas and electricity needed at factory for processing raw materials. But this industry has frequently face gas and electricity crisis. As a result, they authority use farness oil which is affected tea quality and machineries. Finally the industry influenced by the government policies and strategies.

Objective 5: Supply Chain of tea industry shows the functioning of the industry cluster. The supply chain reveals that there are a number of problems prevailing the in growth and production. According to the findings of primary and secondary data, tea industry in Bangladesh has been facing numerous problems Old age of tea bushes, lack of quality at the processing level, re-plantation less than mandatory expansion, insufficiency of productivity both land and labourer, lack of high yield varieties, shortage of skill hands, old machinery and technology, insufficiency of factories, unplanned use of chemical fertilizer and pesticides, lacking of quality pesticides, unchecked pests, disease and organic matter of soil, shade tree vacancies, inadequate planting materials, misuse of tea plantation land, dissatisfaction of labourer, imbalance distribution of labourer, various

disease of tea plant, poor transport system of link road, marketing system, lacking of training both management and labourer level, proper management, political unrest, climate change, man-made hazard are the important factors facing tea industry. Besides these, large consumption market is also an important challenge for tea industry.

Policy Implication

1. As a part of institutional arrangement must be developed regional offices and logistic supports with expert scientists and officials. Ensure intensive research for high yield varieties with climatic adaptation capacity and GIS with other technology based based research. At the same time, capacity building and creating awareness for management level people and training programmes labourers should be conducted regularly for enhancement of knowledge. Employers must create social congenial environment in the work place.
2. To make brand like Srimangal tea, Sylhet tea or Maulvibazar tea or Panchagar tea. Kazi & kazi tea estate already introduced a new brand “Tentulia” which is very popular in the United States of America.
3. Apply proper plantation method and ensure tea quality by monitoring concern institutions. Rough plucking of green leaves to avoid for quality green leaf.
4. Replacement of old machineries and increases modern technology and communication. Initiatives for ensuring capital for tea industry and also preserving special facilities for small growers and holders.
5. Establish an auction centre in North-east region or e-auction and take initiative to establish purchase centre like sugarcane for small growers and holders in North-western region.
6. Tea import control by increasing import duty. Besides this, ensure quality of import tea, intensive monitoring and also discourage import.
7. Law and order situation must be improved in tea garden.

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বাংলাদেশ চা গবেষণা ইনস্টিটিউট।

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মোহান্ত, রসময় (২০০৮) *evsj vf' fki Pv : w#f' I k#g*, বর্নমাউথ : শুয়েব আহমদ শওকতি।

Photographs



Tea garden of hilly area



Tea garden of plain land



A small tea garden



Trough house of a garden



Spraying water in tea garden



Mixing fertilizer in a garden



Women labourer work in a nursery



Women labourer taking rest after giving green leaf



Power house of a factory



General godown



A day care centre



Food grain store room



Ration giving to the labourer



Labourer in front of their home



look after the nursery



Labourer working in a garden



Labourer giving green leaf which they pluck



A couple of labourer



A religious institution



A primary school of a garden area



A primary school of a garden



Labourer working in a nursery



Mixing fertilize in a garden



Women labourer plucking green leaf



Newly established a labour line with sufficient space in North-east region



A new labour line in North-western region



A labourer house in North-east region



Tea processing in factory



Loading made tea for auction



Store made tea at godown in factory



Withering green leaf in a factory



Processing tea in a factory



A stream for irrigation



A labourer house



A paddy land in a tea garden



A replantation area of a garden



Labourer of a small garden



Laboure is working in a small garden



A tea garden in North-western region



A deep tubel well for water supply



A women labourer is working for plant



Green leaf loading on vehicle



Loading made tea for auction



New mechninery in a factory

16. If yes, from where you tested & specify the Ph of soil?
.....
17. How many labours are working in your garden?
Permanent labours...MaleFemale.....& Casual.....MaleFemale
18. Have you got enough labour for your garden?
.....
19. Is there any crisis of skilled labour for your garden?
.....
20. What types of tea plant used in your garden?
Seed Plant Clone Plant Hybrid Plant All of them Don't know
21. What is the ratio of seed or clone plant of used in your garden? Please specify.
..... and Percent.
22. From where you collect tea plant?
.....
23. Have you got enough seed/plant easily in proper time for your garden?
.....
24. What types of seed/Plant is better in quality for more production in your garden?
.....
25. How many inches plant used in your garden for plantation?
.....Inches.
26. What ages plant use in your garden for plantation?
..... Months.
27. In your garden do you use fertilizer?
.....
28. If yes, What types of fertilizer use in your garden?
.....
29. Do you get enough fertilizer for your garden in proper time?
.....
30. Do you get enough organic fertilizer like cow dung or compost for your garden?
.....
31. Do you get enough pesticides for your garden in proper time?
.....
32. If problems, what are the ways to supply enough fertilizer or pesticides in proper time? Please specify.

-
.....
33. How much fertilizer or pesticides you need per hector?
.....
34. When fertilizer or pesticides need to be used of the garden?
.....
35. How you control pests of your garden?
.....
36. How do you control the weeds of your garden?
Mechanically Chemically by Weeding AnotherMethod.....
37. Do you have enough irrigation system for your garden?
.....
38. Do you think that you have enough drainage facility for your garden?
Yes No Moderately to Some extent Don't know
39. How you maintain the quality of your tea?
.....
40. Do you have proper shade which is very much essential for tea garden?
.....
41. Do you use foliar in your garden?
.....
39. When do you pluck green leaf?
.....
40. How many leaves do you pluck at a time in your garden?
.....
41. What is the plucking round or cycle?
.....
42. Do you maintain proper plucking round in your garden?
.....
43. At what interval you pluck green leaves in your garden?
..... days
44. How you tea leaves carrying from field to factory and who carry it?
.....
45. How much time it takes to carrying made tea from factory to Warehouse/ Auction?
.....hours.

46. What is the Transport cost for per kg/per truck made tea from factory to Warehouse/
Auction?
.....Taka.
47. What types of transport problems face for carrying tea from factory to Warehouse/
Auction?
.....
48. What types of packet use for packing made tea?
Wood cartoon Jute Packet Plastic packet All of them Others.....
49. Have any problem for packaging made tea? If yes, What types of problems?
.....
50. Do you think that the price of machinery or various tools uses in factory or garden are
reasonable in price and available?
.....
51. Whether expanded or reduced the tea area of your garden?
.....
52. What is your future expansion plan?
.....
53. What kind of cooperation you receive from BTB & BTRI or related organization?
.....
.....
54. Do you think that there enough necessary Strategy or Policy for the development of
tea industry? If not enough what is your policy suggestion?
.....
55. What are the main problems of tea industry in Bangladesh?
.....
.....
56. What is your suggestion for the development of tea industry in Bangladesh?
.....

Thank You

Department of Geography and Environment

University of Dhaka

Dhaka-1000.

“A REGIONAL PATTERN OF TEA GARDEN AND TEA PRODUCTION IN BANGLADESH”

Questionnaire for Survey

(Collected data will be use only for Research)

A. Information of the respondent

1. Name of the Respondent:
2. Designation & Name of the Institution :
3. Family’s Information:

Sl.	Name of the Member	Age (Year)	Male	Female	Education	Income Tk.
1.						
2.						
3.						
4.						
5.						
6.						
7.						
Total						

B. For Labourers

4. How many member of your family working in the tea garden?
.....
5. How many years are you working here?
..... years.
6. Have you worked other garden or institution or outside of the garden?
Yes No Sometimes Occasionally Don’t know
7. If yes, How much time and how many days?
.....
8. What is your profession before this profession?
.....
9. What is your service type?
Casual Permanent Daily basis Seasonal
Others.....

10. How much income per month in your family?

Sl.	Source of income	Income(Tk.)
	Cash(salary)	
	Ration	
	Agriculture	
	Rickshaw/Van	
	Handy craft	
	Others	
Total		

11. How much Expenditure per month in your family:

Sl.	Types of expenditure	Expenditure(Tk.)
	Food	
	Cloth	
	Education	
	Health	
	Recreation	
	Others	
Total		

12. How many hours you work per day in the garden?

.....hours.

13. Do you work overtime in the garden?

Yes No Sometimes Occasionally No comment

14. If you work overtime, then how much extra wage get?

.....

15. What types of other benefit except salary get from the garden?

.....

16. Do you work after this job?

Yes No Sometimes Occasionally No comment

17. If yes, What types of work?

.....

18. Are you satisfied the salary/wages getting from the garden?

Yes No Moderately to Some extent No comment

19. Have you got any training?

Yes No Not at all Not sure Don't know

20. If yes, from where are you get training?

.....

21. Have you communication with other garden's labour?

Yes No Sometimes Occasionally No comment

22. Do you know about the Labour Law?

Yes No Not at all Not sure No comment

23. Have any problem for the labours in this garden?

Yes No Not at all Not sure Don't know

24. If yes, what types problem?

.....

25. What is your suggestion for the betterment of the labourer?

.....

.....

26. What is your suggestion for the development of tea garden?

.....

.....

Thank You

Department of Geography and Environment

University of Dhaka
Dhaka-1000.

“A REGIONAL PATTERN OF TEA GARDEN AND TEA PRODUCTION IN BANGLADESH”

Questionnaire for Survey

(Collected data will be use only for Research)

A. Information of the respondent

1. Name of the Respondent:
2. Address:
3. Age:.....Years
4. Sex: Male Female Others.....
5. Educational Qualification:
 Illiterate Literate Primary Secondary
 Higher Secondary Graduation Post Graduation Others.....

B. Tea Consumption Related

6. What kinds of drink you like?
 Tea Coffee Other drinks All of them None
7. Are all the member of your family drink tea at home?
 Yes No Sometimes Occasionally
Others.....
8. What about women member of your family?
 Yes No Sometimes Occasionally
Others.....
9. If guest come at home, do you offer them tea for drink?
 Yes No Sometimes Occasionally Not
 sure
10. At what age you started taking tea?
 Years.
11. How many times you take tea every day?
 times/day
12. When you take tea?
 Morning Noon Afternoon Night All
of them
13. Where you take tea?
 At home At Office At Restaurant All of them No Comment

14. Which tea you like most?

Home made tea	At Office's made tea	Restaurant's made tea
At Pavement stall's made tea	All of them	

15. How much cost per month for drinking tea of your family?

..... Tk.

16. Please, Specify the quality of our made tea?

Very good	Good	Bad	Very bad	No comment
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17. Do you take Coffee?

Yes	No	Sometimes	Occasionally	Others.....
-----	----	-----------	--------------	-------------

18. For how many years you take coffee?

..... Years.

19. Do you drink other drinks like Coca kola, Sprite, 7 UP, Miranda etc?

Yes	No	Sometimes	Occasionally
-----	----	-----------	--------------

Others.....

20. Which you like most?

Tea	Coffee	Other drinks	All of them	Don't know
-----	--------	--------------	-------------	------------

Thank You