CHAPTER–1
INTRODUCTION

1.1 GENERAL INTRODUCTION

Tea is a natural beverage brewed from the leaves of evergreen plant called *camellia sinesis* of the family *Theaceae*. The cultivated tea varieties are mainly of three types: First, The China type (*Thea sinensis*) is a shrub growing up to 1 to 3 metres in height and nearly erect branches arising from the base of the plant at the ground level. Leaves are small, deep green, thick and erect (Mondal and mondal, 2006), Second, The Assam type {*Camellia assamica* (Masters)}, the variety where the plant grows to 10-15 metres and looks like a small tree (Randhawa, 1962). It has a thick distinct trunk, sometimes up to one third of its height and branches are also ramifying with large leaf and, Third is Cambodiensis type (*Camellia Assamica sub sp. Lasiocalyx*) which is a Cambodian variety of ascending main stem reaching a height of 6-8 metres when fully grown. The prominent feature of this plant is the blood-red colouration of the mature leaves in autumn (Paul, 2000).

The word ‘tea’ comes from a Chinese ideogram pronounced ‘Chah’ in Cantonese and ‘tay’ in the dialect of Amoy. The word travelled as ‘Chhti’ to Japan, India, Persia and Russia, but the English ‘tea’ was derived from the ‘tay’ which was brought by the Dutch to Europe by way of Java. In the known references to tea in English during the years 1650–59, the word appears in its earlier form as ‘tee’ but was pronounced ‘tay’. It was first spelled ‘tea’ in 1660 but was pronounced ‘tay’ until the mid 18th century (Britannica, 1969).

Tea bush is grown for its leaves. The crop is usually raised from seed. The seeds are obtained from cross–fertilized seed bushes. Seeds are first planted in nursery beds and later transplanted. Planting system vary with the nature of land. On gentle slopes and flat land, tea is
planted in lines in square or triangular form. On steep slopes and hillsides, planting is done in lines along the contours. The plant thrives well in a humid climate. From climatic point of view, tea is a crop of the tropical region but grows well in the subtropical region also. The best range of mean temperature is below 13\(^{\circ}\) Celsius and temperature above 30\(^{\circ}\) Celsius results in cessation of growth of tea bushes. Temperature influences the rate of photosynthesis and controls the growth and dormancy of tea bushes. There seem to be no upper limit to the amount of rainfall and tea plantation can survive even if it is as high as 6000 mm. However, the lower limit has been reported to be 1200 mm provided the temperature is not high. It has been observed that if the average monthly rainfall is below 5 cm over a period of several months, crop production suffers severely. Tea production is increased under high humidity conditions. Tea can grow well on deep fertile soil. Shallow and compacted sub soils limit root growth and reduce the top growth of bushes. Soil has to be well manured with organic fertilizers. The most suitable lands for planting tea are forestlands or grasslands.

Proper drainage is necessary to facilitate retention of water by soil at the optimum level. The size and number of drains vary with the slope of the land, the nature of the soil and the amount of rainfall. The plants flourish best under tree shade. The wild tea plant can grow up to 30 feet (9.1m) high but in cultivation it is pruned at about 3 to 5 feet (100 -152 cm) (Illustrated World Encyclopedia, 1973). This is partly to make plucking of leaves easier, but mainly to insure a higher number of leaves. The lanceolate leaves are dark green; the blossom is cream coloured and fragrant. Each stem on the bush produces a flush (a full growth of leaves) every 40 days (China type). Indian tea is plucked once every 7 to 14 days because this gives a higher yield of leaves of similar quality (Grounds, 1971). Best quality tea leaves grow at the top of each shoot. The commercial tea belt of the world is largely confined
to the mountains within 42° North and 33° south latitudes (Randhawa, 1962).

China has been credited with the origin of the use of tea as a beverage. A Chinese legend places the introduction of tea as a beverage in the reign of the mythological emperor Shen Nung, about 2700 B.C. However, the earliest mention to which modern scholars give credence is found in the Erh Ya, an ancient Chinese dictionary, about 350 B.C. It is believed that tea cultivation began in the interior of Szechwan in China, gradually extending down the Yangtze valley to the seaboard provinces (Jha and Rizvi, 2006).

Tea cultivation was introduced in Japan around the last decade of the 6th century. The returning Buddhist priest Yeisei brought the first tea seeds to Japan from China. Tea received almost instant imperial sponsorship and spread rapidly from the royal court and monasteries to the other sections of Japanese society. Tea was elevated to an art form resulting in the creation of the Japanese Tea ceremony, which was introduced from China in the 15th century. A special form of architecture (chaseki) developed for ‘tea houses’, based on simple cottages. Slowly information concerning this then unknown beverage began to filter back to Europe. The first European to personally encounter tea and write about it was the Portuguese Jesuit Father Jasper de Cruz in 1560. Later on, Portuguese developed trade route through which they shipped tea to Lisbon, and then Dutch ships transported it to France, Holland and the Baltic countries. Russia discovered tea in 1618 after a Ming emperor of China offered it as a gift to Czar Michael I (Tea council, n.d).

By 1650, the Dutch were actively involved in trade throughout the western world. Peter Stay Vesant brought the tea for the first time to America to the Colonies in the Dutch settlement of New Amsterdam (New York). The Japanese variety of tea was introduced into Java in 1684 by Andreas Cleyer, a German naturalist and doctor of medicine. In
1827 a young Dutch tea taster, J.I.L.L. Jacobson, risked his life to penetrate China’s forbidden tea gardens and bring back tea seeds and labourers in order to cultivate the tea plant in the Dutch East Indies. He is recognized as the founder of Indonesian tea industry (Britannica, 2000).

Tea was first mentioned in European literature in 1559 as Chai catai, (Tea of China) in Navigationi Viaggi (‘Voyages and Travels’) by Gian Battista Rumusio, a noted Venetian author. England was the greatest coffee drinking country in the world when tea was first publicly sold at Oarways Coffee House in London in 1657. Advertised as “That excellent and by all physicians approved China drink”, tea gained popularity, within a few years. Metal or leather trade coins, used in lieu of small change and known as tea or coffee tokens, were generally accepted as currency in London’s 2000 coffee houses. The world’s greatest tea monopoly company - The English East India Company flourished from 1600 to 1858 played a major role in the introduction of China and India tea in England and colonial America and in popularizing the beverage. Before 1834, the United Kingdom was totally dependent on China for the supply of tea. The high demand for tea in Britain caused a huge trade deficit with China. The British set up tea plantations in colonial India to provide their own supply. It was then that the East India Company started search for areas to grow tea in Assam, as an alternate source of supply. They also tried to balance the trade deficit by selling opium to the Chinese, which later led to first opium war in 1838 – 1842. Commercial planting of tea in India began as a result of government policy in 1838. The first commercial effort in organized tea growing was started in 1839, by the Assam Tea Company, under the pioneering effort of George Williamson. Earlier in 1834, a committee was appointed by Governor General Lord William Henry Cavendish Bentinck to formulate a plan for tea cultivation. Major Robert Bruce and an Indian Dewan of Northern India discovered indigenous tea in Upper
Assam in 1823. Tea quickly proved popular enough to replace ale as the national drink of England. Tea import rose from 40,000 pounds in 1699 to an annual average of 2, 40,000 pounds by 1708 (Sharma, 2003).

Until 1834 the British East India Company held a monopoly on import to Great Britain, trading by direct and indirect routes exclusively with China. Only after this monopoly was broken did other tea producing areas mainly Kenya, Sri Lanka, India, Indonesia and Taiwan developed as exporters. Leading importers of tea include the United Kingdom, Australia, Canada, Russia and the Netherlands.

Today most of the world’s population consumes tea in form of black tea whereas green tea is consumed by 20 per cent tea consumers. India is the largest consumer of tea and accounts for 22 per cent of global tea consumption. The annual consumption is estimated to over 700 million kg (Boriah, 2006). The per capita consumption of tea was 0.22 kg/year in 1951 which increased to 0.61 kg/year in 1992-1993 (Sharma, 2003). Asians, especially Japanese and Chinese prefer green tea, that is usually drunk neat. Tea is consumed by more people and in greater quantity than any beverage except water. The flavour of tea is due to volatile oils, its stimulating properties to Caffeine and its astringency to the tannin content (reduced in black tea by the fermentation process) (Jha and Rizvi, 2006).

1.1.1 Global Scenario of Tea

Tea (*Camellia Sinesis*) is a very versatile plant that can grow under varying conditions. Thus, tea is grown around the world including the Indian sub-continent in India, Nepal and Sri Lanka to China, Japan, Indonesia and Vietnam, in the African sub continent in Kenya and in Latin America in Argentina. At present 45 countries grow tea over an area of 2.4 million hectares and the current annual production stands around 3.1 billion kgs. Asian countries produce 90 per cent of the
world’s total output. India and China rank as the first and second largest countries respectively in tea production as well as consumption. Together they account for about half of world's tea production. India accounts for one-fifth of the global tea area with a cultivated area of around 5.12 lakh hectares (Boriah, 2006). The total contribution of India is 927 million kilograms which is 27 per cent of its production. In case of China these figures are 625 million kilograms and 22.57 per cent respectively. China exports about a quarter of their production. In global trade, India’s contribution is 17 per cent while that of China is 17.6 per cent. Other countries like Kenya and Sri Lanka contributes 10 per cent each while the share of Indonesia is 6 per cent of world tea production. These three countries produce only 26 per cent of world tea but control 50 per cent of the global trade due to less internal consumption. They export more than 90 per cent of their production (Boriah, 2006 and Kim, 1998).

In China tea has been cultivated for almost 2000 years. Until the 1880’s, China dominated the global tea trade. Large quantity of tea is produced in many provinces of the country. Its out put for 2004 was close to 800000 tonnes. Chinese tea trade is monopolised and sold by a single organisation - The National Native Produce and Animal By-Products Import and Export Corporation of the People’s Republic of China.

Tea is produced in vast areas of China from Hainan Island down in the extreme south to Shandong province in the north, from Tibet in the southwest to Taiwan across the straits totaling more than 20 provinces. These may be divided into four major areas: (i) The Jian-gnan area which lies south of middle and lower reaches of the Chang Jiang (Yangtze) river and is the most prolific of China’s tea growing areas. Most of its output is the green variety, (ii) The Jiangbei is a large area north of the same river where the average temperature is 2-3°C Celsius less than in the Jiang Nan area, (iii) The southwest area embraces
Sichuan, Yunnan, Guizhou and Tibet producing black, green as well as compressed tea and, (iv) The Lingan area consists of the southern provinces of Guangdong, Guangxi, Fujian and Taiwan and produces oolong tea (China Tea Marketing Association, 2007).

Kenya is world’s third largest producer of black tea after India and Sri Lanka. Country earns more than 20 per cent of its foreign exchange earning from tea exports. The area under tea in Kenya is close to 1,10,220 hectares. The main tea growing area is the Kenyan Highlands, at altitudes between 1600 and 3,000 metres. Kenya is the world’s largest exporter of tea and contributes 21.5 per cent of world’s demand. Kenya account for about 10 per cent of the World’s tea production and commands 21 per cent of all global tea exports. Small-scale planters grow more than 80 per cent of tea while the rest is grown by large-scale producers. Small-scale planters market their produce through Kenya Tea Development Authority (KTDA) that is in charge of collection, processing and selling of processed leaves. Large-scale producers of Kenyan tea include Brooke Bond, George Williamson, Eastern Produce and African Highlands. Unlike small-scale planters, large-scale growers are responsible for processing and marketing of their own crop. The majority of the Kenyan tea production is sold through the Mombassa auction, with Pakistan, the United Kingdom and Egypt being the biggest buyers. Kenya Tea Development Authority and Association of Tea Growers develop and market Kenyan tea worldwide. These organisations’ aims are to promote recognised standards and certification for the industry in general. They have made outstanding contributions to the Kenyan economy through excellence, innovation and quality in exporting overseas. They also provide a market for the 3,14,875 planters who depend on tea growing as a livelihood. Established under an act of parliament (cap. 343) in June 1950 the Tea Board of Kenya licenses tea growers manufacturing and exports (Singhal, 1996).
Sri Lankan tea is known the world over as ‘Ceylon tea’ by the island’s former name. James Taylor, a British planter acknowledged as the pioneer of the islands tea industry, first planted tea for commercial purposes on 19 acres of land on Loole Condera Estate in 1867. Today the total area under tea is 2,21,758 hectares with 76.54 million kg production (2006) and accounts for 25 per cent of the countries export earnings, making it a vital source of revenue for Sri Lanka (Abeykoon, 2007). Currently Sri Lanka ranks as the 3rd largest tea producing country in the world, with a production share of 9 per cent. It is the world’s largest tea exporter and contributes 20 per cent of the world’s demand. The Sri Lankan tea industry is the country’s largest employer providing jobs to over a million people directly and indirectly. Sri Lankan tea has unique characteristics and reputation as the best tea in the world. The ideal climatic conditions of the plantation give the tea a variety of rich flavours and aromas, which indicate high quality. Sri Lanka’s finest tea is produced mainly from bushes that grown above 4000 ft. There are six main tea-producing areas. These are Galle, in the south of the island; Ratnapura about 55 miles east of the capital Colombo; Kandy, the low region near the ancient royal capital; Nowara Eliya, the highest area that produces the finest tea; Dimbuda, west of the central mountains and Ura, located east of Dimbuda. The tea produced in each region has its own individual characteristics of flavour, aroma and colour. Among the major tea producers Sri Lanka ranks as the largest exporter of ‘value added’ tea. The export of fully processed tea in packets and tea bags accounts for 40 per cent of the total export volume. Currently over 60 per cent of Sri Lanka’s total tea export is to the Middle East Gulf region. Around 90 per cent of tea produced in Srilanka is marked through the Colombo Tea Auctions (Abeykoon, 2007).

In Indonesia Dutch settlers established tea plantations on the island of Java in the early 18th century and later in Sumatra and
Sulawesi. The industry went into decline after the 2nd World War. In 1984, Indonesia’s tea industry was revived after decades of isolation. After much effort and investment, tea exports from Indonesia began to make their presence felt in the tea market. Since then, constant improvement and modernisation of tea production and replanting of old estates have continued to this day. Indonesian tea differs from other tea producing countries in respect to location, soil, and the climate where the tea estates are found. Tea is planted in the highlands where volcanic soil and tropical climate are predominant. The main product of this region is the black tea and about 80 per cent of production is exported. Indonesian tea is light and flavoured and most is sold for blending purposes as this translates to excellent financial returns through foreign exchange for the country. The main tea plantation is in West, Central and East Java. To-date, several clones have been invented that are more suitable to the soil, climate and for modern tea processing in Indonesia. Export quality tea is sold mainly through auction in Jakarta. The Joint Marketing Office or Kantor Pemasaran Bersama (KPB) conducts the auction. Nearly 60 per cent of Indonesian tea is green tea. Black tea is mostly exported for blending purposes (Malik, 2007).

**Bangladesh** is a small tea producing country sharing 3 per cent of the world tea production. Tea industry dates back to 1857 when the first tea garden was established at Malinichera in Syllet district. Presently tea is grown in 161 gardens on 51225.65 hectares of land. Annual production currently stands at 56 million kg. Other than the above large producers, there are several countries like Africa, USA, Iran and Tanzania producing tea, mostly in limited quantity.

Tea as a beverage is enjoyed by the more than half of the world’s population. Developing countries (South Asia and East Africa) account for more than 85 per cent of world tea production and exports. Developed countries account for about 62 per cent of world tea imports. The larger importers include the United Kingdom, United States of
America, Netherlands, Australia, Canada, Japan, South Africa, Ireland and the Confederation of independent States (CIS). Historically, tea consumption has been very high in the United Kingdom and Ireland accounting for one third of the world’s tea consumption in 1955. Since 1970 India has become the largest absolute consumer of tea. In 1971 - 72 it accounted for 22 per cent of total world’s consumption, compared with the United Kingdom’s 18 per cent. Presently, India is the largest consumer of tea and accounts for 22 per cent of global tea consumption. The average annual consumption is estimated to be over 700 million kg’s (The Hindu Survey of Indian Agriculture, 2006). Tea popularity has been growing rapidly in developing countries like India, China, Pakistan and the Middle East. Tea consumption is stagnant in developed countries such as United States of America, Canada and Japan.

1.1.2 Indian Scenario of Tea

The credit for creating India’s vast tea empire goes to the Britishers who discovered and cultivated tea in India. In India, the extension of Tea Industry in modern form started between 1818 and 1834 (Sharma, 1984). The Scottish adventurer Robert Bruce, discovered tea plants growing in Assam in the 1820’s. At that time, no one thought that tea grew in India; however Major Bruce discovered tea plants growing wild in the Jungles controlled by the tribals. The British East India Company’s monopoly in China ended in 1832 and it became necessary to find other sources to supply of tea to the English consumers. In 1834, a Tea Committee was appointed by Governor-General, Lord William Henry Cavendish Bentick to investigate the possibility of cultivating tea in India. After through investigation and study of the crop, the first commercial tea ever produced outside China came from Assam in 1839 by Assam Tea Company under the pioneering effort of George Williamson (Assam Directory and Tea Areas Handbook, 1997-98).
Later, commercial tea production was also started in other parts of India which included Darjeeling (1850) and Cachar (1856), Terai (1862) and Doars (1862), followed by rapid growth in the Nilgiris, Travancore - Wynnaad and the Annamalai. Today the tea industry in India is one of the largest in the world with over 13,000 gardens (Anupkumar, 2007). India with production touching 927.98 million kgs in 2005 and accounting for 27.74 per cent of the global tea production is the largest producer of tea in the world (Boriah, 2006). It provides employment to about 1 million workers in tea cultivation and 3 million in its processing, packaging, marketing and trade (Anupkumar, 2007). The total volume of tea produced worldwide in recent years has surpassed 3 billion kgs. with India producing over 927 million kgs. Though both North and South India are engaged in tea production, North India has been the major producing region, contributing to more than 75 per cent of the total production (Veni, 2005). Being an agro-based industry in India it provides a source of development of rural India. Women constitute over 50 per cent of the total workforce. It contributes significantly to nation’s economic well being through employment generation, social welfare and creating better standard of living for the people engaged.

The role played by the tea industry in our national economy is very important. It occupies 3rd position by contributing 8.8 per cent of total agricultural exports. Tea plantations and manufacturing units contribute Rs.1200 crores per annum to the gross national product (GNP) of which 75 per cent comes from tea manufacturing units alone (Pathania et al., 2005). Substantial foreign exchange earning (around Rs.1850 crore) with negligible import content and contribution to the state and central exchequers (around Rs.1000 crores) are the other significant features of the Indian tea industry (Boriah, 2006). Tea production in India reached a figure of 928 million kgs in 2005. In the case of tea yield, it took nearly 60 years to increase the yield by 40 kg/hectare between 1850 and 1910, whereas almost the same level of
increase was achieved during the next 40 years between 1950 and 1990 (Table No. 1.1)

TABLE NO. 1.1
DEVELOPMENT OF TEA INDUSTRY IN INDIA

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TEA AREA (In hectare)</th>
<th>PRODUCTION (In million kgs.)</th>
<th>YIELD (In kg/hectare)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>750</td>
<td>.97</td>
<td>129</td>
</tr>
<tr>
<td>1890</td>
<td>152,000</td>
<td>57</td>
<td>375</td>
</tr>
<tr>
<td>1910</td>
<td>228,062</td>
<td>120</td>
<td>524</td>
</tr>
<tr>
<td>1950</td>
<td>315,656</td>
<td>278</td>
<td>881</td>
</tr>
<tr>
<td>1990</td>
<td>416,269</td>
<td>720</td>
<td>1,731</td>
</tr>
<tr>
<td>1995</td>
<td>427,065</td>
<td>756</td>
<td>1,770</td>
</tr>
<tr>
<td>2000</td>
<td>504,366</td>
<td>846</td>
<td>1,649</td>
</tr>
<tr>
<td>2005</td>
<td>519,000</td>
<td>928</td>
<td>1788</td>
</tr>
</tbody>
</table>


Tea cultivation is done in various states of India. Assam is the largest tea producing state of India. Most of the tea production comes from Dibrugarh, Sibsagar and Darrang districts in the upper Brahamputra valley. Nawgong, Kamrup and Goalpara districts in the lower Brahamputra valley produce less than 5 per cent of total output of the state. In Assam there are 840 tea estates, which produce about 80 million kgs tea. Beside the tea estates there are about 2000 small tea gardens in the state established cultivating tea in some 5,500 hectares of land in the vicinity of large estates, which are and they produce about 50 million kg of green leaf or 10 million kg of made tea. They provide
employment to about 30,000 people. The top Assam tea estates are Mokal Bari, Marangi, Mokali and Sibsaga. The Surma valley in Cachar region of Assam also produces tea but productivity is low. Tea occupies a pivotal position in Assam economy contributing about 12 per cent of its total income (Sharma, 2003). The tea industry in Assam at present is facing number of problems, due to adverse law and order situation, cess on green leaf, irregular power supply, costly bank finances and increasing competition.

Another important state producing tea is West Bengal. Here tea is mainly produced in Darjeeling district and plains, which mainly include the Dooars in Jalpaiguri. The Darjeeling tea, recognized world over as having wonderful flavour is the result of unique microclimate of the region, mist mountains and low temperature throughout the year. The main tea gardens of Darjeeling are spread over in Kurseong North, Kurseong south, Darjeeling east, Darjeeling west, Mirik and Rungbong valley also have well known tea gardens. Other than Darjeeling the Tea Board also included 85 more estates in Kalimpong sub-division, which can use the common Darjeeling logo. Japan and Germany is major buyer of Darjeeling tea (Singhal, 1996).

Tea cultivation was also started recently in the hilly states of Meghalaya, Nagaland and Arunachal Pradesh. In Meghalaya plantation was done in Naya Bunglow, Raongran, Sonapabar, Aizwal, Lunglei and Chhintpul districts. In Sikkim, tea cultivation was first taken up in 1965 at kewzing in south Sikkim. Today one of the finest quality tea is being produced on 555 acres of land at Temi by the industries department (Pal, 2000).

The Southern states of Tamilnadu, Kerala and Karnataka account for a significant share of the tea produced in India accounting for about 18 per cent in terms of area and 25 per cent in terms of output. Tamilnadu accounts for 9.2 per cent of area and 15.2 per cent of all
India production. Kerala accounts for 8.2 per cent of area and 9.2 per cent of production and Karnataka about 0.5 per cent of area and little over 0.5 per cent of production. Commercial cultivation began in south only after 1859. Plantation was initiated in the Nilgiris in Tamilnadu and Wynaad district of Kerala. More than 20,000 small holders grow tea on some 37,000 hectares under cultivation.

TABLE NO.1.2

ANNUAL STATE-WISE PRODUCTION OF TEA

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>STATE</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSAM</td>
<td>399,133</td>
<td>424,864</td>
<td>425,430</td>
<td>462,783</td>
<td>414,129</td>
<td>428,174</td>
</tr>
<tr>
<td>WEST BENGAL</td>
<td>160,305</td>
<td>165,375</td>
<td>169,946</td>
<td>195,704</td>
<td>180,212</td>
<td>180,724</td>
</tr>
<tr>
<td>TRIPURA</td>
<td>5,933</td>
<td>6,657</td>
<td>6,756</td>
<td>6,642</td>
<td>D.N.A</td>
<td>D.N.A</td>
</tr>
<tr>
<td>OTHER STATES</td>
<td>2,602</td>
<td>2,730</td>
<td>2,835</td>
<td>3,901</td>
<td>9,960</td>
<td>10,001</td>
</tr>
<tr>
<td>NORTH INDIA</td>
<td>567,973</td>
<td>599,626</td>
<td>604,967</td>
<td>669,030</td>
<td>604,301</td>
<td>618,899</td>
</tr>
<tr>
<td>TAMIL NADU</td>
<td>116,486</td>
<td>113,755</td>
<td>130,594</td>
<td>125,086</td>
<td>128,088</td>
<td>129,699</td>
</tr>
<tr>
<td>KERALA</td>
<td>64,971</td>
<td>61,962</td>
<td>69,637</td>
<td>70,618</td>
<td>67,796</td>
<td>69,355</td>
</tr>
<tr>
<td>KARNATAKA</td>
<td>4,492</td>
<td>4,691</td>
<td>5,415</td>
<td>5,671</td>
<td>5,427</td>
<td>5,427</td>
</tr>
<tr>
<td>SOUTH INDIA</td>
<td>185,949</td>
<td>180,408</td>
<td>205,646</td>
<td>201,375</td>
<td>201,311</td>
<td>204,481</td>
</tr>
<tr>
<td>TOTAL - INDIA</td>
<td>753,922</td>
<td>780,034</td>
<td>810,613</td>
<td>870,405</td>
<td>805,612</td>
<td>823,380</td>
</tr>
</tbody>
</table>

Sources: Statistical abstract, India, 2002.

Tea Board of India, Kolkata, 2001.

Tea cultivation in Kerala is done on 34,640 hectares of land. But there has been a decrease of 12.6 per cent in area under tea in the
state. The tea productivity levels in Kerala are lower than in Tamilnadu partly because of agronomical factors such as lower bushes, soil erosion, heavy monsoon, periodic drought, frost and retention of low yielding China giant variety. The average yield in Kerala is less than 2000 Kg against 2,300 kg per hectare in Tamilnadu. The Blue Mountains of Nilgiris in the Tamilnadu are famous for Kair betta Estate and Kolipatly Tea Estate. Most of Nilgiris Tea is used for blending.

In Uttarakhand State government is trying to motivate planters in Chamoli, Pauri, Dehradun, Pithoragarh, Nainital, Almora and Kausani to expand and start cultivating tea. The government has set up nurseries in Bering and Chakari in Pithoragarh districts, Bhawali, and Bhimtal in Nainital district, Kausani and Vijaynagar in Almora district and Bhuseti and Gadoli in Pauri district. Training centers also exist in Bhimtal and Nainital. Modern tea processing unit was also started at Champawat by Uttarakhand Tea Development Corporation to promote cultivation and processing of tea in this region. Consultancy services of Council of Scientific and Industrial Research complex at Palampur in Himachal Pradesh are being used to revive its abandoned gardens.

In Himachal Pradesh the Britishers introduced tea in Kangra district because of its ideal climatic and soil conditions. They imported seeds from China and encouraged tea plantation in this region. Nearly 150 years old China hybrid tea plants in the state are now yielding 14,000 kg. Green tea leaves per hectare. Kangra tea won gold medal at an international exhibition in London in 1886. Table No.1.2 show annual state-wise production during years 1995-2000.

1.1.3 Kangra Valley Tea

The production of tea in Himachal Pradesh takes place mainly in Kangra district (Palampur, Baijnath, Kangra and Dharmashala tehsils) while some new plantation has also been done in Mandi district (Jogindernagar tehsil) and Chamba district (Bhatiyat tehsil). Kangra
Valley renowed as the ‘Valley of Gods’ is famous for its scenic beauty and tea gardens. Due to local geographical conditions uniqueness of Kangra tea is different from the tea produced in other parts of India. The Kangra tea prepared from leaves, buds and tender stems of the tea plant, has its unique flavour, colour and taste. The tea industry here is over 150 years old and both green and black variety is not only produced in the factories but also in households at small scale. In the days of Britishers, it used to be exported to England and other parts of Europe, America, Central Asia and Australia. Kangra Tea won gold and silver medals at London and Amsterdam fairs in 1886 and 1895 respectively (Khatta, 2005).

Tea gardens are located between 800 -1600 metres above mean sea level. Below the towering and exquisitely beautiful White Mountain Dhauladhar, tea has been grown on the well -drained medium loam soil on the gentle slopes of the outer Himalayas with annual rainfall varying between 175 cm and 375 cm. In Kangra valley the soils with a pH range of 5 to 6 are most suitable (Pathania, 1984).

Tea was first introduced in Himachal Pradesh way back when Dr. Jameson, the Superintendent of Botanical Garden Peshawar, North West province and Saharanpur visited Kangra district in 1849 and recommended the site of lower slopes of Dhauladhar range lying between 900-1400 metres above mean sea level with annual rainfall of 1500-2500 mm and soil pH below 6.0 as ideally suitable. In the same year, he brought China tea plants from the nurseries at Almora and Dehradun and planted them in three government gardens at Kangra, Nagrota and Bhawarna, located at an elevation of 750, 870 and 960 metres above mean sea level, respectively. The plants performed excellent in growth at two places - Nagrota and Bhawarna, but at Kangra the plants did not thrive owing to high temperature and scarcity of irrigation water. The success at two places encouraged the government to go ahead for establishment of tea industry in the valley.
The first government plantation at commercial scale mainly of China type established as ‘Hailey Nagar Tea Estate’ at Holta in 1852. By the year 1880 many plantations were developed covering an area of 4180 hectares extending from Jogindernagar in Mandi to Shahpur in Kangra district (Sharma, 2000 and Sud and Singh, N.D.).

However, the massive earthquake of 1905 in the Kangra region was a great set back to the flourishing tea industry of the region. The local planters could not maintain their plantations because of lack of technical know-how, poor processing facilities, fragmentation of land holdings and low returns with the result that many plantations were either uprooted or abandoned (Sharma, 1984). The period between 1905 and 1983 was the worst for this important crop. In 1983, establishment of Council of Scientific and Industrial Research (CSIR) complex, presently known as the Institute of Himalayan Bioresource Technology (IHBT) in Palampur helped in rejuvenation of tea industry in the region. A Department of Tea Husbandry and Technology was established with the objective to improve the production as well as the quality of made tea. The Increasing demand for high quality products and competition from leading tea producing countries of the world due to world Trade organization (W.T.O.) agreement has made an intense impact on the growth of the Kangra valley tea industry. For the development the tea industry of this region four co-operative tea factories were established at Palampur, Baijnath, Bir and Sidhbari. But somehow co-operative management system failed in the case. In year 1984 Council of Scientific and Industrial Research (CSIR) and in 1997 with the help of financial assistance from Tea Board surveys of tea was conducted in Kangra valley. Tea factories encouraged the disillusioned tea planters to produce quality tea. Continuous efforts are on by the State Government to sustain the tea cultivation. It can be judged by the recent decision of handing over the Bir Billing and Sidhbari co-operative factories to private parties. The immediate concern of the government is
to strengthen the exciting area under tea cultivation and ensure the smooth running of the factories that are processing the leaves for making Black tea. The processing of green tea is being taken as cottage industry (Chauhan, 2004).

The Council of Scientific and Industrial Research (CSIR) survey show that there are 1660 tea planters cultivating 2063 hectares of land under tea with maximum concentration in Palampur tehsil. As per the survey conducted by the Tea Board of India, tea growers in Palampur, Sidhbari, Baijnath and Bir are cultivating tea on 2,118 hectares spread over four tehsils of Palampur (1256 hectares), Baijnath (564 hectares), Dharamshala (232 hectares) and Kangra (66 hectares) of Kangra district. Jongindernagar tehsil (193 hectares) of Mandi district and Bhatiyat tehsil (01 hectare) of Chamba district also have very limited area under tea cultivation. Most significantly, about 96 per cent of the total tea growers individually have less than 2 hectares accounting for 46.97 per cent of the total area while rest 53.03 per cent of the area is shared by 4 per cent of the tea growers. Only 150 tea growers, constituting 4 per cent of total tea growers (Dhar, 1997) and possessing of 444.9 hectares, are fully dependent on tea for their livelihood while 469.4 and 625 hectares fall under neglected and abandoned category respectively. The average size of tea gardens in the valley is 2.5 hectares, which is much below the national average of about 24 hectares (Pathania, 1984). Himachal Pradesh is having .49 per cent of all India area under tea (Sharma, 2003).

Total production of tea in Kangra region was reported to be 17.11 lakh kg in 1998 as against 5.5 lakh kg during 1980. This industry is earning revenue of about Rs. 9.41 crores per annum besides providing direct and indirect employment to approximately 6000 workers.

Recently initiatives were taken for growing organic tea for the health conscious tea lovers. Plantation has begun on 10 acres in the
first phase and an area of 110 acres has been set aside for further plantation. But it will take nearly 20 years to make tea plantations free from chemical residuals used in the past (Mohan, 2005).

Kangra tea industry is a source of the sustainable development of the region. It provides employment to the local people of this valley. Setting up of the Chaudhary Sarvan kumar Himachal Pradesh Agriculture University, Palampur and Institute of Himalayan Bioresource Technology (IHBT) is a positive step for the development of tea industry. Due to its economic and ecological importance it will continue to get encouragement in the years to come.

1.2. REVIEW OF RELATED LITERATURE

Research in the field of Indian Tea was started as early as in 1891 with an effort of India Tea Association (ITA) and the Agricultural and Horticultural Society of Bengal. The beginning of new era of tea research in India was marked by the establishment of the scientific department of Indian Tea Association in the year 1900. Another landmark was with the setting up of Tocklai experimental station near Jorhat, Assam in 1911. This was followed by the establishment of a scientific department by the United Planter’s association of southern India at Devershala in 1926. Publication of Tea Encyclopedia in year 1946 became a source of quality information on different aspect related with the tea plantation. The formation of Tea Research Association (TRA) in 1964 with Tocklai at the centre of all activities further expanded the horizon of tea research and development in the entire North East India. From these beginnings, Indian tea research has spread to other tea research centres and Universities through the National tea Research foundation. Acting as facilitator for the development of the tea industry in India, the Tea Board has been extending financial support to the research institutes besides maintaining a small research and development centre at Kurseong in Darjeeling (Borah, 2006).
research organizations and individuals have analysed various aspects of tea. Tea studies include those of tea plantations and industry problems, developmental strategies, production trends, Geographical factors, economic analysis, historical aspects, quality status and medicinal value of tea. A brief survey is presented in chronological order.

The maximum numbers of studies are mainly related with the theme tea plantations and problems. National Council of Applied Economic Research (1961) survey of 15 small gardens in North-Eastern India concluded that the poor financial position of tea plantation was due to various factors such as price fluctuations, scarcity of capital, labour etc. Bhoca (1969) emphasised that replacement and replanting of older plantations together with modern methods of tea plantations and tea manufacture are the most important pre requisites for the development of tea industry. Dass (1969) reported that the tea industry in Assam was facing the problem of disorganized transport service and it can prosper only by concentrating on production of quality tea at lower prices and ensuring its cheaper transport. Sahoo (1969) also studied the problems encountered by the tea plantation industry of India and reported that India’s share in world production and export decreased in mid sixties. The increased cost of production due to the wage rise and increasing tax burden made the India tea internationally less competitive. Balasubrmanian (1974) also concluded that ailing tea industry should no doubt be helped to stand on its own feet. Government need to adopt a constructive approach to the problems of excise duty charged at source of production because it becomes part of the cost of production, while the price realised at the auctions are determined by the market which in turn, depend upon the world supply and demand position of tea. Mishra (1983) in his article, Tea industry in
Berinag reported that tea is a declining industry in Berinag area in Uttarakhand and faced problems such as old plantations resulting in lowering the flavour and colour of tea. He suggested the replacement of old tea plants. He further observed that the processing of tea is done by old methods and lack skilled labour for plucking of tea. Later Chattopadhyay (2003) discussed about the current poor condition of Happy Valley Tea Estate near the Darjeeling town. Author stressed upon improving the management of the tea garden and excellent prospects of Happy Valley tea garden being located at an altitude of 1890 metres owing to its high perch, the garden can fully utilize the mountain mist, which has a great effect on the pollen of the plants.

An article, Kangra tea estates gasping for survival (2004), reported about the poor conditions of Kangra’s tea estates. It mentions that the kangra valley in Himachal Pradesh was once the largest producer of tea in northern India, but it is gasping for survival because of frequent droughts and cheap imports from countries like China and Sri Lanka. Article also notes that under the WTO regime, tea from Sri Lanka, Bangladesh and Indonesia is being sold in our country at half the prices. Khatta (2005) in his article discussed the initiative taken by the Himachal Pradesh Patent Information Centre of the State Council for Science, Technology and Environment (SCSTE), in collaboration with the Technology Information Forecasting assessment council of the Union Government, to register Kangra Tea with the Registrar of the geographical Indications Act, 1999. This would provide full protection to the Kangra tea. Nandy (2005), in his article, ‘Tea industry wage agreement in West Bengal’, stressed upon proper management of tea industry in West Bengal. It discussed the ongoing problems of starvation and related causes. Later Pathania et al. (2006) revealed that the area under tea in the state of Himachal Pradesh is almost
constant. Most of the plantations are in abandoned stage therefore, there is need to increase productivity of tea by rejuvenation, introducing new varieties on additional land and also by replacing the existing plantation. The net profit of rejuvenating tea gardens is realized during second year of their maintenance. Adoption of different components of the technology by tea growers ranged between 35 to 60 per cent. The important constraints faced by tea growers were the scarcity of unskilled and skilled labour, lack of timely availability of agro chemicals, lack of remunerative prices and delayed payment to the producers by cooperative factories.

Some studies were conducted with the theme of developmental strategies. Bhoca (1969) emphasised that replantation and replacement of older plantations together with modern methods of tea plantations and tea manufacture are the most important pre requisites for the development of tea industry. Rajagopalan and Sundaram (1969) advocated the strengthening of Indian tea trade promotional strategies as adopted by the competing tea producing countries. They also suggested cooperative ventures on sound business principles to effect cost economics, production, processing and marketing. Weerahewa (1997) evaluated the returns to Sri Lankan tea producer’s on tea research, promotion and advertising. Result show that response to research, promotion and advertising are positive and tea producers can increase profits by transferring funds from research to promotion. Advertising does not seem to be a viable investment strategy.

Selvaraso and Rao (2004) in a study conducted in the Tamilnadu, Nilgiri district and titled ‘Over A Cup of Tea’ emphasised on the policy and planning for facing the consequences of the free trade agreement on the tea industry of the region. Investing in the emerging market of organic and herbal tea certainly has provided the scope of
paying rich dividends. Later another study related to organic tea was conducted by Mohan (2005) which analysed about intensive research on how to make tea chemical free. The fertilisers and pesticides used on tea leaves across the country leave some residue in the final product, which can even cause cancer. But, no chemicals are used on organic tea. It takes nearly 20 years to make tea planters free of residuals of chemicals used in the past. At present, only a couple of tea growers in Darjeeling have adopted organic tea. Presently most of produce is exported to Australia and New Zealand. Mondal, et al. (2006), stressed the need to establish gene banks to avoid genetic wipe out of the valuable tea gene pool. Authors describe the current distribution patterns and suggest that tea possibly originated somewhere in the vicinity of the Irrawaddy basin, from where it dispersed to other countries. The first commercial effort in organized tea growing was started in 1839, by the Assam Tea Company, under the pioneering effort of George Williamson. The efforts of Institute of Himalayan Bioresource and Technology (IHBT), Palampur for conducting research work on tissue culture are appreciable in improving tea gene. Sud (2006) revealed about going efforts to bring new area under tea cultivation in Himachal Pradesh. New strategies particularly aimed at enhancing yield, improving quality, reduction of production cost, inter-cropping, organic farming, product diversification and enhancing the demand for Kangra valley tea are required to be formulated.

In recent years the growth rates of world agricultural production and crop yields have slowed, raising fears that the world may not be able to grow enough food and other commodities to meet the needs of future population. Keeping production trends theme many researchers have conducted studies of tea. Sisodia (1969) indicated that North
India recorded a higher increase in area (48 per cent) as compared to South India, whereas production increased at a higher rate (27 per cent) in South India during 1958 - 1965. Author suggested that under those circumstances the profitability of tea industry can be increased by increasing productivity by active implementation of replantation schemes and by reducing tax burden. Reddy (1970) analysed the trends in area, production and productivity trends of tea in India during 1953-1967. Result show positive growth in all the aspects. Author also suggested for setting up an autonomous organization for carrying out a vigorous and dynamic tea promotion campaign in foreign markets. Later Singh et al. (1972) reported that empirical evidences show that bringing more land under tea cultivation could increase the tea production and more capital investment was needed. In a Kenyan study Rutherford (1976) concluded that tea factory output had declined due to managerial inadequacy and increasing processing cost per unit. Arimoto (1979) studied 32 tea farms in Japan and reported that the type of tea plantation and production indicate different trends in prices received by planters, for percentage of quality products, yield per unit area and income per unit of tea products. He further observed that factors like slope and size of garden, drainage, availability of irrigation water affected the productivity of tea gardens. Dhar (1997) took the initiative of publishing the Tea Directory of Himachal Pradesh based on the survey of the entire tea area with the financial assistance and approval from Tea Board of India. The directory contained the information regarding the number of tea growers, extent of area, production etc with information about neglected, abandoned and available area for formulating future plan in order to revitalize the Tea industry of Himachal Pradesh. It also shows that out of total produce of tea, co-operative and private tea factories manufacture 55 per cent and 45 per cent respectively.
Some of the studies focused on the geographical aspects of tea. **Sinha** (1974) examined the origin, cultivation, historical development, geographical controls, soil pH value and other requirements for the growth of tea bushes. He also mentioned the minimum requirements of fertilizers. In another study **Jain et al.** (1993) reveal that shade trees inter planted with tea bushes in tea plantations from an agro forestry system unique in the plantation industry. The double-layered canopy of shade tree and tea bush almost completely blocks off sunrays from reaching the soil, creating a microclimate similar to a tropical rain forest at the ground level. Under the current practices of an extend pruning cycle and chemical wood control without soil disturbances, the ground surface is expected to be covered by a thick layer of humus consisting of the droppings of both shade trees and tea plants. This soil condition would be ideal for the sustained high productivity and longevity of the tea plants. **Sharma et al.** (2000) discuss about Tea Industry in Himachal Pradesh with special emphasis on climate, soil, land preparation, young tea plants’ management, pruning techniques, weed management etc. Author points out that, about 47 per cent of the area is still under neglected or abandoned state and needs improvement. For effective management of tea gardens the knowledge of different types of cultivation techniques was also emphasised. In another article **Sood** (2000b) reported about favourable weather including adequate rainfall which was a major factor behind the bumper tea crop in the Kangra valley. Author also mentioned about the past history of the Kangra tea Industry, and underlined the importance of four tea factories in the cooperative sector, which has proved boon to growers. **Sood** (2006), in his article discuss about occasional adverse weather conditions in the Kangra valley, which resulted in heavy losses to the Kangra tea industry in 2006. Due to heavy rain and continuous
cold conditions in March and April the production of green leaves came down to 30-50 per cent in the valley. Small tea growers were the worst hit where the fall in the production was up to 60 per cent.

Regarding economic analysis of tea, National Council of Applied Economic Research (1979) made a detailed examination of field and factory operations, the cost and income structure of selected tea estates in Darjeeling Hills and Tarai. The economic analysis revealed that the profitability in these areas declined as compared to rest of India. The trend could however, be checked by the lower production costs achieved by taking advantage of Tea Board’s subsidies for replantation, plantation finance and re-purchase of machinery. The study also suggested that government should also improve the transport and communication network to reduce the marketing cost. In a study conducted in Bangladesh Chawdhary (1976) reported that despite negative private returns, tea has high social profitability. In another study, Achoth (1980) studied the cost of production and productivities of tea estates in Nilgiri district and showed that returns per acre were higher among the large tea estates. However, returns per rupee invested were higher on small tea plantations. Tea prices had shown remarkable stability over the years, whereas costs have been progressively rising. Pathak (1980) studied the cost of processing of tea according to the size of holding. He concluded that the variable cost was lowest on medium tea farms and highest on large ones. However, fixed cost was lowest in case of small planters but the quality of finished products was poor. Later Humpton (1981) reported that orthodox method of tea processing is the most economical in fuel consumption. Silwal (1981) in an economic analysis of tea industry in Nepal, studied the cost and revenue structure of tea estates for the period 1974-75 to 1977-78 and calculated cost per unit of foreign exchange saving during the same period. He also discussed
some of the policy measures regarding the expansion and increasing productivity of existing tea estates.

**Sood** (2000a) in his article tried to explain the condition of tea planters of the Kangra valley due to increase in the competition in the international market and observed that the decline in the tea prices has affected the future of planters. On the same theme another article published in the Deccan Herald (2004) mentioned that Himachal Pradesh Tea Industry pins hope on Indo-Pak Free Trade Agreement highlighted the hope for planters with the opening of a new market. **Roy** (2007) in his article ‘A Refreshing Cuppa for Kangra Tea’ stated that special purpose Tea Fund announced in the Union Budget 2007 is expected to play a pivotal role in reviving the ailing tea plantation in Kangra valley of Himachal Pradesh. Under this fund there is a provision of 25 per cent subsidy which would be provided by Tea Board of India.

Some of the studies of tea cultivation have focused on the historical aspect of tea. **Singhal** (1996) discuss about the past, present and future of tea cultivation in Himachal Pradesh. He revealed that the prices of Kangra tea fell sharply as the locals could not manage the gardens because of lack of technical knowledge. The Indo-Pak wars in 1965 and 1971 also saw Kangra tea losing its market in Afghanistan. Later on, application of improved pruning, plucking, transportation and new methods of pest and disease management developed by Council of Scientific and Industrial Research complex at Palampur has doubled the tea output in Himachal Pradesh from 6.77 lakh kg in 1985 to 13.0 lakh kg in 1994. Flavour profile analysis reveals that the first flush of tea plucked in this region is as rich in teapenoids as Darjeeling tea. **Sud and Singh** (1998) in an article, ‘History of Tea in the Kangra Valley’, discussed about introduction of tea and its developmental phases. Kangra tea industry occupied prime position with respect to its quality from last quarter of nineteenth century to beginning of twentieth century.
Authors also focused on the problems faced by the Kangra tea industry during late nineteenth century. The decline of kangra tea started due to high freight charges by railways, tax imposition by Afghan, discrimination in the revenue charged on tea fields diversified from agriculture, lack of rail link between Palampur and Pathankot, pending repair of Chakki and Matour bridges. Anupkumar (2007) in an article, *Tale of a tea leaf*, discussed about past and present status of Indian tea industry with focus on plantation management, research, brokering and auctioning, tea tasting, consulting and the skills required for a career in the tea industry.

An article in *The Tribune* (2006) discussed serious concern for decreasing area under tea year after year as the state government is liberally allowing the sale of tea gardens. In the past, number of tea growers has managed to get permission from the government to sell their land while section 7-A of the Himachal Pradesh State Land Revenue Act prohibits the sale of tea gardens in the state. The author also point out that the owners of tea gardens had availed the benefits of the Himachal Pradesh land Ceiling Act whereby they have been allowed to retain land in excess of 30 acres. Just to promote the tea industry in the state such tea growers were allowed to retain excess tea holdings. After the Land Ceiling Act was made applicable in the state these tea growers were only custodians of such tea holdings and not the owners. The state government was well conversant with the situations; therefore, it had imposed a ban on the sale of tea gardens. But it is a matter of surprise that tea growers have managed to get the permission from the state government for the sale of their gardens in gross violation of law. Sale deeds in such cases were also registered. Butail (2006) stated that the tea planters of the Kangra valley are not the custodians of the tea gardens; they are the owners of their properties. Author also
does not agree to the reason that sale of tea gardens was behind the decline in the tea areas and states that areas declined due to acquisition of tea gardens by the research institutes like Chaudhary Sarvan Kumar Himachal Pradesh Agriculture University, Palampur, Institute of Himalayan Bioresource Technology, Palampur and also by the Vivekananda Medical Trust, Palampur. Author, of course, also agrees that some tea garden land sales are going in the region with due permission of the state government.

Sharma (2006), in his article, ‘Tea, Basmati to Redefine Ties between India, Pak’, discusses about bilateral trade producer of the commodity. As of today, Pakistan import bulk of tea from such far-away lands as Kenya. The two countries have also agreed to encourage delegation of importers and exporters of tea to visit respective countries. Article also reveals that tea exports to Pakistan will provide a new market for the India tea. Sandhu (2007) in his article ‘Tea Growers Hope to Regain Lost Glory’ analysed the kangra tea status from initial stage to present. Author discuss that, keeping in view the quantitative value of the kangra tea, value added tea based products developed by the scientists of the Institute of Himalayan Bioresource Technology and efforts to revive the neglected / abandoned tea gardens, the tea growers of Kangra hope that this unique tea would possibly soon regain its lost glory.

Under perfect competition maintaining quality standards are the first requirement. Many studies were focused on the tea quality theme. Mehta et al. (1975) found the Kangra local variety (China hybrid) to have good survival percentage and to be vigorous long lived highest yield and fetching better prices. They noted that the varieties introduced from North East India have failed to maintain their vigor, yield potential and quality under the local conditions. Thakur (1976) showed that Kangra Tea lacks proper processing due to non-availability of
sophisticated equipment that resulted in the difficulty to control various ingredients like liquor, flavour, odour and brickness. He reported that Kangra tea lacked uniform grade standards. Beside this, excise duty rates were reported to be very high with commission charges by the various intermediaries which result in low share of producers. Later Thakur and Raghubanshi (1977) found that for small tea planters of Himachal Pradesh, processing cost was the lowest, but the quality of their finished product was very poor. Authors also underlined the need of opting for grading by the planters for increasing additional value of the product. Another study conducted by Ranjita (1982) opined that the demand for tea is not likely to fall as it is a major beverage of the world with two third of its population drinking it. Efforts to improve its quality through research and marketing it with a special eye on the foreign market must be taken up so that this major industry does not lose out to other countries. Boriah (2006) stated that increase in tea production in India was the result of adoption of the modern technology developed by the research institutes. Contribution to quality improvement has also been achieved through improvement in processing facilities. The research have innovated and invented more machines than has the rest of the world and today India is major exporter of tea machinery.

Assessment of Medicinal value of tea was another recent theme selected by some scholars. Hajra (2006), in his book, ‘Tea and Health’ discussed about the history of tea, its various types, uses and health benefits that come from drinking tea. Tea has several therapeutic uses. It is anti-oxidant and anti-carcinogenic in nature. Tea is also helpful in diabetes, kidney stones, infections and bone problems. Jha, et al. (2006), discussed about the history, processing techniques, tea types and health benefits of green tea. Author concludes that tea can be a “Magic Bullet” for the prevention of various diseases. Tea can be part of healthy life style; there are more beneficial effects. It can delay or prevent onset of various complications. In recent years, the
consumption of green tea has increased and its popularity as a health beverage is rapidly making its place in the society. Malik (2006) also discussed about the medicinal value of tea. Highest consumed beverage in the world after water, tea is healthy, low-calorie and inexpensive drink. Author also mentioned the researches at the American Health Foundation, that the tea contains vital antioxidants that can lowers the risk of serious ailments like cancer, cardiovascular diseases, gastric ulcer, blood sugar and even blood cancer. An article published in The Tribune (2007) reveal that green tea could prove helpful in treating inflammatory bladder diseases. Green tea, reported to have many health advantages, is rich in potent antioxidants that make it a potential cure for many medical conditions. It consists of plant metabolites that supply it with many anti-oxidative properties.

Sustainability itself is a complex and contested concept. To some it implies persistence and the capability of something to continue for a long time. To other, it implies not damaging or degrading natural resources. The sustainability or unsustainability status of agriculture can be reflected through the health and productivity of the biophysical resource base, yields and returns from various production activities. Brundtland Commission’s report, ‘Our Common Future’, defined sustainability as, “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Roling and wagemakers, 1998). The literature on the topic of sustainable development is abundant. Some of the investigations in chronological order are presented here. Taylor et al. (1993) have developed a composite Planters Sustainability Index (FSI) that is designed to measure the degree of sustainability of individual planters management practices followed in the production of cabbage in Malaysia. They recognize that there are no universal principles for defining an absolutely sustainable
system, but there are a variety of practices that taken together can express the degree of sustainability of individual operations. Kaarite (1994) in his PhD thesis stated that large scale natural resource policies, which focus on environmental objectives from a global perspective and cut across sectors and disciplines, are often motivated by a desire to find general models for resource use. These large-scale policies, in this thesis referred to as grand visions; focus on sustainable development, which is now a priority issue of government. Planned management of land resources is an essential part of implementing sustainable development concepts. This thesis address the problem of implementing large scale visionary resource policies through developing and utilizing analytical frameworks from both theory and field situations.

Another study conducted by Kingsbury (1994) discuss about large scale logging in Dominica characterized both by serious environmental degradation and lack of profitability. Small-scale timber production is both less degrading and more viable financially. However, financial viability and limited environmental degradation do not equal long-term livelihood security or sustainable development. Conclusions are that factors such as an Island nation’s inability to achieve economies of scale, localized environmental factors resulting in high extraction costs and a variety of internal and external economic relationships significantly reduce the ability of Dominicans to achieve income security or sustainable development through non-degrading timber extraction. Factors favouring and inhibiting sustainable forestry are analyzed and recommendations to ‘operationalize’ sustainability are given. Born (1995) uses an exploratory methodology to investigate eight-case studies that met the substantive criteria of integrated environmental management (IEM). Author identifies the components of an operational model and analyzes the planning and implementation stages of IEM. The model leads to several hypotheses for future research. Canham (1995) disclose that Selva Lacandona in the
Mexican state contains many of the largest remaining areas of tropical rain forest in the nation. It is rapidly being converted to land for cattle ranching and agricultural use. The work considers the social and historical processes that influence land-use and create obstacles to sustainable development. A series of recommendations is provided. Driscoll (1995) thesis focuses on the Forest round table on sustainable development, a multistake holder collaborative and consensus based dialogue process. The research was both theory and problem oriented, with focus on sustainable development. Rao (1995) while delivering convocation address at the Indian Statistical Institute, Calcutta focused mainly on sustainable development of natural resources for maintaining the fragile balance between productivity functions and conservation practices through monitoring and identification of problem areas which require application of alternate agricultural practices, crop rotation, use of bio fertilisers, energy efficient farming methods and reclamation of underutilized lands. Bahdon (1996) discuss about an action plan put forward to rebuild Somalia, priorities are given to the immediate needs of the people by using natural resources and institutions. Author stress to ensure the compatibility of short term social and economic viability and long term ecological sustainability, principles of sustainable development should be applied in formulating the rebuilding process and future development projects. Study concludes that natural resources and related activities are the corner stone not only to the rebuilding process but also for the future of Somalia.

Bernasconi (1996) described that the principle of sustainability should be operationalized in Switzerland as part of forest planning for development. Study clears that sustainable management aims at influencing the forest in such a way that the forest (Resource) and man (use of the resource) can develop sustainable. In this work, the respective regulations are called standards of sustainability; standards of sustainability lay down the basic requirements of sustainable
development. Bouapao (1996) revealed that sustainable development is an evolutionary process in which all ethnic groups live in harmony with a healthy environment. For approximately forty years, Laos has been subject to many disruptions. Thesis concludes that the progressive transformation of their methods of land use, their mode of production and their migrant life style must clearly be understood before any attempt at a sedentary lifestyle with a view to a sustainable development is undertaken. Jokinen (1996) thesis deals with Finnish formation of agriculture – oriental environmental policy from the early 1970’s up to 1994. Ecological concepts and ideas of sustainable development have spread rapidly to Finnish agricultural and agro-environmental policies in the early 1990’s. However, the force which promotes environmental services in Finnish agriculture is primarily an economic, not an ecological one. Robert et al. (1998) calls for a new paradigm of eco-restructuring for sustainable development. This involves shifts in technologies, economic activities and also in life styles. Authors agree that for sustainable land use, there is no single best pattern, which is universally applicable. Identification of sustainable uses and technologies has to be done at the local level and implemented by local communities based on grass roots initiatives. Saini et al. (1998) stress the policy makers and planners to lay more emphasis on energy maximising plans because these can generate higher monetary returns and save energy inputs for making agriculture sustainable. Authors also suggested that short duration training on planters management extension should be arranged for hill planters, so that they may be able to understand the importance of judicious allocation/use of source energy input to have more energy efficient, economically viable and sustainable farming systems. Singh (1998) in his inaugural address at the international conference on ‘Ecological Agriculture: Towards sustainable development’ stressed to integrate sustainable agricultural development (including animal husbandry,
forestry and fishery) with a national perspective of development which takes into account the strategies for industrial development, urbanization as well as broader issues of social development including poverty eradication as well as pursuit of life-systems which are eco-friendly.

Saxena (1999) focus on the concept of sustainable development and stress upon the aspects, which require monitoring of sustainability. He concludes that sustainable development is the need of the present time not only for the survival of mankind but also for the future protection. Stamp (1999) examined the nature of indigenous agroforestry by rural inhabitants in the communal farming system in northeastern Zimbabwe. The purpose of this examination is to evaluate indigenous agroforestry’s present role as well as its potential in contributing to sustainable development. The goals of sustainable development are maintaining or restoring integrity in the households, communities and ecosystems of the farming landscape. Ahluwalia (2000) in his paper focused that the early emergence of sustainable environmental governance for maintaining global environmental health would depend upon growing international cooperation, leadership of UN and super powers driving the globalization community-based political reforms and their maturity through the coming decades. Franceschi (2000) study can be broadly classified under the economic paradigm of sustainable development. Author, stress on theoretical treatment of sustainability. This includes the analysis of a dynamic optimization model of production, which allows growth but Constrains environmental degradation. This approach gets at two essential ideas of sustainability, one that has received much attention in the literature. First, the analysis explores the intergenerational effects of the use of natural resources in the present or future. And second, it outlines the
importance of the difference between exhaustible and renewable resource use over time and their respective relationships to sustainability in terms of quality of life. The activity that produces the most output and revenue per environmental unit spent might be considered the more sustainable. Mehra (2000) in his article, stressed upon problem of poverty and environmental degradation. Author suggested that Governance is the key to deal with both these problems of humanity today and also to sustainable development. Musila (2001) examines the potential for local knowledge in sustainable agricultural development in developing countries with reference to Kenya. The conceptual framework is based on the rural African understanding of sustainable livelihoods, which calls for a broader perspective between local knowledge and agricultural sustainable development. Study draws the conclusion that agricultural practices based on local knowledge have the potential for sustainable agricultural development in the Kenyan environment if accompanied with appropriate policies, research and funding. Vodden (2001) stress that co-management and sustainable community economic development (SCED) are important strategies for sustainable development neither is easy to achieve. In British Columbia resource depletion and job loss have brought the question of sustainable development in fishing communities to forest front of the minds of academics, governments, fishermen and communities alike.

Adams (2002) cleared that today geographers have at hand the empirical and theoretical tools to enter and lead pragmatic debates about sustainable development, and with which to explore and understand their implications. Both tasks are important, for the discipline and for their potential contribution to the growing international debate. Mainstream sustainable development is a synthesis of
conventional ideas about development. **Sharma et al.** (2003) focuses on the current status of horticultural farming, especially of apple cultivation in Himachal Pradesh at the threats/challenges it faces from the ongoing process of globalization/ liberalisation, technological and climatic changes. Author discusses in detail the open trade linked strategy and WTO. Growers are prepared to meet the challenges of globalization / liberalisation provided they have easy access to market intelligence, improved technologies and better infrastructure facilities such as cold storage, efficient collection arrangements etc. The real challenge to sustain fruit farming in general and apple farming in particular therefore lies in the availability of suitable production and marketing technologies. **Aulakh** (2006) in an article focused on diversification necessary for long – term resource and income sustainability. Punjab is gradually moving toward change in the form of crop diversification. More than 30 per cent of the operational holdings of the state are small and marginal and their economic viability is under threat due to falling profitability of paddy and rise in fixed investments due to lowering of the water table. Author stress that traditional cropping pattern of paddy – wheat cycle should be changed through careful planning and implementation for long-term economic and ecological sustainability. **Bansal** (2006) conducted a study on sustainable Tourism Development in Himachal Pradesh. The study identifies a number of problems in developing tourism on a sustainable basis and has come out with a number of recommendations. Analysis also reveals that sustainable tourism development is not possible in the state if it remains the responsibility of government above.

On the basis of above literature review, it can be summarized that tea cultivation is facing various challenges in India and other parts of the world. Economic and ecological issues emerge as the most
discussed aspects. It is also evident that tea cultivation and processing in Kangra Valley need to be analysed with long term sustainable perspective.

1.3. RATIONALE OF STUDY

Tea is an important cash crop of the Kangra valley of the Himachal Pradesh. Kangra tea is the renowned brand in the country after Darjeeling tea. Fragrance of Kangra tea has marked its appearance in national and international level. Congenial geographical conditions are one of the positive factors for the development of tea industry in this region.

The role of the Kangra tea cultivation can’t be neglected in the sustainable development of the valley. The future of the 150 years old industry should be analysed in the light of increasing competition in the market. The present study will be an effort to understand the role of tea cultivation in sustainable development with emphasis on the ecological and economic impact in the Kangra valley. The Study will also attempt to understand the past, present and future of tea cultivation in the valley. It will also be relevant in understanding the reasons of failure of Co-operative management of tea industry, government role, the currently prevailing conditions and the potential of small-scale industrial development related with the tea cultivation in the study area.

1.4 OBJECTIVES OF THE STUDY

The following are the main objectives of the study:

(i) To study the historical profile and present status of tea cultivation in Kangra valley.

(ii) To study the role of geographical conditions responsible for the present status of the tea cultivation/industry.
(iii) To analyse the economic and ecological significance of this practice there.

(iv) To understand the current status and variables affecting the growth of the local tea industry vis-à-vis National /International standards and suggest remedial measures thereof.

(v) To analyse the impact of the privatization of tea factories on the tea planters in the Kangra valley.

(vi) To analyse the overall role of tea cultivation/industry in promoting sustainable development of the Kangra valley.

1.5 STUDY AREA

The area selected for the present study is the Kangra valley of Himachal Pradesh. The Kangra valley is located approximately, between $31^\circ\ 35'$ to $32^\circ\ 15'$ North latitude and $75^\circ\ 45'$ to $76^\circ\ 45'$ longitude of Himalayan range. The altitudinal variation in Kangra valley is between 600-1200 metres high. It is roughly 40 km long and 13 to 30 km broad and roughly coincident with Kangra district except Multan tehsil of Himachal Pradesh which is representative of the conditions in the longitudinal ‘dun’ type tectonic valleys of the outer Himalaya (Bruce, 1910 and Ahmed, 1992). Kangra valley is bounded on the southwest by Una district, on the east by Kullu and Mandi districts, on the north by Chamba district while on the south it touches the Hamirpur district of the state (Figure No. 1.1 and 1.2). The Kangra valley is the valley of the river Beas and numerous tributaries (Randhawa, 1974). More or less Kangra valley is co-terminus with Kangra district area, which is 5,739 sq km in area and this is 10.31 per cent of the state area ranking fourth among all the districts.

Kangra valley is one of most picturesque low altitude valleys in the Himalaya. Valley is located between the Dhauladhar range in the
north and the Shivalik hills in the south (Bruce, 1910). It ranges from
west to east rising gradually from Shahpur to Baijnath and Palampur.
Valley is located under the shadow of mighty Dhauladhar range.
Dhauladhar has abrupt rise of 3600 metres above the kangra valley.
Geographically, the Dhauladhar range separates Kullu and Mandi
districts of the state at one end and Chamba and Kangra at other.
Viewed from Dhauladhar top, the hills look like ripples on the surface
of the sea. An uninterrupted chain of mountains with Kangra valley spread
out at its base can be seen (District Administration, Dharamshala,
2003). The Kangra valley is spread mainly in tehsils Baijnath,
Palampur, Dharamshala, Kangra, Nurpur, Jawali, Shahpur and sub
tehsils of Harchakian, Fatehpur and Dhira (Figure No. 1.2). The
average rainfall in the valley exceeds 1778 mm. whereas the mean
annual temperature varies from 13 ° Celsius to 20 ° Celsius. The climate
in the Kangra valley is subtropical with mild summer and moderate to
severe winters. The Beas is the largest river of the valley and
contributes to the fertility of the land here (Survey of India, 1995).

The focus of the present study will be the tea gardens of the
Kangra valley located mainly in the four subdivisions of Kangra,
Dharamshala, Palampur and Baijnath (Figure No. 1.3). Palampur is the
tea capital of northwest India. A bundance of water and proximity to the
mountains has endowed it with mild climate. The town has derived its
name from the local word ‘pulum’, meaning lots of water.

The place enjoys a healthy climate and the pine scented air is
said to have curative properties. The scenery presents a sublime and
beautiful contrast- the plain presents a picture of rural loveliness and,
while the hills are majestic. Palampur is situated in and about the
middle of the Kangra Valley.
DATA AND METHODOLOGY

The present study attempts to analyse different aspects of cultivation in the Kangra valley of the Kangra district, Himachal Pradesh. The primary focus of the study is to look at the economic and ecological parameters with a view to understand the importance of tea in sustainable development of the region. Sustainable development encompasses the need for long term strategy of the resource utilization to allow adequate future production in a manner that is socially acceptable, economically viable and environmentally sound. Therefore in present study stress was laid on collecting information on three components of sustainability namely environment, economy and society.

The study is mainly based on the primary and secondary data. Primary data was collected through socio-economic survey, schedule, observations, and interview methods. Separate schedules were prepared for cultivators and factory owners.

Socio-economic survey method was quite useful in collecting data and information. Most of the geographic field research problems are sample studies. Sampling is a process by which relatively small number of individuals or measures of individual's, objects or events is selected and analysed in order to find out characteristics of the entire population from which it was selected. The process of sampling makes it possible to draw valid inferences or generalizations on the basis of careful observation of variables within a relatively small proportion of the population.

The target population in the present study comprised of the tea planters and tea factory owners from four tehsils i.e. Palampur, Dharamsala, Baijnath and Kangra of Kangra District, Himachal Pradesh. Personal interview method was used for collection of data. This method was selected because person-to-person situation creates
a setting in which ambiguous answers can be clarified. It lets the interviewer control the questions sequence and probe for additional detail to improve the quality of data. Further, personal interview is not as dependent on the educational and literacy levels of the respondents.

Survey of the tea planters’ of the Himachal Pradesh was conducted by the Council of Scientific and Industrial Research in 1984 which show that there are 1660 tea planters cultivating 2063 hectare of land under tea, with maximum concentration of tea plantations in Palampur tehsil. Survey shows that, 80 per cent of tea planters’ have holdings of less than one hectare (Institute of Himalayan Bioresource Technology, 1984). Same fact was revealed in another study in year 2006 that 90 per cent of the holdings in Kangra valley are less than two hectare. It is the 10 per cent of the tea holdings which are contributing 85 per cent of the total tea produce (Khanna, 2006).

Keeping this fact in mind a sample of about 10 per cent tea growers comprised of small, medium and large growers was collected on the basis of random sampling method. There are 110 planters from small tea planters’ category who are having less than 1.5 hectare land under tea cultivation from four tehsils of Kangra valley. In the case of medium and large tea planters a sample of 15 per cent (50) tea growers was collected. Large tea planters sample included 10 large tea estates also who are controlling the maximum production in the valley. Another sample of 26 per cent (11) tea factory owners/managers was collected from 10 privately managed factories and single functioning cooperative tea factory in the Kangra valley.

The information was collected from 150 tea planters including 90 tea planters from 12 villages of Palampur tehsil, 30 tea planters from 06 villages of Baijnath tehsil, 25 tea planters from 03 villages of Dharamsala tehsil, 05 tea planters from 01 village of Kangra tehsil (Table1.3).
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Tehsil</th>
<th>Name of Village</th>
<th>Number of Sample Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Palampur</td>
<td>Patti</td>
<td>15</td>
</tr>
<tr>
<td>2.</td>
<td>Palampur</td>
<td>Tanda</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Palampur</td>
<td>Chachian</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>Palampur</td>
<td>Deogran</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Palampur</td>
<td>Sullah</td>
<td>05</td>
</tr>
<tr>
<td>6.</td>
<td>Palampur</td>
<td>Holta</td>
<td>05</td>
</tr>
<tr>
<td>7.</td>
<td>Palampur</td>
<td>Baloo</td>
<td>05</td>
</tr>
<tr>
<td>8.</td>
<td>Palampur</td>
<td>Band Bihar</td>
<td>05</td>
</tr>
<tr>
<td>9.</td>
<td>Palampur</td>
<td>Saliana</td>
<td>05</td>
</tr>
<tr>
<td>10.</td>
<td>Palampur</td>
<td>Banuri</td>
<td>05</td>
</tr>
<tr>
<td>11.</td>
<td>Palampur</td>
<td>Pantehar</td>
<td>05</td>
</tr>
<tr>
<td>12.</td>
<td>Palampur</td>
<td>Sungal</td>
<td>05</td>
</tr>
<tr>
<td>13.</td>
<td>Dharamsala</td>
<td>Khanyara</td>
<td>10</td>
</tr>
<tr>
<td>14.</td>
<td>Dharamsala</td>
<td>Sidhpur</td>
<td>10</td>
</tr>
<tr>
<td>15.</td>
<td>Dharamsala</td>
<td>Sidhbari</td>
<td>05</td>
</tr>
<tr>
<td>16.</td>
<td>Baijnath</td>
<td>Dharer</td>
<td>05</td>
</tr>
<tr>
<td>17.</td>
<td>Baijnath</td>
<td>Bir</td>
<td>05</td>
</tr>
<tr>
<td>18.</td>
<td>Baijnath</td>
<td>Sakri</td>
<td>05</td>
</tr>
<tr>
<td>19.</td>
<td>Baijnath</td>
<td>Majehrna</td>
<td>05</td>
</tr>
<tr>
<td>20.</td>
<td>Baijnath</td>
<td>Baijnath</td>
<td>05</td>
</tr>
<tr>
<td>21.</td>
<td>Baijnath</td>
<td>Deol</td>
<td>05</td>
</tr>
<tr>
<td>22.</td>
<td>Kangra</td>
<td>Pathiar</td>
<td>05</td>
</tr>
</tbody>
</table>

**Total**  
Tehsils - 04  
Villages - 22  
Sample - 150
The sample of 10 large tea estates including 07 from Palampur tehsil, 02 from Dharamsala tehsil and 01 from Baijnath tehsil was selected randomly (Table 1.4). The data was also collected randomly from 11 tea factory owners/ managers including 05 from Palampur tehsil, 03 from Baijnath tehsil, 02 from Dharamsala tehsil and 01 from Kangra tehsil (Table1.5).

**TABLE NO. 1.4**

**SAMPLE DETAIL OF LARGE TEA ESTATES**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of Tehsil</th>
<th>Names of Large Tea Estates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Palampur</td>
<td>Department of Tea Husbandry and Technology, Chaudhary Sarvan Kumar Himachal Pradesh Agriculture University, Palampur.</td>
</tr>
<tr>
<td>2.</td>
<td>Palampur</td>
<td>Bandla Tea Estates, Palampur</td>
</tr>
<tr>
<td>3.</td>
<td>Palampur</td>
<td>Wah Tea Estate, Deogran</td>
</tr>
<tr>
<td>4.</td>
<td>Palampur</td>
<td>Sungal Tea Estate, Sungal</td>
</tr>
<tr>
<td>5.</td>
<td>Palampur</td>
<td>Zen Tea Estate, Gopalpur</td>
</tr>
<tr>
<td>6.</td>
<td>Palampur</td>
<td>Butail Tea Estate, Gopalpur</td>
</tr>
<tr>
<td>7.</td>
<td>Palampur</td>
<td>Raipur Tea Estate, Raipur</td>
</tr>
<tr>
<td>8.</td>
<td>Baijnath</td>
<td>Baijnath Tea Estate, Baijnath</td>
</tr>
<tr>
<td>9.</td>
<td>Dharamsala</td>
<td>Mann Tea Estate, Nargota, Dharamshala</td>
</tr>
<tr>
<td>10.</td>
<td>Dharamsala</td>
<td>Hoodle Tea Estate, Dari</td>
</tr>
</tbody>
</table>
The basic objectives in the design of a schedule are two fold: to obtain information relevant to the research study and to acquire this information with the highest degree of accuracy possible. The questions included in a schedule can be of two basic types. They can be closed (categorical) or open-ended (inviting free responses). The open ended or free response questions frequently go beyond statistical data or factual material into the area of hidden motivations that lie behind attitudes, interests, preferences and decisions. They are difficult to classify. The closed response questions, on the other hand, are most appropriate when investigator’s objective is to classify the responses (Moore, 1956).
TABLE NO.1.5
SAMPLE DETAIL OF TEA FACTORIES

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Tehsil</th>
<th>Names of tea factories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Palampur</td>
<td>The Palampur co-operative tea factory, Palampur.</td>
</tr>
<tr>
<td>2.</td>
<td>Palampur</td>
<td>Mukamiah tea factory, Tanda.</td>
</tr>
<tr>
<td>3.</td>
<td>Palampur</td>
<td>Sarwan Kumar tea factory, Tanda.</td>
</tr>
<tr>
<td>4.</td>
<td>Palampur</td>
<td>Dhauladhar Valley tea Industries, Chachian</td>
</tr>
<tr>
<td>5.</td>
<td>Palampur</td>
<td>Wah tea factory, Deogran.</td>
</tr>
<tr>
<td>6.</td>
<td>Dharamsala</td>
<td>Manjhi Valley tea factory, Sidhbari</td>
</tr>
<tr>
<td>7.</td>
<td>Dharamsala</td>
<td>Dharamsala tea factory, Nargota.</td>
</tr>
<tr>
<td>8.</td>
<td>Baijnath</td>
<td>The Baijnath co-operative (Him tea) factory, Baijnath</td>
</tr>
<tr>
<td>10.</td>
<td>Baijnath</td>
<td>Raghuvir Singh and son’s tea unit, Bir.</td>
</tr>
<tr>
<td>11.</td>
<td>Kangra</td>
<td>Pallav mehra tea factory, Pathiar.</td>
</tr>
</tbody>
</table>

After studying the related literature and fair amount of discussion, comprehensive schedules were prepared. Pre-test was conducted for getting the feedback regarding the problems faced by the target sample in filling the schedules. Wherever necessary required changes were done before finalising the schedules (see Appendix No.1). Two separate Schedules were prepared one for tea cultivators and other for tea factory owners. Beside questions for getting general information, the tea cultivator’s schedule was divided into four sections. These sections focused on tea cultivation status with 21 questions, economic status with 22 questions, ecological impact with 16 questions and the management aspect with 17 questions. Total 76 questions covering all
the aspects of the study were included in the tea cultivator schedule. Another schedule specially prepared for tea factory owners carried 21 questions. In both the schedules close ended and open-ended questions were included for getting the desired information in a simpler manner.

After completing a sample survey, the tea cultivator’s schedules were segregated on the basis of total land holding under tea cultivation. Tea cultivators having land area less than 1.5 hectare land under tea cultivation were categorised under small tea planters, tea cultivators with 1.5 to 2.5 hectare under tea cultivation were kept under middle class tea planters and tea planters having more than 2.5 hectare were treated as large tea planters. Total sample collected under these three categories were: 110 small tea planters, 25 medium and 25 large tea planters.

Other than the primary data, secondary data was also collected from Himachal Pradesh Governments’ agricultural department, production statements of tea factories, Directorate of Extension Education and Department of Tea Husbandry and Technology of Chaudhary Sarvan Kumar Himachal Pradesh Agriculture University and Tea Board of India and Ministry of Commerce and Industry, Regional office Palampur, Himachal Pradesh.

Simple Mathematical and statistical tools viz, averages and percentages were used for analysing the collected data. In order to examine the constraints of tea development in the study area faced by the different category of tea farm owners and whether they differ significantly, **chi-square \( (\chi^2) \) test** was applied with following steps:

1) Calculation of the expected frequencies:

\[
E = \frac{RT \times CT}{N}
\]

\( E \) = Expected frequency

\( RT \) = The row total for the row containing the cell.
CT = The column total for the column containing cell.
N = The total number of observations.

2) Calculation of the difference between observed (O) and expected (E) frequencies and obtaining the squares of these differences:

\[(O - E)^2\]

3) Obtaining the calculated chi-square value by dividing the value of \((O - E)^2\) by the respected expected frequency and obtaining the total.

- \[\frac{(O - E)^2}{E}\]

4) The calculated value of \(\chi^2\) is compared with the table value of \(\chi^2\) for given degree of freedom (v)

\[v = (c - 1) (r - 1)\]

\(c = \text{columns}\) \(r = \text{rows}\) (Gupta, 2002).

The chi square test (\(\chi^2\)) is a test of independence, the idea that one variable is not affected by, or related to another variable. The \(\chi^2\) is not a measure of the degree of relationship. It is merely used to estimate the likelihood that some factor other than chance (sampling error) accounts for the apparent relationship (Best and Khan, 1986). Chi-square is a measure of actual difference between the expected and observed frequencies and as such if there is no difference between actual and observed frequencies the value of chi-square is 0. If there is a difference between observed and the expected frequencies than the value of chi-square would be more than 0. But the difference in the explained observed frequencies may also be due to fluctuation of sample and the value of chi-square may arise due to sampling fluctuations and it should be ignored in drawing inferences. such values of chi-square is more than that given in the table it indicates that the
difference between expected and observed frequencies is not solely due to sampling fluctuations and there is some other reason for it. If, on the other hand, the calculated value of chi-square is less than the table value it indicates that the difference between actual and observed frequencies may have arisen due to chance fluctuations and can be ignored. In this way, chi-square test enables us to find out fact or between expected and actual frequencies is significant or not. If calculated value of chi-square is very small as compared to its table value it indicates that divergence between actual and expected frequencies is very little and consequently the fit is good (Prakash, 1976).

Another statistical technique **Student’s ’t’ – test** (significance of the difference of means) was applied to determine whether a true difference exists between population means of two samples drawn from same normal population. In present study 't’-test was applied among three respondent classes of tea farmers i.e. small-medium, small-large and medium-large to understand whether significant difference exist among them as far as variety of tea growing operations are concerned. To apply the test for two independent random samples of size \(n_1\) and \(n_2\) with means \(\bar{X}_1\) and \(\bar{X}_2\) and standard deviations \(s_1\) and \(s_2\) drawn the same normal population, the 't’-value is calculated as:

\[
't' = \frac{\bar{X}_1 - \bar{X}_2}{S} \times \sqrt{\frac{n_1 n_2}{n_1 + n_2}}
\]

Where

\(\bar{X}_1\) = Mean of the first sample.

\(\bar{X}_2\) = Mean of the second sample.

\(n_1\) = Number of observations in the first sample.

\(n_2\) = Number of observations in the second sample.
\[ S = \text{Combined standard deviation.} \]

The pooled estimate of standard deviation can be obtained by the following formula:

\[ S = \sqrt{\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1 + n_2 - 2}} \]

If the calculated value of ‘t’ is greater than the tabulated value, at \( t_{0.05} \) (or \( t_{0.01} \)), the difference between the sample mean is said to be significant at 5 per cent (or 1 per cent) level of significance (Gupta, 2002).

**Karl Pearson's Coefficient of Correlation** method was used for determining the degree of relationship between tea production and annual rainfall, average maximum temperature and average minimum temperature for the year 1974-2004 by using assumed mean method as actual means were in fractions. When deviations are taken from an assumed mean the following formula is applicable:

\[ r = \frac{N \sum d_x d_y - \sum d_x \times \sum d_y}{\sqrt{N \sum d_x^2 - (\sum d_x)^2} \sqrt{N \sum d_y^2 - (\sum d_y)^2}} \]

Where \( d_x \) refers to deviation of X series from an assumed mean, i.e., \((x - \bar{x})\).

Similarly, \( d_y \) refers to deviations of Y series from an assumed mean, i.e., \((y - \bar{y})\).

- \( d_x = \) Sum of the squares deviations of X series from an assumed mean.
- \( d_y = \) Sum of the deviations of Y series from an assumed mean.
• $d_x d_y = $ Sum of the product of the deviation of X and Y series from their assumed means.

• $d_x^2 = $ Sum of the squares of the deviations of X series from an assumed mean.

• $d_y^2 = $ Sum of the squares of the deviations of Y series from an assumed mean (Gupta, 2002).

The value of the coefficient of correlation as obtained by the above formula shall lie between $\pm 1$ when $r = +1$, it means there is perfect positive correlation between the variables. When $r = -1$, it means there is perfect negative correlation between the variables. When $r = 0$, it means there is no relationship between the two variables and as the value of $r$ gets less and less, it means lower degree of positive and negative correlation.

Visual form for presentation of statistical data is also used in the form of graphs, charts, bar-diagrams and pie-diagrams etc. The diagrams exhibit the results more clearly.

1.7 ORGANISATION OF THE STUDY

Study is organized under the following chapters:

1. INTRODUCTION

1.1 General Introduction

1.1.1 Global Scenario of Tea

1.1.2 Indian Scenario of Tea

1.1.3 Kangra Valley Tea

1.2 Review of related literature

1.3 Rationale of the study
1.4 Objectives of the study
1.5 Study area
1.6 Data and Methodology
1.7 Organisation of the study

2. PROFILE OF THE STUDY AREA
2.1 General and administrative history of the study area
2.2 Physiography
2.3 Climate
2.4 Drainage
2.5 Vegetation
2.6 Fauna
2.7 Demographic Characteristics
2.8 Economic Characteristics

3. TEA CULTIVATION IN THE KANGRA VALLEY - ANALYSIS AND DISCUSSION
3.1 Physio-climatic factors responsible for tea cultivation in Kangra Valley
3.2 Historical profile of tea cultivation
3.3 Present status of the tea cultivation
   3.3.1 Area
   3.3.2 Production
   3.3.3 Consumption (Marketing) pattern
   3.3.4 Problems and Prospect

4. STATUS OF LOCAL TEA INDUSTRY
4.1 Past and Present status of local Tea processing industry
4.2. Co-operative management / privatization of tea industry

4.3. Potential and Problems of Tea industry

4.4. Overall perspective in post W.T.O. scenario

5. **TEA CULTIVATION—SUSTAINABLE DEVELOPMENT AND ECOLOGICAL SIGNIFICANCE**

5.1. Tea cultivation and Economic significance

5.2. Tea cultivation and Ecological impact

5.3. Cottage industry and tea plantation

6. **CONCLUSIONS AND SUGGESTIONS**

6.1. Conclusions

6.2. Suggestions

Bibliography

Annexure