

CHAPTER - II

HISTORY OF TEA PLANTATION AND TEA INDUSTRIES

INTRODUCTION

Probably it will never be known with precision when tea was first used as a beverage nor how it was discovered that tea leaves could be treated and used to make a palatable drink, One Chinese legend has sought to dramatise the advent of tea by ascribing it to the reign of Emperor Shen Nung called the 'divine healer' who lived in about 2723 B. C., tea leaf of Shen Nung was gifted with remarkable medicinal properties. Use of tea as a beverage commenced towards the close of Sixth Century. The Arabian travellers who went to China in the ninth century spoke of tea as a common beverage of the country (Bamber; 1893). The first exclusive book on tea was published about the year AD 780 by Lu Yu, who was a noted author and expert on tea. (Barua, 1989). Mother nature's original tea garden was located in the south east corner of China, where Tibetan mountain walls meet with the North Eastern Frontier of India and the State of Maynamar, Thailand and Vietnam. The Dutch introduced China's manufactured tea in Europe in the 17th century, but only in 18th and 19th centuries did tea drinking become widely popular in Western Europe (I.T.P.A. 1965). Tea shifted to Europe came from China which was the sole supplier of the commodity till the middle of the nineteenth century.

The opening of the sea route to India by Portuguese in 1497 is facilitated large scale trading between the Europe and the Orient. Tea became popular in America also which was then a British Colony.

2.1. ESTABLISHMENT AND GROWTH OF TEA PLANTATION

2.1.1. Place of Origin

The Place of origin of tea is still a matter of speculation. (Barua 1989). Our knowledge of tea in the distant past is derived from China but information available from the Chinese sources does not throw much light on its place of origin. The true origin of tea, *Camellia Sinensis* as a wild plant is a matter of conjecture, since it has been utilised by man for such a long time that records of its occurrence in a

wild state can no longer be regarded as trustworthy (T.R.A. 1982). No single centre of origin can be pointed out for the different varieties of tea. Sealy (1956) in his monograph on the Genous *Camellia* considered that the China variety might have been indigenous to Western Unnan in China and the Assam variety indigenous to the warmer parts of Assam.

A third variety of tea, recognized as a sub-species of the Assam tea but not cultivated as such in North-East India, was found in Tran-ninh in Indo China (Sing 1990).

2.1.2. Classification of tea plant

The tea plant *Camellia sinensis* belong to the family Theaceae. There are three basic types, or varieties of tea plants.

- (i) The China type
- (ii) The Assam type
- (iii) The southern or Combodian type

(i) The China type

Camellia Sinensis L.O. Kuntze; this plant is distinguished from the Assam tea plant by its shrub like nature. It has virgate stens originating from the base of the bush near the ground level giving rise to a dome shaped bush when full grown. The leaf is small elliptic usually dark matt green, characteristically think and erect upper surfaces smooth and marginal veins are indistincts shoots are of very small size.

(ii) The Assam type (*Camellia Assamica*)

In contrast to the China type, this plant grows to 1.0 - 1.5m in height and looks like a small tree. The tree has a thick district trunk. Some times upto 2.3 of its height. Branches are also thick and ramifying. Leaf is a large light green broadly elliptic glossy, upper surface prominently buelate, marginal veins are distinct, leaf pose is horizontal.

(iii) Combodian type (*Camellia Assamica* Sub-group *lasiocalyx* planch M.S.)

By habit, the combot variety is a fastigate tree with more or less equally develop ascending menstems reaching a height of 6 - 10m. When fully grown. Leaf is of medium size, yellowish green when young and light green at maturity, glossy and more or less erect. The most prominent feature of this plant is the blood

red, colouration of the mature leaflets in Autumn young leaves of seedlings also show colouration style 3 - 5 free for nearly $\frac{1}{2}$ of its length, straight with epical or linear stigma. (T.R.A. 1992).

2.1.3. Types of cultivated tea

All the present stock of planting materials in cultivation are hybrids between these 3 basic varieties. The hybrids are assigned to the type they represent closely i.e.,

- (a) *Camellia Sinensis* (China hybrids).
- (b) *Camellia Asamica* (Assam hybrids).
- (c) *Cambodiensis* (Cambot hybrids).

The tea tracts discovered by Bruce in Assam were almost certainly clumps of cultivated tea abandoned by the migratory hill tribes. Watt and Mann (1903) seemed to hold the same view.

2.1.4. Introduction of tea cultivation in India

In India indigenous tea plant was grown naturally in Assam, but it was not known to the Britishers till 1821 when Major Robert Bruce discovered it in the Sibsagar district of Assam, followed by Mr David Scott in 1824. East India Company made a virtue of necessity starting tea industry in India under historic circumstances while reveal how tea habit, though originally Asian, with China as its cradle, did not reach India directly from her Chinese neighbour. European Countries including Great Britain commenced tea planting in India just to fill up a big gap in its trading profits, due to termination of monopoly of China tea trade (I.T.P.A. - 1965). Indians picked up tea drinking in the 19th century with a home product after the plantations opened in India by the British entrepreneurs went into manufacture. Upto the end of 18th Century tea was sent to Europe from China. It was from Holland that the early imports of tea came into England. East India Company began direct importation of tea from China since 1689 (I.T.P.A. 1965). In 1721, the Company obtained the right to import tea from the Parliament and this monopoly was continued for a little over 100 years.

In 1780 a few tea shrubs had been imported from Canton in China and planted in the Botanical Gardens in Calcutta. In 1788, the East India Company seeking an alternative source of supply, requested the naturalist Sir Joseph Banks to study the

possibilities of planting tea in India. Sir Joseph recommended cultivation in Behar and Koch Bihar. But the East India Company was more concerned with the Company's highly profitable monopoly of the China tea trade. Nothing came of Sri Joseph's suggestion though tea plants from China seeds were successfully raised in the Botanical Gardens.

About this time all schemes of cultivation of tea in India were based on importing of Chinese tea plants and seed; but hidden in the wild hills of Assam, just beyond the then frontier of British India, the indigenous tea plant which was the ancestor of Chinese tea, was all the time flourishing. In 1823, this was traced by an Indian, Late Moniram Dewan, though East India Company completely suppressed the claim of the Indian finder and gave credit for the discovery to Major Robert Bruce who had gone to Assam on an expedition. In 1833, East India Company lost its monopoly of tea trade with China and therefore it took vigorous steps to establish a source of supply in India. A committee was appointed by Lord Bentinck, the Governor General in 1834 which recommended the cultivation of tea in (Fig - 2. 1).

- (a) the lower hills and valley of the Himalaya.
- (b) the Eastern Frontier and
- (c) the Nilgiris and western part of South India.

Upon this, the Tea committee recommended that the indigenous plant under proper management could be cultivated with complete success for commercial purpose. The majority of the plants in this early period was imported from China, though indigenous tea was found in many parts of Assam Valley but it was more successful in Dooars and Darjeeling. In the Assam Valley the indigenous tea gradually ousted the Chinese variety and this tendency continued in other districts also. In 1838 the first consignment of Indian tea containing 8 chests (35016s) were exported to England and it was sold in the London market on 10th January 1839. The first tea company in India was Assam tea company; established in 1839 in London.

2.1.5. Tea plantation in Jalpaiguri district

The tea growing areas in the district of Jalpaiguri with an annexation of a small tea growing area in Kooch Bihar is popularly known as Dooars. It has already been stated that non Indian interest has been predominating in the tea industry of India; the most obvious reason of this is that the non Indians were pioneers and the Indians were late comers in this field.

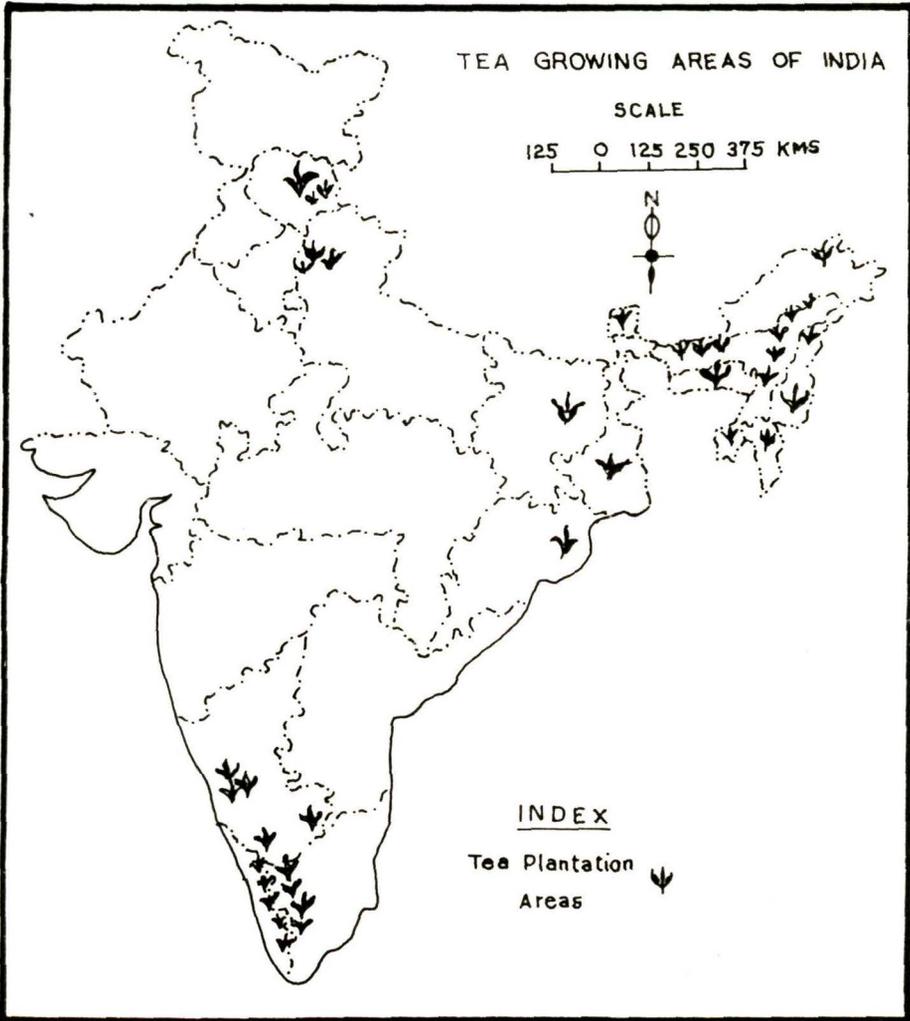


Fig. 2.1 .

According to the statistical account of Bengal, Darjeeling, Jalpaiguri, and Koch Bihar published in 1897, the tract around 5m to 10m downslope in the neighbourhood of Bhutan range has a low depth of soil containing a substratum of gravel and shingle. In the dry season the beds of hilly down stream around these tracts were left dry with it reappearing further down. Apparently because of this the area was known as waterless area where the ordinary cultivation found no charm for putting the land for agricultural use. Eventually such lands came up under tea and its success with the early experiments culminated in rapid spread of tea cultivation throughout the district. The district Gazetteer of 1874 reported that the first non Indian tea garden in Dooars was Gagalduba (in 1871) established on 16.2.1871 by Dr Brougham an erstwhile entrepreneur in Darjeeling who employed Mr. Richard Houghton as his manager. Mr. Richard Houghton is described in the Gazetteer as the pioneer of tea in Jalpaiguri district. Later this garden was purchased by an Indian Company viz. Friends Tea Company Ltd. In 1877 Munshi Rahim Baksh was allowed as the first Indian to receive some grant which was known as Jaldhaka grant for the purpose of tea cultivation. The first Indian tea company with exclusively Indian share holdings and board of directors was the Jalpaiguri Tea Company Ltd. established on 29th May 1879. The company secured from the government a plot of forest land in Banarhat in western Dooars, called Mogulkata, cleared of trees and started tea cultivation. As years rolled on this tiny garden developed into a big tea estate.

Eleven Indian tea companies were formed in the Dooars of Jalpaiguri district during the period of 31 years from 1879 to 1910. Between 1911 and 1927, thirteen new companies were formed in Jalpaiguri district.

2.1.6. Tea Plantation in the Study Area

As per available information Dooars tea plantation was found to be fairly old (previously described). The chronological profile regarding establishment of Tea Estate in the study area during the 60 years period is given in table 2.1.

Table 2.1. Growth of Tea Estates according to year of commencement of Tea Plantation in Banarhat and Nagrakata Police Stations.

Year of Commencement	No of Tea Estate	Banarhat P.S.	Nagrakata P.S.	Percentage to Total
1870 - 1879	5	2	3	12.83
1880 - 1889	11	1	10	38.46
1890 - 1899	14	14	Nil	35.90
1900 - 1909	1	1	Nil	2.56
1910 - 1919	4	3	1	10.01
1920 - 1929	2	2	Nil	5.12
After - 1930	2	1	1	5.12
Total	39	24	15	100.00

Source : Ghosh Tushar Kanti - 1987.

Out of 39 tea estate 5 were established during 1872 - 1879 while 15 tea estate were established during 1872-1889. Establishment of new tea estate there after become comparatively fewer with only 3 (7.69% tea estate having been established between the period from 1900-1909. Another 14 (35.90% T.E. were established during 1992-1999. It may also be pointed out that during the next 2/3 decades after 1909 no new tea estate was established. Only 2 tea estate were established in 1952 -1960. Such revolution indicates that more than 85% of the total tea estates of the study area were more than 100 years old. As such it was considered imperative to take up replantation programme to sustain the viability in yield rate along with effective nature of the old but non-economic bushes.

2.2. MANAGEMENT OF TEA PLANTATION

2.2.1. Management of Young Tea

Young tea management lays the foundation of the yeild of tea for the3 next forty to sixty years. Mistakes committed in the initial stages either can be corrected with great difficulty and expense or not corrected at al. Every planter has to bear in mind that in its formative years, the tea bush do not give any production.

2.2.1. (i) Requirements of Land

Before deciding on any land as a prospective area for tea planting, the following should be checked very carefully :

- (a) **Soil Profile** : Ensure a minimum depth up to 3' (90 cm) of good soil. There should be no formation of sand, grit or gravel.
- (b) **Ability to Drain** : Check whether there is enough drop to drain up to 4' or 120 cm below the ground level and the drainage point is accessible. If the outlet is into a nearby river or stream, check the water level during rains.

SOIL PARAMETERS

- (a) **Soil pH** : The pH status should be between 4.5 to 5.8. If the pH is above 6.0, do not attempt to plant unless correction has been done and confirmed.
- (b) **Organic Carbon%** : The ideal would be to have the organic C% 1.00 or above. If this is lower then the area would need corrective action.

CHOICE OF PLANTING MATERIAL

This is a major one-time decision. Clones and tea stocks differ in their soil and water requirements and one must be very careful in selecting the right type of clone best suited to the soil.

LAND PREPARATION

It is absolutely necessary that the soil is well prepared before the commencement of planting operations. In fact it is suggested that after land preparation, the area is kept under green crop for at least a year. Suggested schedule is :

1. Year (i.e. One Year Before Planting)

- (a) Plough.
- (b) Harrow.
- (c) Sub-soiler (Ensure penetration up to 18" or 45cm).
- (d) Cross plough.
- (e) Harrow.
- (f) Tiller/cultivator or spring tine harrow.
- (g) Leveller.

All the localized depressions must be filled up by bringing soil from outside, not attempting to cut soil from the same plot to fill up. This would only expose the sub-soil. (Plate 2.1).



Plate 2.1 Land Preparation for Young Tea



Plate 2.2 Dugging for New Plantation.

Once the land has been prepared, *depending* upon the soil report if the organic C% is low, apply 2 to 3 tons per acre of cattle manure. If this quantity of organic manure is not available, then apply 800 to 1000 kg of commercially available organic manures like Surya Khol etc. A light cultivation after application would be useful.

This area should then be put under green crop which in order of preference are

- (a) Guatemala (Plate 1.4).
- (b) Mimosa invisa (thornless).
- (c) Lemon grass
- (d) Boga medcloa (if the soil is sandy).
- (e) Crolalaria in good soils.

If the land preparation before planting of green crop has been satisfactory and the land is level there is no real need to repeat the ploughing and harrowing operations. A jungle buster also known as jungle jim can be used to reduce the green crop to a pulp and the planting operations can follow. If the jungle buster is not available then a light ploughing or digging to turn in the mulch would be needed. (Plate 2.2)

2.2.1. (ii) Planting

A. PLANTS

- (a) Plants should, preferably have been grown in tubes of size 6" by 9" or 15cm by 22.5cm. (Plate 2.3 and 2.4).
- (b) Stem thickness should be of diameter 2/8 to 3/8" or 0.5 to 0.8cm.
- (c) Height of plants should be 16" to 18" or 40 to 45cm.
- (d) Foliage should be 12 to 16 leaves per plant.

B. PLANTING

- (a) Pit size : 12" by 18" (30cm by 45cm)
- (b) Manure use at the time of Planting : (Plate 2.5)
 - (i) Well rotted dry cattle manure : 4 to 5 kg
 - (ii) Super phosphate : 30 gm
 - (iii) Rock phosphate : 30 gm
 - (iv) Phorate : 2 to 3 gm.

In case the above quantity of cattle manure is not available, as substitute, commercially available organic manures like Surya Khol etc. can be used. The



Plate 2.3 Seed Nursery.



Plate 2.4 Clone nursery

quantity required per pit can vary between 120 to 150 gm. This manure should always be placed near the bottom of the pit. Proper ramming of the pit is a must especially when the planting is being done during rains. Care should be taken that when ramming is done the plant bheti. Polythese waste *must* be completely removed from the site. After planting, the soil should be properly levelled manually. Green crops like :

- (a) *Crotolaria anagyroides*.
- (b) *Tephrosia candida*.
- (c) *Priotropis* are cultivated.

Shade trees should be planted in every alternate row. It should be noted that the green crop should not be used as temporary shade. Boga medoloa (*Tephrosia candida*) should not be in the field for more than one year. Green crops should be side trimmed regularly to prevent smothering of the plants underneath.

BRINGING UP YOUNG TEA

Development of Bush Frame

If the objective is to achieve yield level upwards of 4000 kg made tea per ha or 1600 kg per acre or 7500 kg green leaf per acre, It is necessary to develop a bush frame covering 3-3.5 sq. ft. or 2700-3200 sq. cm., having at least 26 to 32 branches on the permanent frame.

To achieve this objective, a bush frame can be developed in three stages :

- (a) Initial operations like devcentering, finger pruning or debudding.
- (b) Formative prune.
- (c) Frame formation before the bush can be termed mature.

Table 2.2. Suggested calender for bringing up young tea from 0 year (Year of planting)

May to July	:	Plant tea.
Oct. to Dec	:	Plant tea if irrigation is available. Debudding. Allow to grow.
+ 1 YEAR		
Feb to Apr	:	Lung pruning or decentering. Pluck regrowth at 24" or 60 cm
Jul / Aug	:	selectively remove strong central leader branches limited to one branch per bush and only if the lateral branches appear thin and not growing. No attempt should be made at so called 'chest cleaning'.

+ 2 YEAR

- A. only if the branches at around 14" or 35 cm have put on growth of around 0.4" or 1 cm.
End of Jan / early of Feb : FFP at 14" (35 cm) or 16" (40 cm), Remove thick central branches but not below 10" (25 cm). This should be done after starch test. Give a 10" (25 cm) tipping allowance for plucking.
- B. If the branches at around 14" (35cm) have not put on adequate growth. Leave unpruned. After first flush raise plucking surface by a leaf.

+ 3 YEAR

- A. If pruned in the previous year.
Leave unpruned.
- B. If unpruned in the previous year.
End of Jan / early of Feb : Prune at 14 to 16" or 35 to 40 cm.
Tipping on 10" or 25cm allowance.

+ 4 YEAR

- A. If pruned in +3 Year :
End of Jan / early of Feb : SFP (young tea prune) giving 2" or 5 cm allowance of new wood over the previous cut markt. plucking/ tipping giving a 10 or 25 cm allowance.
- B. If pruned in + 3 Year : Leave unpruned and pluck & janam.

+ 5 YEAR

- A. If given SFP previous year : Leave unpruned.
- B. If unpruned in the previous year :
End of Jan / early of Feb : SEP giving 2" or 5 cm allowance of new wood over the previous cut markt. Tipping allowance 10" or 25 cm oever the cut markt.

2.2.2. (iii) Weed control

Young tea needs complete weed control. Weeds apart from competing for nutrition, also prevent and suppress lateral growth and force the bush to have a wine glass appearance without having a proper spread. Weed control can be achieved by:

Chemical weed control :

Weedisides like Praquat should not be used till the FFP has been given. 2, 4 -D should not used at all. Simazine and oxyflourfen (Goal) are safe pre-emergent

weedicides. Glyphosate should be used with care. It is known to damage tea if used indiscriminately. (Plate 2.5).

Manual weed control :

Operations like thulling by hand and cheeling by hoe should be carefully supervised to prevent exposure of the root and damage near the collar region.

2.2.2. (iv) Irrigation requirement

Young tea differ in its requirements of irrigation compared to mature tea. It is, however, not uncommon to see the same equipment and frequency being given to young tea as is done in mature tea plants. More frequent irrigation with lesser effective rainfall per round is considered more useful. If the potash level is below 10 ppm, a mixture of 02 : 01 : 03 of NPK should be adopted. Under normal circumstances, NPK mixture of the proportion of 10 : 05 : 10 kg per 10 kg of mixture is to be applied. This mixture combination is also known as YTD mixture. The quantities required per acre or ha vary with the health and vigour of the bush.

2.2.2. Management of mature tea

2.2.2. (i) Pruning and skiffing

The twin operations of pruning and plucking may be considered the most important factors directly controlling the most important factor of directly controlling productivity of tea-bushes (Plate 2.6). The type of pruning determines the plucking measure to be adopted. Pruning and plucking influence the quantity and quality of the harvested crop.

Pruning : Pruning operation of tea is a necessary evil in that it has to be carried out periodically inspite of the huge loss of crop it causes. It is essential for the following purposes :

- (i) to re-establish the initial vigour of the shoot-system, (i.e. stimulation of growth),
- (ii) to control undue rise in bushframe and plucking level, (i.e. control of growth).
- (iii) to maintain quality in make tea,
- (iv) to rejuvenate the bushes which have crossed their period of maximum production,



Plate 2.5 Manuring before Planting.



Plate 2.6 Pruning at Kalabari Tea Estate.

- (v) to avoid the deleterious effects of drought on tea bushes and
- (vi) to check the spread of stem diseases to the lower region.

Type of Pruning : The different types of pruning done on tea and based on the severity of cuts, are classed as follows :

- (i) Skiffs
 - (ii) Light prune (or cut-across or to-prune).
 - (iii) Medium prune (or cut-back).
 - (iv) Heavy prune (or collar prune).
 - (v) Rejuvenation prune.
- (i) **Skiffs :** These are very light forms of cut done in order to remove a certain amount of growth, but are not severe enough to be termed a prune (Plate 2.7).
- (ii) **Light prune :** This is a cut given 2.5 cm to 5 cm above the last prune level in order to remove the congested top hamper and to renew the shoot system for more vigorous growth. In the plains it is given across a flat level, but in the hills cutting parallel to the slopes (i.e. slop-pruning) is more popular. The height of cut above the last prune-level is determined by the thickness of the wood-intended to be pruned; (ideal thickness 8 - 10 mm in diameter) accordingly pruning heights may vary between 2.5 cm to 5 cm from the last prune level. If, at the intended time of pruning, the wood is not suitably thick, pruning is postponed by a year or more. At the time of light pruning, knife cleaning-out should also be done.

Time of Pruning

Pruning produces best results when done in the cold weather, i.e. between mid-November of mid-January. In non-drought areas, pruning can commence as soon as the bushes go dormant in the winter; beginning from about mid-November, the operation should be completed by third week of December. In drought areas, pruning should start in December (i.e. pruning into drought) and be completed by mid-January. In all cases resting the bushes for a few weeks prior to pruning prevents excessive dieback.

Time of Cleaning-out

Knife cleaning out should always be done immediately after a prune and completed before bud break occurs. Vigorous sections should be cleaned out first. (Plate 2.8).



Plate 2.7 Skiffing at Nagrakata Tea Estate.



*Plate 2.8 Clearing or Jhathing
at Kalabari Tea Estate*

Manuring

In addition to the usual dose of nitrogen, 40kg, addl. phosphate if not applied annually should be given as SSP in the year of light prune.

(iii) **Medium Prune** : Medium pruning is done to :

- (a) reduce the height of bush frame, so that it does not exceed 80 cm (32 inches).
- (b) remove congested to-hamper consisting of the weak and twiggy branches,
- (c) remove knots and diseased wood,
- (d) reduce the proportion of unproductive wood.

Height of prune : Medium prune is generally done between 60 cm to 70 cm (20 - 80 inches) for removal of knots, diseased wood etc. even from below the general pruning heights.

Time of pruning : Medium prune is best done from mid-December to end-January. In drought prone areas medium pruning should preferably be done in January. Under no circumstances this operation should be carried out before mid-November.

Method of Pruning : The bushes should be cut-across at the predetermined height, followed by the removal of dead, diseased and damaged branches and knots. All large cuts should be treated with a protective bituminous paste, like Indopaste, within 24 hours of the cut-across. To prevent the bushes from sunscorch, the branches may be lime-washed and covered with the pruning filter immediately after the prune.

Resting of medium pruned tea : Recovery after pruning will be best when the bushes are having sufficient starch reserve in the roots; for this purpose, resting the bushes for 6 - 8 weeks before pruning is beneficial.

Manuring before pruning : Sections due for medium pruning should receive both phosphate and potash in March / April along with the usual dose of nitrogen. Phosphate should be applied at 40kg/hac SSP and potash at 40 kg/hac and 10kg/hac for soils with high and low or low medium potash content, respectively.

Manuring after Pruning : Medium pruned tea should be manured with 10 : 15 : 10 YTD mixture, at the rate of 80 : 40 : 80 kg NPK/hac for poor tea, and 90 : 45 : 90kg NPK/hac for average or good tea.

Manuring should be done on moist soil when the bushes have produced some leaves. A proper time to manure will be from mid-April to mid-May.

(iv) **Heavy Prune** : It is like the same as rejuvenation prune.

(v) **Rejuvenation Prune** : It is done to rejuvenate the bushes which have become old and contain an excessive amount of unproductive wood in their frames. The purpose of rejuvenation is to arrest the deterioration of some of the old and middle-aged sections of tea. It is not a substitute for uprooting and replanting.

Selection of Sections for Rejuvenation Prune : Only those sections which show potential of improving after the pruning should be considered for heavy prune. The criteria for judging the suitability of section for heavy prune are as follows :

- (a) the section should not be affected by primary root-diseases,
- (b) drainage of these sections should be taken for immediate improvement.
- (c) vacancy should not normally be higher than 25% or so;
- (d) not more than 25% of the remaining bushes should be affected by stem diseases like *Poria* and *Aglospora* down to the collar region,
- (e) recovery potential should be good it is essential to build up starch-reserves by putting them through a long pruning cycle and resting them for the suggested period prior to heavy prune.
- (f) sections found eligible in consideration of the above criteria but showing a steady decline in yield over the last five years or so should first receive priority for rejuvenation,

Height of Heavy : Prune for Rejuvenation : For *Assamica*, in the plains of Assam and Dooars. 35 - 45 cm from ground, and at lower elevations in the hills 25 - 37 cm from ground. For *Sinensis*, at higher elevations 15 - 20 cm from ground, or if *Anglospora* is present then it is advisable to prune even to the ground level.

Resting of Bushes for Heavy Prune : The bushes should be rested for 6 - 8 weeks prior to pruning, but may not be necessary when pruning is done in August-September due to possible heavy infection from blister blight.

Time of Heavy Pruning : In mid to high elevations heavy pruning can be started as early as August, providing starch reserves in roots are satisfactory and labour is available. In low elevation areas and in the plains, it should commence in October and be completed by November.

Method of Heavy Pruning : At the time of pruning all bushes should be cut at the predetermined level and thereafter the diseased wood below the pruning level should be cut down to healthy wood. If the section is infected with *Aglospora* or *Poria*, the pruning should be dipped in a % of solution of any approved copper fungicide after pruning the bush. All the big cuts should be properly polished and pasted within hours from pruning.

2.2.2.2 Tipping and Plucking

(i) Tipping

Tipping is the first plucking operation done on the new shoots produced as a result of pruning. It serves to :

- (i) establish a flat level convenient for plucking,
- (ii) stimulate the axillary buds on the primary shoots to grow into lateral shoots, and
- (iii) regulate the density of the maintenance foliage.

Tipping height varies according to type of tea, climatic conditions, length of pruning cycles, and standard of pruning after an extended pruning cycle. However, the basis of consideration in determining tipping height is to leave an average of 5 leaves on the primary level below the tipping level. Assamica types are usually tipped at 20 cm, whereas sinensis types are tipped at 15 cm, from the general prune level. Shoots which have grown over the predetermined tipping height by at least one fully unfolded leaf are tipped. Tipping height may be measured from the ground level when the concerned prune-marks are not in good level.

(ii) Plucking

Plucking is the most important operation in a tea estate and so much so that, (Plate 2.8).

- (i) it is the harvesting operation,
- (ii) it is the most expensive operation,
- (iii) it determines the quantity and quality of the harvested crop.

Types of Plucking are

(i) **Fine Plucking :** One leaf and a bud, two leaves and a bud, and single banjhis are plucked over the janam. This calls for plucking at shorter intervals. High level of quality tea leaves may be produced, but there is a big loss in quantity with this method.

(ii) **Standard Plucking** : Two leaves and a bud, large one and a bud and single banjhis are plucked over the janam. Shoots larger than two and a bud are plucked over the third leaf from the top and broken back to the janam. Plucking at seven day's round is suitable for this method of plucking.

(iii) **Coarse Plucking** : All two and a bud shoots larger than two and a bud and all double bajhis are plucked without breaking back. It causes an increase in quantity, but decrease in quality of the harvested crop. Plucking is done at longer intervals, e.g. 8 - 10 days.

Plucking -systems : According to the degrees of plucking, three systems of plucking are recognised :

(i) **Black Plucking** : This means plucking all the growth on the plucking table except the janam and buds. This system may be advantageously followed to produce finer shoots in the vigorously growing season, and to increase the yield of unpruned and medium skiffed tea.

(ii) **Standard Plucking** : Standard plucking is plucking all the growth on the plucking table leaving the janams, buds, and small one and a bud. This system has always produced high yield and is of good quality.

(iii) **Fish-leaf Plucking** : This is the most lenient system and involves standard plucking over the fish-leaf instead of the janam. This has been known to produce lower yield in comparison to standard and black plucking. This is suitable for place having slow rate of shoot growth.

Plucking Rounds : The length of plucking round is determined by the rate of leaf unfolding. The standard practice in North-East India is to pluck strictly at seven days round throughout the year; but plucking interval may be extended to 8 - 10 days in early spring or end-autumn, or shortended to 5 - 6 days during the monsoon periods, according to the quantity or quality requirement. Longer rounds involve heavier breaking back.

Breaking-back : Leaves and stems projecting above the plucking surface of a plucked tea bush, and not suitable for manufacture, should be removed at the plucking surface. This operation is known as breaking-back. It is done to maintain a flat plucking surface. It should, however, be noted that breaking-back is a wasteful operation and the necessity for doing this should, at all time,s be reduced to the minimum.

Principles of Plucking : The basic principle in plucking is correct adjustment of the plucking round, with standard plucking during the monsoon the shortest practicable round is five days and the longest practicable round is seven days. With fine plucking, the corresponding rounds are six and nine days.

Features of a Correct Plucking System

- (a) it should allow the maximum harvest of shoots of desirable quality.
- (b) it should leave enough leaf on the tea bush to maintain sustained productivity,
- (c) the plucking table should not rise excessively.

2.3 TEA PROCESSING METHODS (EARLY HISTORY)

The tea plant and tea drinking habit were exclusively Chinese initially. But the tea drinking has undergone changes to suit the styles and requirements of countries of its later adoption (Subramaniam 1995).

Wutu a mountain situated in Szechwan province of China, is celebrated as the birth place of tea-industry, where the shrub is said to have been first cultivated around 350 A.D. and used as a medicinal decontam. During 386 - 353 A.D. tea leaves were plucked and made into cakes which were roasted until reddish in colour, pounded into tiny pieces and placed in Chinaware pot. Boiling water was then poured over them after which onion, ginger and orange were added to flavour the drink (Banerjee.1993).

Later in the 6th century, the Chinese began to regard tea as something more than medicinal drink. Tea was first used as a beverage in the reign of Wen Ti, of the Sui dynasty (589 - 620 A.D) and was acknowledged to be good, though not much esteemed, it continued in high repute as a remedy, however, for the "noxious gases of the body, and as a cure for lethargy." (Banerjee 1993).

By the time of Sung dynasty (960 - 1280 A.D.) tea was used in all the provinces and whipped tea had made its appearance as the fashionable mode among tea exquisites. The dried leaf was ground to a fine powder and whipped in hot water with a light bamboo whisk. Elaborate tea houses appeared in all cities. In the temples, Buddhist priests gathered before the image of Bodh dharma and drank tea in a solemn ceremony from a single bowl.

In Japan teaism (tea making and tea drinking) took a deep religious significance in the 15th century. The tea room was the most important building,

set apart from the house in a garden tastefully planted with shrubs where the ceremonies were held.

2.4. PATTERN OF OWNERSHIP AND MANAGEMENT

2.4.1. Tea gardens pattern of ownership

Earlier there were two type of ownership existed, one was by British companies and the other by some rich and elite classes of people of Jalpaiguri. Four types of ownership (Fig. 2.3) of the tea gardens is noticed in the study area.

(i) This type of ownership have been dealt with some Govt. undertaking companies such as below 50% share holder of the Govt. and 50-60% share of companies. As per example - Andrew Yule and Co. Ltd., Gillanders Arbuthnot etc.

(ii) Private Limited Co. - These type of Co. do not have any sharing by Government. There are many private share holders in this group.

(iii) Proprietary - This is the ownership of one Co. or one person shareholder.

(v) The Public Sector or Govt. Ltd. Co., - This type of ownership is totally dealt by the State Govt. or the Central Govt. directly.

There are four types of ownership (Fig. 2.4) of the tea garden under Nagrakata P.S. which are as follows.:

(i) Public Ltd. Co., having 10 tea garden and sharing 67% of the the total ownership of the P.S.

(ii) Proprietary having only one tea garden and sharing 7% of the total ownership of the P.S.

(iii) Private Ltd. Co. having 2 T.E. and each of the two companies sharing 13% of the total ownership of the P.S.

(iv) Govt. Ltd., having two tea garden and sharing 13% of the total ownership of the P.S.

In the Banarhat P.S. there are two types of ownership of the tea garden is to be found.

(i) Public Ltd. Cod., having 21 tea garden and sharing 87% of the total ownership of the P.S. (Fig. 2.2).

(ii) Private Limited Co. having 3 tea garden and sharing only 13% of the total ownership of the P.S.

OWNERSHIP OF THE TEA ESTATES OF THE STUDY AREA

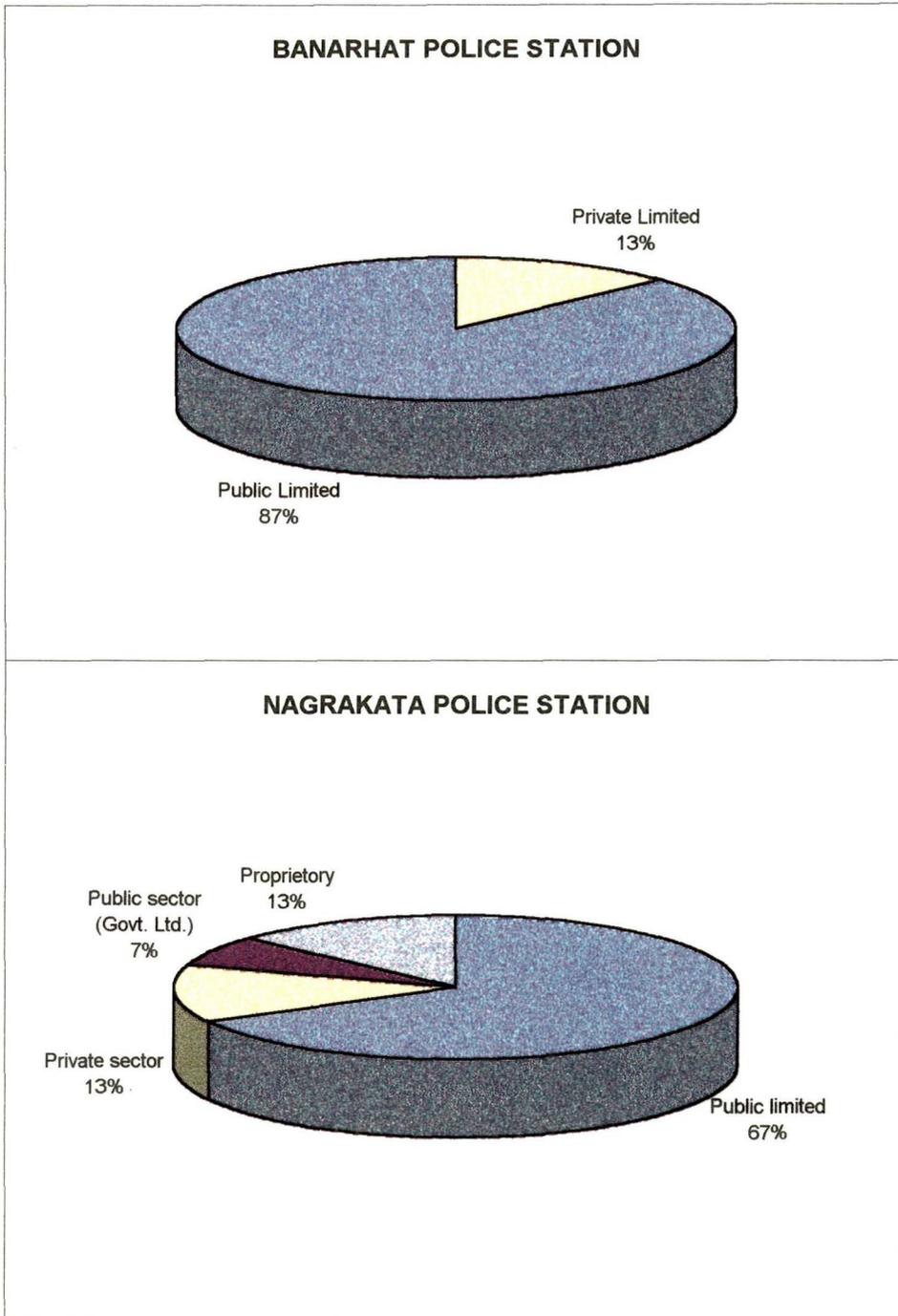


FIG 2.2

Table : 2.2 : Distribution of tea estates by size groups & types of ownership of Banarhat P.S.

Size group (Hectare)	Ownership				Total	Percentage to Total
	Prop.	Pvt.	Pub. Ltd.	Pub. Sec.		
< 600 V low	-	2	6	-	8	33.33
600 - 700 low	-	-	2	-	2	8.3
700 - 800 Medium	-	1	4	-	5	20.84
800 - 900 high	-	-	2	-	2	8.33
< 900 very high	-	-	7	-	7	29.17
Total	-	3	21	-	24	100.00

Table : 2.3 : Distribution of tea estates by size groups & types of ownership of Nagrakata P.S.

Size group (Hectare)	Prop.	Pvt.	Pub. Ltd.	Pub. Sec.	Total	Percentage to Total
< 500 very low	1	-	-	1	1	6.67
500 - 600 low	-	-	1	1	2	13.33
600 - 700 medium	-	-	2	-	2	13.33
700 - 800 high	-	1	4	1	6	40.00
> 800 very high	-	1	3	-	4	26.67
Total	1	2	10	2	15	100.00

In the case of Nagrakata P.S. Table 2.2 & 2.3. is reveal that there are 4 types of companies. In size groupwise a majority of the tea estates were of size in between 700 and 800 hectares, six tea estates (40%)are in this groups.

Among the 15 tea gardens four tea estates (26.67%) belong to the very larger group that is > 800 hectares In this P.S. there are only two (13.33%) in each size group of > 500 hectares & 600 - 700 hectare respectively only one tea estate belongs

to 500 - 600 hectares size group. Out of 15 tea estates the largest number was noticed in public limited companies and two are operate by the Govt. of West Bengal and the Govt of India Enterprises own by proprietary and private limited company.

Table 2.2. reveals that in Banarhat P.S. size group wise a majority of tea estates were in size < 600 hectares accounting for 33.33% of the total number. Among these two estates (8.33%) belonged to the size group of 600 - 700 that is small group and 5 tea estates are (20.84%) belonged to the size group of 700 - 800 hectares. Two estates are in size group of 800 - 900 hectares and remaining 7 tea estates are belonged to the size group of 900 hectares. Out of 24 tea estates the largest number (21) was noticed in Public Limited companies (87.5%). Estates under private limited companies is only three and share 12.5% of total. On the basis of the distribution of estates into different strata it has been revealed that Dooars tea industry was dominated by large tea holdings under public limited companies. On the basis of distribution of estates into different strata it has been revealed that tea estates of Nagrakata P.S. were dominated by large tea holdings under public limited companies.

Change of ownership of Tea Estate

Out of the 39 tea estates, 5 were reported of change of ownership during the last 30 years. Some of them underwent such changes more than once. Most of such tea estates undergoing freequent changes in ownership were owned by proprietary and private limited firms.

2.4.2. Types of Management in the Tea Estate

The management of a tea estate is revealed from table 2.4.

Table 2.4. : Management of a tea estate.

Manager				
	Field			Factory
	Deputy Manager			Deputy Manager
	Sr. Manager			Sr. Manager
	Asst. Manager			Asst. Manager
	Gardenbabu			Worker (M+F+C)
	Sardar			Withering (M+F)
	Labour (M+F+C)			Rolling (M+F)
				Fermenting (M+F)
				Weighting/sorting /cutting(C)
				Packing (M+C)
Plucking (F+M)	Spraying and Pruning (M)	Drainage (M)	Nursery (F+C)	Weeding (F+C)

N.B. : M = Male; F = Female; C = Child

There is a distinctive hierarchy in the work organisation in tea plantation system. This hierarchy helps to maintain the class structure of workers and planters. Generally there are four categories of employees in the tea estates every category is assigned with different type of work, their status wages also different. These categories are management staff, substaff, and worker.

Category - 1 Management

The manager is on the top of the hierarchy in a teagarden. He is all in all in a tea estate. In a tea garden he is responsible for all types of work. He is the legal representative of the employer or the company. In some companies, there are Superintending manager above the manager to supervise a group of gardens under one company. In this hierarchical organisation the next lower rank consist of a few assistant managers. The number of assistant managers depends on the size of the garden. Generally garden less than 500 hectares of land under tea will have



Plate 2.9 Spraying (Hand Sprayer).



Plate 2.10 Power Sprayer.

one or two assistant managers. The garden above this size may have more than two or three assistant managers. The duties of assistant managers are to assist the managers. In a large tea estate the assistant managers are of two types. (i) assistant manager garden (ii) assistant manager factory. Generally the assistant manager factory is an engineer who looks after the manufacturing works and machineries of the factory, The assistant manager garden is normally given the charge of a division of the garden or a part of it. He is supposed to supervise the works of the labourers in his division or a part of it. Sometimes the large tea-estate may have middle cadre officer. (M.C.O) or Junior cadre officer (J.C.O) as the link between the managers and staff.

Category II - Staff : The staff category is just below the management category in the organisational hierarchy of a tea estate. Generally this category consists of office clerks, factory assistant and garden assistance. The factory assistant and garden assistant do not work in the offices. The duty of a factory assistant is to assist the assistant manager (factory). His counterpart in the garden, the garden assistant is also supposed to assist the assistant manager (garden). There is a number of clerks in the office of a tea estate, headed by the head clerk. The head clerk supervises the works in the office. He also handles the cash. Below him there are a number of clerks like provident fund clerk, store clerk etc. who are assigned with specific official jobs.

Category III - Sub-Staff

This category comes below the staff category. Sub staff are mainly supervisory staff and generally promoted from the rank of workers. But unlike the daily rated workers they are paid on monthly basis and their wages are slightly higher than that of daily rated workers.

In the substaff category *Munshi* and *Sardar* are the highest designation in the garden and factory respectively. In the garden next to *Munshi* comes *chaprasi*. The smaller garden i.e. less than 500 hectare generally do not have either of these two posts. Instead they have only a *Munshi* or *chaprasi*. Both the *munshi* or *Chaprasi* supervise the works of the daily rated workers. The next rank after *chaprasi* in the garden is *Baidar*. His work is to keep attendance of sub-staff and workers in the field. The *Dafadar* comes next to *Baidar*. He is given the charge of a group of workers. He is the group leader. He supervises the works of this group. *Dafadar* is one of the most important post in a tea garden. He directly supervises the performance of the workers. He has to guide them at every step. He is responsible for all minute details of work in the garden both quality and quantity of work.

Chowkidar and Paniwala are the next two posts after the Dafadar. There are a number of chowkidar and paniwalas in a garden. The chawkidar is the watch man or guard of the tea estate. There are line chowkidars also, who guard the labour lines and also convey managers orders to the workers. The paniwala's duty is to carry drinking water to the worker while they are at work. In the factory, the sub-staff category is not so broad like that of the garden. Beside the factory Sardar there are Electrician and Fitters also. Beside all these there are other sub-staff, such as Dawawala (health assistant) or the Pharmacist who helps the doctor in dispensing medicines. The drivers, cleaners of vehicles, gardeners, office peons are some other sub-staffs in a tea estate.

Category - IV Worker or Collie

This is the fourth or the last category in the hierarchy of a tea estate. This category consists of factory workers and garden workers. They are the main force among the employees in a tea estate. They are directly related in tea production. This worker are of four types Male, Female, Adolescent and children. Those who are above 18 years old are called male or female worker according to their sex, those who are with in 14 to 16 old are called children worker. In the tea estates in West Bengal Adult male, female, Adolescents are paid equal wages. Children are paid half the wages of the former.

The factory workers do all the tea processing works in the factory, this includes withering of tea leaves to weighing and packing of prepared tea leaves. In the garden the workers have to do every thing from preparation of soil to plucking of leaves. Generally the female workers are engaged in plucking as they are good pluckers in comparison their male counterparts. (Plate 2.10). The male workers do the heavier works hoeing and clearing undergrowth, pruning the bushes in winter, chopping down shade tree when required and so on. Children workers are given lighter works like removing creepers, parasites from bushes and also leaf plucking.

There is little scope of promotion from one category to another in the hierarchy in tea estate except from worker to substaff. It is very rare that a staff gets promotion to management, category and also from a substaff to a staff. The ethnic composition of workers, substaff, staff and management is also different. The workers and the substaff are of tribal or Nepali origin. The staff are generally Bengalee and those in management are either Bengalee or Non-Bengalee. Even an educated tribal youth hardly gets a service in the staff category.

2.5. LABOUR PARTICIPATION IN TEA

Tea plantations in Dooars started by 1876 when the population of the Dooars was very thin. Local people has plenty of land and were engaged in cereal food cultivation. They lived an easy life. So local men were not available for the arduous job of tea plantation and these people did not like to experience the life of a labour in an industry. So like Assam, labour force had to be recruited from outside. Both the European and Indian tea planters had to do this. Within a short period the number of tribal people from Chotonagpur (Bihar) M.P. Tamilnadu began to increase Formerly the labours were supposed to go home after there expiry of the term of 'contract' but mostly they settled in the Dooars permanently and were not in a position to go back to their villages (Ghosh. 1968).

In 1962 - 63, a research was conducted by the Cultural Research Institute under the Ministry of Tribal Welfare of the Govt. of West Bengal and published a bulletin : Impact of tea industry on the life of the tribals of West Bengal in 1964. The following description is given from this bulletin regarding recruitment of labours and their subsquent settlement in the tea gardens. "Since the middle of the 18th century i.e. at the initial stage of this industry, a huge number of natural labourers from different tribal belts of Bengal, Bihar and Orissa needed to be collected every season by simply alluring them with the help of the 'brokers.' Only those tribals who did not have seemed economy, i.e, the landless labour were tempted to participate in this sort of migration although not voluntarily and only very few of them could manage to come back. The rest of them were either forced or tempted to settle down in the tea garden areas thereby keeping the manpower secured for the industry. Some settled voluntatily being very much attracted by the carefree life far way from the binding of their traditional way of life and also by the security of service in the gardens" (Lakashruti - 1992).

From the above statement we get two main causes of migration to the tea grdens viz. economic and non-economic. Economic causes arise out of increase of population and consequent pressure on the soil. This lead junior member of the families to go out to earn when the ancestor holding became insufficient to support all. Besides indebttness was another great stimulant to migration to the tea gardens. Non-economic causes which sometimes operated were love of travel and domestic disagreements, hopes of obtaining increative employment as Sardars.

Recruitment of the Dooars was mainly done by the garden Sardars i.e. men employed as labourers in the tea estates and sent back to this country with their employer's certificate countersigned by a magistrate authorising them to recruit

from their own communities. The sardar told his relatives and friends of the wages and life and conditions in upon the tea gardens. Every thing was discussed in details. The young people, those whom the land could not support, listened to the accounts of the new life which was to be their and finally they decided to accompany some recruiters, generally a relation or connection to Assam or Bhutan, as they still called the Dooars. They were taken to adopt where the agent of the recruiting organisation examined them and enquired. No married girl was accepted unless her husband was with her. No minor (below 14 year) was accepted without the approval of his parent's. The Sardars were usually accompanied by a garden supervisor who supervised the recruitment and also kept an eye on the Sardars. This is because the planters feared that if the sardar was sent alone he would never return (Bhowmik, 1981). The recruited workers of Dooars had always been free and under no contract or agreement. Thus it is apparent that the economic hardship in the native land was the prime cause of migration of tea labourers. It is not possible to state the exact number of men and women workers separately during the different stages of migration of tea labourers in Jalpaiguri districts as no such systematic data are available. However, the total number of immigration to Jalpaiguri at different stages is available in 1951 census (Mitra, 1951). This is presented in Table 2.5. This mainly related to migration in tea estates of Jalpaiguri district.

Table : 2.5. Immigration to Jalpaiguri (1891 - 1951)

Year	Actual Population	Immigrants	Percentage of Immigrants to total Population
1891	433334	44329	10.23
1901	544906	95899	17.60
1911	661282	152174	23.01
1921	694,056	163024	23.01
1931	739160	158765	18.54
1951	914538	278842	30.49

Source : Mitra A. K. Census of India 1951, Vol. VK Part. I A (West Bengal, Sikkim and Chandan Nagar). Report, Calcutta - 1953.

Table 2.5. shows that immigration to Jalpaiguri district increased continuously upto 1921. The figure of immigration increased by 17.60 percent during 1891 -

1901 and by 50.84 percent during 1891-1911. After 1911 the rate of increase of immigrants considerably decreased. In 1921, the immigrants composed of near about one fourth of the actual population. There after this composition of immigrants to the actual population decreased.

Conclusion

In India merchants of the East India Company were primarily responsible for the development of the trade and planting, which together comprise the tea industry. The Company built factories at Surat in 1608, Madras in 1639, Bombay in 1668 and Calcutta in 1690. From around 1715, the East India Company took complete control of the export trade of tea from China and held it till 1833. During this period of monopoly, tea developed into a popular drink not only in England but in the American colonies too, which were becoming popular and wealthy.

The East India company had its monopoly renewed from time to time by the British Government inspite of protests from other concerns who wished to trade in the East. In 1813, an Act passed ending the Company monopoly of trade in India and in 1833 all trading privilege came to an end in China. That year marked a turning point in the history of tea industry. In 1858 the East India Company handed over its ruling functions in India to the British Government. After this period tea plantation of a large scale was introduced in India particularly in North-East India. In the very beginning of the tea industry it is necessary to use the plant growing land properly. So we can discuss about the landuse pattern in tea area on the next chapter.