TECHO-ECONOMIC SURVEY
OF
DOOARS TEA INDUSTRY

ISSUED BY TEA BOARD OF INDIA

Rupees Thirty five only

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Foreword

Techno-Economic Survey of Dooars Tea Industry is the eleventh in the series of survey reports brought out by Tea Board.

Techno-Economic Survey as an on-the-spot study into the problems of tea industry has, for quite some time in the past, been immensely useful in assessing the pressing needs of tea industry. A need for a similar study on the tea industry in Dooars has been felt since long, as Dooars occupies a significant position in the national tea map which has a commendable record of attracting the potential tea entrepreneurs over the decades.

Dooars Tea Industry is blessed with its overall distinctive growth standards-qualitative and quantitative. But certain segments of the industry need sharper focus in the matter of extension, replanting, infilling and better nurture of plantation to accelerate the growth process. The Report analyses a host of problems that the industry has been facing since long and attempts to provide recommendation to sort them out wherever possible. A well co-ordinated effort on the part of the industry, the Government and the Tea Board is, however, necessary, to further the improvement prospects.

It is hoped that the Survey will bring about a general awareness of the Dooars Tea Industry to shape its economy on a prosperous footing.

May, 1994,
Calcutta.

(P. K. Bora)
Chairman

Introduction

A study into the problems of Dooars Tea Industry was long awaited since this tea growing district in the North-East India has a vast area under tea which called for an in-depth analysis on its various techno-economic parmameters.

The Techno-Economic Cell of Tea Board undertook the field work in two phases during April, 1991 to December, 1991. The data collected mostly related to the period from 1986 to 1990. Inspite of a lot of difficulties encountered during the course of data collection, our Investigators put their best efforts in collection and compilation of data by interacting with various sources apart from the sample gardens. Every care has been taken to represent the findings in a lucid and simple way.

The survey revealed that the Dooars Tea Industry was dominated by large holdings under Public Limited Companies and had much scope to bring new areas under tea cultivation. Replanting/rejuvenation and consolidation with interplanting for improving the bush density and to reduce the percentage of vacancy was also necessary Greater emphasis needed to be given for upkeeping the bushes, proper irrigation and use of high yielding planting materials. Severe soil erosion in specified belts was a pressing problem. All these findings have been analysed chapterwise together with possible recommendation for remedies. Efforts have been made to present the revelations suited to the needs of the industry and other concerned interests.

I must place on record the services rendered by the survey team, the DBITA the TAI. the ITPA the garden managers and their staff as also Tea Board Regional office at Siliguri who immensely helped the survey in successful completion.

May, 1994.
Calcutta.

H. N. Dwibedi,
Statistician.

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PART I
General

CHAPTER—I

The District Profile & Back Ground of Dooars Tea Industry :

1.1. The foothills of the Himalayas covering the districts of Darjeeling and Jalpaiguri of West Bengal have come to occupy a significant position in the tea map of India. The tea growing areas in the district of Jalpaiguri with an annexation of a small tea area in Cooch Behar is popularly known as Dooars which is bounded by Bhutan and Darjeeling district in the North-West, Cooch Behar district and Bangladesh in the South and Assam in the East. The district of Jalpaiguri extends over an area of 6227 sq. km. in the shape of an irregular rectangle lying lengthwise East to West between longitudes 88.25' to 89 53' East and latitudes between 26.16' to West 27.0' North. The present revenue district of Jalpaiguri was formed on 1st January, 1869 by the amalgamation of Western Dooars district and Jalpaiguri Sub-division of Rangpur district. The district has a distinct ecological setting. The average annual rainfall is more than 300 cms but bulk of it i.e. around 90% is received between April to September. Having administrative headquarters at Jalpaiguri town the district has a fairly good communication net-work with the rest of North East India,

1.2 The main agricultural crops in the district are rice, wheat, gram, jute, sugarcane, potato and tea. The soil of the region is supplemented by mineral deposits brought down by hilly rivers like the Tista, the Mahananda, the Torsa, the Jaldhaka and their tributaries from a height of over 10.000 ft. The greater part of the district is covered with alluvial soil. In the basin between the Jaldhaka and the Tista the soil is of hard black and clayey type. Uplands, to the North of Dooars the soil is well suited for the growth of tea plants while Western part of the district contains numerous old river belts now deserted by their erstwhile

flows. Presence of stones, boulders and gravels in many areas brought along by hilly downstreams over the ages poses a considerable problem in cultivation. The fertility of the soil is often subject to depletion of its natural minerals and salts by lateral run-off due to heavy downpour during monsoon months. The soil structure in general is known to have low water-holding capacity

1.3. Topographically, the district may be divided into three parts viz., (i) Mountainous Eastern Siwaliks in the Northern part, (ii) Sub-mountains or foothills (Tarai) and (iii) Plains of Jalpaiguri and Dooars in the Southern part. These physical sub divisions are lying parallelly from East to West. The main rivers of the district are Teesta, Jaldhaka, Mahananda, Torsa, Raidak, Kaljani and Sankose. Besides, there are a number of small and medium sized streams, mostly, seasonal, which criss-cross the whole area. But the main flow is from North West to South-East according to the topography of the land. Despite having high annual rainfall, its uneven distribution poses serious problem in crop production and as such needs supplementary irrigation during the peak dry months. The soil having low waterholding capacity and the rainfall being unevenly distributed the tea growing lands badly need effective soil-erosion measures and proper drainage system.

1.4. Population of the District as per 1991 Census was 27,89,827. A sizeable proportion of the labour force in tea is constituted by the tribals like Oraons, Mundas, Santhals, etc The population density is around 448 per Sq Km. against the West Bengal state averaga of 766. According to Official statistics, 11% of population are cultivators, 5% are agricultural labourers, 2% marginal workers and the rest constitutes other occuparions.

1.5. The District Jalpaiguri is divided into two administrative Sub-divisions viz., Jalpaiguri Sadar and Alipurduar: Out of the total geographical area around 25% is under the cover of forest which abound with leopards, tigers, wild elephants, deer, etc. Total area under cultivation (including area under tea) accounts for 13%while net area under irrigation is around 5% of the total geographical area of the District.

Formation of Jalpaiguri-Dooars and a Short History of Tea Cultivation :

1.6. Dooars was originally a strip of land situated at the foot of the Himalayas and to the east of the river Teesta which was annexed from Bhutan to the British India in 1865. The word "DOOARS" implies 'Doors' or 'Passes' into Bhutan and there are 18 such passes. After annexation of Dooars it was divided into two parts viz., the Eastern Dooars and Western Dooars of which the former now forms a part of Goalpara in Assam while the Western Dooars came to be known as the present day Dooars. Initially, the Western Dooars was divided into three Tehsils viz, the Sadar, the Buxa and the Dalinkot. Later, the Dalinkot tehsils was transferred to Darjeeling district while the Titalya Sub-division of Rangpur (now in Bangladesh) was united to the Western Dooars to take shape as Jalpaiguri District in the year 1869.

1.7. Although considered unhealthy for human habitation due to menacing diseases in and around the mid eighties there was much to recommend this district as a tea growing area for its geoclimatic characteristics. According to the Statistical Account of Bengal, Darjeeling, Jalpaiguri and Cooch Behar, published in 1876, the tract of around 5 to 10 miles 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 downstream around these tracts were left dry with the stream reappearing further down. Apparently because of this the area was known as waterless area where the ordinary cultivators 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 says that the first tea garden in Dooars was Gazaldubi established on 16.2.1876 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 the tea in Jalpaiguri district. Although tea cultivation in Dooars was primarily engineered by the British planters through their agency enterprises there was significant contribution of Indian entrepreneurs who set up considerable number of new plantations with the issuance of grants of lands in a phased manner. In 1877 Munshi Rahim Baksh was

allowed as the first Indian to receive such a grant which was known as Jaldhaka grant for the purpose of cultivation. The first Indian tea Company with exclusively Indian share holdings and board of directors was the Jalpaiguri Tea Co. Ltd., established in 1879. The Dooars planters Association, the first Association of the European Planters was started in 1880 which later became a branch of Indian Tea Association with their headquarters at Binaguri. This was followed by formation of the Indian Tea Planters' Association in January, 1919 with the exclusive objective of looking after the interest of the Indian tea planters.

Area Prodoction and Productivity :

1.8. According to the primary information available with Tea Board there are 163 tea estates in Dooars covering an area of 67,760 hectares producing around 114 M.kgs, tea ; Dooars accounts for 20% of tea area and 21% of tea production in North India (16% and 16% respectively of All India). Average yield rate in Dooars works out to 1684 Kgs. per hectare as against 1480 kgs per hectare in West Bengal and 1598 kgs per hectare in North India during the year 1990.

Table—1

Area Production & Yield of Tea

Area : Hectares.
Production : Th. Kgs.
Yield : Kgs/Hect.

Year	Dooars			West Bengal			North India		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn	Yied
1980	62,782	104,624	1,667	93,497	133,185	1,424	306,039	438,077	1.431
1981	63,418	100,251	1 580	93,971	128,259	1.376	309,066	437,790	1,416
1982	65,074	102,915	1,582	96,613	133,265	1,379	319,955	437,031	1.366
1983	65 265	108,218	1,658	97,170	139,705	1,438	322.170	466,259	1,447
1984	65,475	115,250	1,760	97,788	148,298	1,516	324,584	491,428	1,514
1985	65,816	121,956	1 853	98,015	157,371	1,606	325 290	514,295	1,581
1986	66,209	110,008	1,662	99,129	141,270	1,425	332,961	481,299	1,446
1987	66,422	116 229	1,750	99,530	149,617	1.503	336,570	518,373	1,540
1988	67,295	114,066	1,695	100,616	150,034	1,491	339,502	524,723	1.546
1989	67,620	111,380	1,647	101 000	143,168	1,418	340,204	529 571	1,557
1990	67,760	114 124	1,684	101,170	149,753	1,480	341,004	545,106	1,598

1.9. Yield rate in Dooars had almost remained stagnant over the last decade. There has been a marginal increase of 8% in planted area when compared to a larger expansion over the other tea growing region in North India.

Sizewise Distriburion of tea Estates :

1.10. It would be observed from the classification of the tea estates in Dooars presented in Table-2 below that more than 51% (79 in number) of the tea estates are in the size group of above 400 hectates. As many as 48 tea estates are within size group between 200 to 400 hectares. These 127 tea estates together account for 96% of the total tea area and production of the district in 1989.

Table – 2

*Size-wise Distribution of Estates in Dooars During 1990

Size-Group (in Hect.)	Total Number of Tea Estates	Total Area (in Hect.)	Percentage to Total Area	Production (in Th.Kgs)	Percentage to Total Production
Upto 8.09	5	15	0.02	5	0.01
Above 8 09 to 50	5	96	0,15	199	0.18
Above 50 to 100	4	330	0.51	427	0 37
Above 100 to 200	13	2,117	3.28	2,340	2.06
Above 200 to 400	47	13,254	20.53	24,406	21.48
Above 400	83	48,757	75.51	86,234	75.90
All Groups	157	64,569	100.00	113 611	100.00

*Due to incomplete coverage the figures will not tally with the figures in Table-1.

Size-Group and Yield Variation :

1.11. There were only 10 tea estates below the size of 50 hectares while 13 tea estates belonged to the size-group of 100 to 200 hectares, Size groupwise yield pattern for year 1990 indicates a moderate positive

correlation between yield and the size The lowest yield of 333 kgs. per hectare corresponds to the estates under small holdings upto the size of 8.09 hectares Although the gardens in size groups of 200 hectares to 400 hectares and above 400 hectares did not show significant variation in yield rate the yield difference between the estates below 200 hectares and those above 200 hectares was significantly sharp.

Table – 3

*Size-Group and Yield Per Hectare 1990

Sive-Group (in Hectare)	Yield (Kg,/Hect.)
Upto 8 09	333
Above 8.09 to 50	2,073
Above 50 to 100	1,294
Above 100 to 200	1,105
Above 200 to 400	1,841
Above 400	1,769
All Groups	1,759

*Owing to incomplete coverage the figures will not tally with figures in Table-1.

Table—4

*Age-Group of Bushes in Dooars During 1990

Age-Group	Area Covered (Hect.)	Percentage to Total
Below 5 Years	4,152	6 52
6 to 10 Years	4,465	7.01
11 to 20 Years	6,044	9.49
21 to 30 Years	9 646	15.15
31 to 40 Years	5.881	9.24
41 to 50 Years	3 370	5.29
Above 50 Years	30 122	47.30
All Groups	63.680	100.00

(o incomplete coverage the figures will not tally with Table-1.

1.12. It may be observed from the above Table that more than 47.3% of the total tea area in Dooars contained bushes which crossed the age of 50 years. Young bushes below 10 years of age constituted around 14% while bushes between 11 to 40 years of age accounted for around 34% of the total planted area in the District.

Primary Marketing of Tea :

1.13. Around 69% of the total teas produced in Dooars are sold through auctions at Siliguri snd Calcutta. Bulk of auctions sales of Dooars tea is accounted for by Siliguri auction which shares around 86% of the total sales through auctions while the remaining 14% is disposed off through Calcutta auction, It will be seen ftom Table-5 that quantum of Dooars teas sold in Calcutta auctions shows a decreasing trend over the last few years.

Table—5

Quantities of Dooars Tea sold at Calcutta and Siliguri Auctions (in thousand kgs)

Years	Calcutta Auction	Percentage to Total Auction	Siliguri Auctton	Percentage to Total Auction	Totai Auction	Percentage ro Production
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1986	28,083	32.4	58,579	67.6	86.662	78.78
1987	24,299	26.4	67,403	73.6	91.702	78.90
1988	20,407	20.2	80,714	79.8	101,121	88,65
1989	13,139	16.9	64,610	83.1	77,749	69.81
1990	11,483	13.9	71,217	86.1	82,700	69.21

1.14. A comparison of the average price fetched by Dooars teas, West Bengal teas and North Indian teas indicates that at Calcutta auction the prices of Dooars teas are generally lower than teas of other origins in North India taken together including Darjeeling Contrary to this, Dooars teas, however, fetched higher price in Siliguri auctions. Despite domination of prices at Calcutta over other auctions there is a substan-

tially higher through-put of Dooars teas at Siliguri auction apparently because of the distance and transport cost factor vis-a-vis only the marginal price advantage at Calcutta auction. During 1990 the prices per Kg. of Dooars tea were lower by Rs. 5.47 at Calcutta auction but higher by Re. 0.14 at Siliguri auction as compared to North Indian teas.

Table—6

Average Prices of Dooars Teas Sold at Calcutta, Siliguri and Guahati Auctions (Rs/Kg)

Years	Dooars Teas at			West Bengal Tea at			North Indian Teas at		
	Calcutta Auction	Siliguri Auction	Guahati Auction	Calcutta Auction	Siliguri Auction	Guahati Auction	Calcutta Auction	Siliguri Auction	Guahati Auction
1986	22 33	22.27	—	27 68	22.15	—	26.94	22.13	24.15
1987	24 67	23 67	—	30.85	23 62	—	28.97	23.61	24 83
1988	23 82	23.29	—	30.71	23 26	45.34	28.46	23 25	24 65
1989	35 69	36 46	—	46 40	36.39	69.84	39.56	36.39	36 59
1990	43 60	41.50	—	58 38	41.44	—	49 07	41.36	43.10

CHAPTER— II

Survey design and distribution of the sample

2.1. According to initial official records there were 163 tea estates in Dooars during 1990 but an indepth scrutiny of the population units revealed that among these, a number of tea estates were non-existent while there were others not recorded in the list which were subsequently established. The survey could identify 154 tea estates which were reported to be in working condition. Out of them all had their own factories except seven tea estates not having factory of their own.

Table—7

Distribution of Tea Estates by Size-Groups and types of Ownership

Size-Group (Hects.)	Ownership						Total	Percentage to Total
	Prop	Part	Pvt.	Pub. Ltd.		Pub Sec.		
				Fera	Non-Fera			
Above 8.09 to 50	—	1	—	—	—	1	2	1.30
Above 50 to 100	1	—	2	—	2	—	5	3.25
Above 100 to 200	2	—	6	—	7	—	15	9.74
Above 200 to 400	—	1	10	1	38	2	52	33.76
Above 400	—	1	8	11	56	4	80	51.95
All Groups	3	3	26	12	103	7	154	100.00
Percentage to Total	1.95	1.95	16.88	7.79	66.89	4.55	100.00	

2.2. The field investigation and data collection were done by the Inveatigators of the Techno-Economic Cell of the Statistics Branch of Tea Board in two phases. The field survey in Phase-I was undertaken

during March to April 1991 and the Phase-II in December, 1991. For the purpose of the survey a sample of 96 tea estates was drawn from the population. Out of the total 96 sample units the field survey in 48 tea estates located in Jalpaiguri Sub-division was carried out in Phase-I while another 43 estates located in Alipurduar Sub-Division were included in Phase-II. Information could not be gathered from 5 tea estates despite repeated efforts by the survey team and as such the effective sample size under survey was 91. There were altogether 7 estates in the population which did not have their own factory. Out of them 5 were included in the sample. Altogether the number of sample units constituted 59% of the population whereas planted area-wise the sample coverage was also 59%. The sample was selected by a methodology analogous to Probability Proportional to Size Without Replacement (PPSWOR) where proportional representation was given in respect of different sizes of holding as also the ownersnip status viz., Proprietory, Partnership, Private Limited, Public Limited (under FERA and Non-FERA companies) and Public Sector. The sample so constructed was based on the objective scope and time schedule of the survey and in some cases purposive inclusion of a few sample units could not be avoided in order to ensure representativeness of the sample.

2.3. The data were collected from the sample tea estates on the basis of a pre-designed questionnaire. Copies of the questionnaire were mailed to the tea estates well in advance so as to give them sufficient time to keep ready the information sought. Subsequently on a time bound programme the Investigators in two separate Phases visited the tea estates for canvassing the questionnaire and made an on-the-spot study of the various problems and the adopted cultural practices in estates. In the process, they had detailed discussion with the garden managers, group managers and the producers' associations on the specific problems on Dooars tea industry. Information on tea disposal, finance, cost of production, etc. which were not available at the garden level in most of the cases were collected from their respective Head Offices.

2.4. Before the actual field data collection commenced, the survey team had a meeting at Siliguri with the leading planters of Dooars along with the representatives of tea producers' associations in Dooars

to discuss the basic problems of Dooars tea industry and to chalk out the executional steps of the survey. During the course of the survey, the Statistician of Tea Board visited Dooars and took a number of meetings with the tea Associations including TRA and the State Government Authorities. He also visited a few tea estates and factories to have a first hand information about existing tea situation in this region. Later, he inspected the field work done by the survey team and discussed with the concerned garden managers about the existing problems faced by them.

Distribution of Sample Estates :

2 5. The sizes of the sample tea estates were found to vary widely among 6 classifications of ownership status viz., Proprietory, Partnership, Private Limited, Public Limited, FERA, Public Limited Non-FERA and Public Sector Companies. The distribution of sample tea estates according to size-groups and type of ownership is shown in the table below :

Table—8

Distribution of Sample Estates by Size-Groups and Types of Ownership

Size-Group (Hect.)	OWNERSHIP						Total	Percentage to Total
	Prop	Part.	Pvt. Ltd.	Public Ltd.		Pub Sector		
				Fera	Non-Fera			
Above 8.09 to 50	—	1	—	—	—	1	2	2 08
Above 50 to 100	—	—	2	—	—	—	2	2.08
Above 100 to 200	2	—	5	—	4	—	11	11.46
Above 200 to 400	—	1	4	1	22	2	30	31.25
Above 400	—	1	5	8	35	2	51	53.13
All Groups	2	3	16	9	61	5	*96	100.00
Percentage to Total	2.08	3.13	16,67	9.38	63.54	5.21	100 00	

*The effective sample size was 91.

2.6 Out of the 96 sample tea estates the largest concentration was noticed in Public Ltd. companies containing as many as 70 (73%) tea estates. Among them 9 were under FERA ownership, the rest 61 being under non-FERA estates. Estates under Private Ltd. Companies numbering around 16 shared 17% of the sample size. Among the 5 sample tea estates under Public Sector, 2 were owned and managed by the State Government undertaking while 3 were under Central Government undertaking.

2.7. Size-Group-wise, a majority of the sample tea estates were of size more than 200 hectares accounting for 84% of the total number. Among them 30 estates (31%) belonged to the size-group of 200 to 400 hectares and 51 estates (53%) to the sizegroup of above 400 hectares. Out of the remaining 15 tea estates 11 b longed to the sizegroup above 100 to 200 hectares and 2 each in the sizegroups of 50 to 100 hectares and 8.09 to 50 hectares. On the basis of distribution of estates into different strata it has been revealed that Dooars tea industry was domi nated by large tea holdings under Public Ltd. companies. The operation of Proprietory, Partnership and Private Ltd. holdings was found to be in a lesser proportion.

2.8. In terms of area under tea in different size groups and ownerships the size-group of above 400 hectares accounted for nearly 73% of the total area under tea followed by 23% in the size-group of 200 to 400 hectares. The size-group within 8.09 to 200 hectares together shared 5% of the total tea areas indicating domination of tea holdings above 200 hectares in Dooars. Ownershipwise, around 80% of the total tea area was covered by Public Ltd. Companies with FERA holdings alone 12%. Public Sector undertakings accounted for 4% while the rest 16% was covered by Private Ltd., Partnership and Proprietory holdings.

Table—9

Distribution of area by size-group and type of Ownership

(in hectares)

Size Group (in hectares)	OWNERSHIP							
	Prop	Part	Pvt. Ltd.	Pub. Ltd.		Pub Sec.	Total	Percentage to Total
				Fera	Non fera			
Above 8.09 to 50	—	25.33	—	—	—	34.50	59.83	0.15
Above 50 to 100	—	—	184.35	—	—	—	184.35	0.46
Above 100 to 200	321.88	—	868.60	—	282.95	—	1473.44	3.67
Above 200 to 400	—	354.84	955.86	380.22	6904.06	676.15	9271.13	23.08
Above 400	—	561.03	2919.17	4407.12	20302.57	996.14	29186.03	72.64
All Groups	321.89	941.20	4927.98	4787.34	27489.58	1706.79	40174.78	100.00
Percentage to total	0.80	2.34	12.27	11.92	68.42	4.25	100.00	

Commencement of Tea Plantation :

2.9. As per available information Dooars tea plantation was found to be fairly old. The chronological profile regarding establishment of tea estates in Dooars over the last 150 years is depicted below :

Teble—10

Classification of the Sample Estates According to Year of Commencement of Platation

Year of Commencement of Plantation	Number of Tea Estates	Percentage to Total
1840-1849	3	3.30
1850-1859	Nil	—
1860-1869	Nil	—
1870-1879	5	5.49
1880-1889	15	16.48
1890-1899	24	26.37
1900-1909	14	15.38
1910-1919	16	17.58
1920-1929	7	7.70
1930-1939	2	2.20
1940-1949	2	2.20
1950-1959	1	1.10
1960-1969	1	1.10
1970 AND AFTER	1	1.10
TOTAL	91	100.00

2.10. Out of the 91 respondent tea estates 39 (43% of the total number) were established during 1880 to 1899 while 30 (33%) tea estates were established during 1900 to 1919. Establishment of new tea estates thereafter became comparatively fewer with only 14 (15%) tea estates having been established between the period from 1920 till date. It may also be pointed out that during the two decades from 1850 to 1869 no new tea estates was established and 3 (3%) estates were established during 1840 to 1849. Such revelation indicates that more than 52% of the total number of tea estates of Dooars were more than 100 years old. As such it was considered imperative to take up replantation programme in a phased manner to sustain the viability in yield rate alongwith effective nurture of the old but non-economic bushes.

Change of Ownership of Tea Estates :

2.11. Out of the 91 respondent tea estates 10 reported change of ownership during the last 10 years some of which underwent such change more than once. Most of such tea estates under going frequent changes in ownership were owned by Proprietory and Private Limited firms.

Membership of Associations :

2.12. All the respondent tea estates were reported to have membership of producers' associations viz., DBITA, TAI and ITPA. As many as 79 were reported to be the members of TRA. All producers' associations were found to have their branch offices at Dooars through which the estetes were offered general assistance as also representation on their common problems. While TRA offered technical advice on agro-technical aspects of tea, many tea estates were also found to receive technical advice on both plantation and factory operation from private professional experts known as Visiting Agents (VA).

2.13. Tea Board's assistance to the Dooars tea industry in the matter of disbursement of Loan/Subsidy and various other development Incentives Schemes are effected through its Sub-Regional Office at Siliguri. The survey team was of the opinion that in consideration of wide coverage and location of the large number of tea estates in far fluing areas the present infrastructure of the Siliguri Sub-Regional Office was inadequate which needed to be further strengthened. Alternatively, it is recommended that a new Sub-regional Office of Tea Board may be opened at Jalpaiguri to facilitate timely monitoring of tea development schemes put across to the Dooars tea industry which will be particularly beneficial to the tea estates under Alipurduar Sub-Division.

PART II
Analysis of Data

CHAPTER—I

Mode of Utilisation of Grant Area :

11. The following table will indicate the position relating to utilsation of total grant area by size-group alongwith the share of different size-groups in the total grant for the sample tea estates in Dooars.

Table—11

Utilisation of Total Grant Area by Different Size-Groups

Category of Utilisation	SIZE-GROUPS (in Hectares)						
	Above 8.09 to 50	Above 50 to 100	Above 100 to 200	Above 200 to 400	Above 400	Total	Percentage to Total
1. Area Under Tea	59.83 (34.85)	184.35 (43.75)	1473.44 (43.61)	9271.13 (61.29)	29186.03 (60.15)	40174.78	59.41
2. Area Under Nursery	1.00 (0.58)	0.74 (0.18)	6.92 (0.21)	72.16 (0.48)	211.87 (0.44)	292.69	0.43
3. Area Under Rice and Other Crops	43.49 (25.33)	20.32 (4.82)	176.41 (5.22)	582.06 (3.85)	2415.78 (4.98)	3238.06	4.79
4. Other Areas	67.38 (39.24)	215.97 (51.25)	1721.86 (50.96)	5201.37 (34.38)	16709.08 (34.43)	23915.66	35.37
Total Grant Areas	171.70 (100.00)	421.38 (100.00)	3378.63 (100.00)	15126.72 (100.00)	48522.76 (100.00)	67621.19	100.00
Percentage to Total	0.25	0.62	5.00	22.37	71.76	100.00	

(Figure in brackets indicates the percentage to total grant)

Tea was cultivated in 40,175 hectares out of the total grant of 67,621 hectares of surveyed estates indicating 59% utilisation of the total grant by way of tea cultivation. Around 293 hectares were utilised for nursery both clonal and seedling which accounted for 0 43% of the total grant. As much as 23,916 hectares remained as 'Other areas' containing forests, fallow and waste land, factory buildings, staff and labour quarters, bungalows, roads, bridges, culverts, etc. The survey could reveal that around 28% of such 'Other area' could be suitable for tea cultivation.

1.2. Size-group-wise, as Table 11 indicates, a major chunk (72%) of the total grant area of the surveyed estates was covered by the estates of size above 400 hectares. On an average, proportion of area under nursery to the total grant was found to be 0.43% and this percentage fluctuated over different size-groups. The percentages of area utilisation within the two size-groups of 50 to 100 hectares and 100 to 200 hectares were found to be low in comparison to other size-groups. The proportion of 'Other areas' for the estates above 200 hectares over the total 'Other areas' was as high as 92%. It, thus, reveals that there is a greater scope for the estates above 200 hectares to identify the available areas within the grant in order to take up extension planting.

1.3. Table-11, inter alia, incorporates the proportion of utilisation of grant area by size-groups in terms of percentages. This proportion was found to bring out a moderate positive corralation with the size of the estates. For the estates below 100 hectares the proportion of utilisation of grant area on tea cultivation amounted to 41% while such proportion worked out as 60% for the estates above 200 hectares. Area utilised for nursery was less than 1% for all the size-groups. It was also observed that percentage of area other than rice and other crops classified as other areas was somewhat higher in respect of the estates within 50 to 200 hectares than the other size-groups, This percentage was found to be as high as 51% for the estates within 50 to 200 hectares of size and around 34% for the other size-groups taken together. On the whole, nearly 5% of the total grant was under rice, vegetables and other crops. It was noticed that lands under rice and other crops were allowed for use by the labourers to raise such crops as a part of welfare measures. The return from such crops, therefore, did not accrue to the tea estates.

Table – 12

Utilisation of Total Grant by Sample Estates Classified into Different Type of Ownership

(in hectare)

Category of Utilisation	TYPE OF OWNERSHIPS						Total	Percentage to Total
	Proprietory	Patnership	Private Ltd.	Public Ltd.		Pub. Sector		
				Fera	Non-Fera			
1. Area under Tea	321.89 (45,37)	941.20 (50,96)	4927.98 (52,10)	4787 34 (61.86)	27489.58 (60 82)	1706.79 (64,02)	40174.78	59.41
2. Area under Nursary	1.21 (0.17)	8 64 (0.47)	28.46 (0,29)	42.42 (0 55)	205.29 (0 45)	2,67 (0.25)	292.69	0.43
3. Area under Rice & other Crops	— —	59 49 (3 22)	561.54 (5 94)	436 27 (5.64)	2018.46 (4 47)	162,30 (6.09)	3238 06	4.79
4. Other Areas	386.32 (54.46)	837.74 (45.35)	3941.22 (41.67)	2472.14 (31.95)	15487.88 (34.26)	790.36 (29.64)	23915 66	35.37
Total Grant Area	709.42 (100.00)	1847.07 (100.00)	9459.20 (100.00)	7738.17 (100,00)	45201.21 (100.00)	2666,12 (100 00)	67621.19 (100.00)	100.00 (100.00)
Percentage to Total	1.05	2 73	13.99	11.45	66.84	3.94	100.00	

(Figures in brackets are the percentage to total grant)

'—' indicate : NIL.

1.4. On the basis of ownership pattern the Public Limited Companies accounted for 78% of the total grant followed by 14% by Private Limited Ownership, 4% by Public Sector 3% by Partnership and 1% by Proprietory ownership. The percentage of area under tea over total grant was highest at 64% in respect of bublic Sector units followed by 62% for FERA, 61% for NON-FERA Public Limited Companies and 45% for Proprietory ownership. The survey team recommends that it is imperative to extend tea cultivation within the available grant for all categories of ownership. Necessary steps need to be taken by Public Sector undertaking for healthy upkeep of bushes, proper irrigation and proper fertiliser application in order to improve the profitability of the tea estates. Around 35% of the total sample grant were available as 'Other areas' (apart from tea, nursery, rice and other crops) which could be considered as possible source of land for new planting.

Table—13

Avarage Size of the Estate, Average Grant Area & Average Area other than Tea classified among Different Size-groups

Size-Groups (in Hectar)	Number of Estates	Total Area Under Tea (Hectare)	Average Area Under Tea per Estate (Hectare)	Tatal Area Under Grant (Hectare)	Average Area Under Grant par Estate (Hectare)	Average Area othe than Tea Area (Grant Minus Tea Area (Hectare)
Above 8.09 to 50	2	59.83	29.92	171.70	85.85	55.93
Above 50 to 100	2	184.35	92.18	421.38	210.69	118.51
Above 100 to 200	9	1473.44	163.72	3378.63	375.40	211.68
Above 200 to 400	29	9271.31	319.70	15126.72	521.61	201.91
Above 400	49	29185.85	595.63	48522.76	990.26	394.63
TOTAL	91	40174.78	441.48	67621.19	743.09	301.61

1.5. Table-13 above shows the size groupwise quantification of average area under grant per estate vis-a-vis the average area under tea per estate It is observed from the above table that the average grant area per estate was 743.09 hectares while the average non-tea area per estate was 301 61 hectares which comprised around 41% of the total

grant. Tea was cultivated in an average area of 441.48 hectares per estate constituting 59% of the totat grant. The average area under tea and the average non-tea area bore a ratio of 1 ; 0.68, Sizegroupwise, an average estate within the sizegroup of above 8.09 to 50 hectares contained 29.92 hectares planted with tea and 55.93 hectares of non-tea area out of an average grant of 85.85 hectares, Such figures in respect of the size-group of above 50 to 100 hectares averaged to 92.18 hectares of planted area and 118 51 hectares of non-tea area out of an average grant of 210.69 hectares. For the sizegroup of 100 to 200 hectares, the average area under tea was recorded as 163.72 hectares out of an average grant of 375.40 hectares. The ratio of average area under tea to the average non-tea area was calcuated as 1 : 1.87 for the sizegroup of above 8 09 to 50 hectares, 1 : 1.28 for the sizegroup of 50 to 100 hectares, 1 : 1.29 for the sizegroup of above 100 to 200 hectares, 1 : 0.63 for the sizegroup of above 200 to 400 hectares and 1 : 0.66 for the sizegroup of above 400 hectares. These observations indicate that the utilisation of grant area for tea cultivation by an average estate was comparatively more for the estates above 200 hectares than those below 200 hectares,

1 6. On the basis of ownership classification the average area other than tea area per estate was 317.88 hectares for Public Ltd. Companies followed by 283.20 hectares for Private Ltd. Companies, 193.76 hectars for Proprietory concern and 191.86 hectares for the Public Sector undertakings. Among the Public Ltd. Companies the FERA companies seemed to have larger average non-tea area per estate than non-FERA companies. The Public Ltd. Companies including the Public Sector had more non-tea area within the grant as compared to other categories of ownership. It would imply that such ownerships have a greater scope for extension of tea cultivation provided the available lands within the grant are suitable for tea.

Table—14

Average Size of an Estate, Average Grant Area, Average Non Tea Area According to Ownership

Status of Ownership	Number of Estates	Total Area Under Tea (in Hectares)	Average Area Under Tea Per Estate (in Hectares)	Total Grant Area (in Hectares)	Average Area Under Grant Per Estate (in Hectares	Average Area Other Than Tea Area Per Estate (in Hectares)
Proprietory	2	321.89	160 95	709.42	354.71	193.76
Partnership	3	941.20	313.73	1847.07	615.68	301.96
Private Ltd.	16	4927.98	308 00	9459.20	591.20	283.20
Pub. Ltd. FERA	8	4787.34	598 42	7738.17	967.28	368 86
Non-FERA	57	27489.58	482.27	45201.21	793.00	310.73
Total Pub. Ltd,	65	32276.92	496.57	52939.38	814.45	317.88
Public Sector	5	1706.79	341.36	2666 12	533 22	191.86
Overall	91	40174.78	441.48	67621.19	743.09	301.61

1.7. The above analysis has been carried out separately in respect of the estates in Jalpaiguri Sadar and those located in Alipurduar Sub-division. For the estates in Jalpaiguri Sadar the average non-tea area per estate was 292.13 hectares on an overall basis and the corresponding figure for the estates in Alipurduar was recorded as 313.70 hectares. This indicated larger utilisation of the grant area for the estates in Jalpaiguri Sadar than those in Alipurduar. In particular, the Public Ltd. non-FERA companies reflected larger utilisation of the grant for the estates under Jalpaiguri Sadar than those in Alipurduar. There having largest representation of non-FERA ownership in the sample it may be concluded that there is a greater scope of bringing more areas under tea cultivation in Jalpaiguri Sadar than in Alipurduar.

Table – 14(a)

Average Size of an Estate, Average Grant Area, Average Non-Tea Area According to Ownership

(Area in Hectare)

Jalpaiguri Sadar

Status of Ownership	Number of Estates	Total area Under Tea	Avarage Area Under Tea Per Estate	Total Grant Area	Average Area Under Grant Per Estate	Average Area Other Than Tea Area Per Estate
Proprietory	2	321 89	160 95	769 42	354 71	193.76
Partnership	1	354.84	354 84	570.63	570.63	215 79
Private Ltd	10	3048.94	304 89	5929 02	592.90	288 01
Public Ltd FERA	7	4149.22	592,75	6866 55	980.94	388.19
Non-FERA	27	11848 29	438.13	19650.75	727.81	288.98
Total Pub. Ltd	34	15997 51	470 52	26517.30	779.92	300.40
Public Sector	4	1672 29	418 07	2567 75	641.94	223.87
Overall	51	21385 47	419.52	36294.12	711.65	292.13

Table—14(b)

Average Size of an Estate, Average Grant Area, Average Non-Tea Area Per Hectares According to Ownership

(Figures in Hectares)

Alipurduar

Status of Ownership	Number of Estates	Total Area Under Tea	Average Area Under Tea Per Estate	Total Grant Area	Average Area Under Grant Per Estate	Average Area Other Than Tea Area Per Estate
Proprietory	—	—	—	—	—	—
Partnership	2	586.36	293.18	1276.44	638 22	345.04
Private Ltd.	6	1879.04	313.17	3530.18	588 36	275.19
Public Ltd. FERA	1	638.12	638.12	871 62	871.62	233.50
Non-FERA	30	15641.29	518.04	25550.46	851.68	333 64
Total Pub Ltd.	31	16279.41	525.14	26442.08	852.32	327.18
Public Sector	1	34.50	34.50	98.37	98.37	63.87
Overall	40	18779.31	469.48	31327.07	783.18	313.70

Land Suitable for Extension :

1.8. In order to assess the availability of area not used in tea cultivation as well as the quantum of area which could be suitable for the cultivation the following analysis has been made :

Table—15(a)

Land Suitable for Extension of Tea Area by Size-Groups (Jalpaiguri Sadar)

Size-Groups (in Hectares)	Number of Estates	Average Grant Area Per Estate (in Hectares)	Land Suitable for Extension Per Estate (in Hectares)	Percentage of Land Suitable for Extn. to Total Grant Area
Above 8.09 to 50	..	—	—	—
Above 50 to 100	1	144.28	5.00	3.47
Above 100 to 200	6	333.14	124.71	37.43
Above 200 to 400	19	519.85	52.45	10.09
Abobe 400	25	970.96	34.13	3.52
All Groups	51	711.65	51.04	7.17

1.9. Primary analysis based on the sample estates in Jalpaiguri Sadar Table-15(a) would reveal that the average area suitable, for extension of tea area from waste, forest and other area was 51.04 hectares per estate. Such average area was found to be highest at 124.71 hectares for the estates above 100 to 200 hectares followed by the estates within the size-group of 200 to 400 hectares with 52.45 hectares of extensible area per estate. It may be suggested thet the estate under size-group 100 to 200 may lay emphasis on identification of suitable area for extension within the grant on a priority basis. Further, while about 58.95% of the total grant area of the estates in Jalpaiguri Sadar was under tea there was a scope of extension of tea in another 7.17% of the grant in so far as the sample estates were concerned.

1.10. In regard to the estates in Alipurduar around 77.09 hectares of area per estate were available for extension within the gtant. It was important to note that the size-group of above 100 to 200 hectares had

the maximum average area suitable for extension per estate for both Jalpaiguri Sadar and Alipurduar Subdivision. The analysis based on sample estates also indicated that with about 59.95% of the grant area of the estates under Alipurduar Sub-division being under tea there was a further scope of bringing 9.84% of the total grant under tea cultivation. Analysis on land suitable for extension by size-group for Alipurduar Sub-division has been given in Table-15(b) below:

Table– 15(b)

Land Suitable for Extension of Tea Area by Size-Groups in Alipurduar

Size-Groups (in Hectares)	Number of Estates	Average Grant Area Per Estate (in Hectares)	Land Suitable for Extension Per Estate (in Hectares)	Percentage of Land Suitable for Extension to Total Grant Area
Above 8.09 to 50	2	85.85	22.50	26.21
Abovee 50 to 100	1	277.10	100.00	36.09
Above 100 to 200	3	459.94	102.56	22.30
Above 200 to 400	10	524.98	57.78	11.01
Above 400	24	1010.37	85.54	8.47
All Groups	40	783.18	77.09	9.84

1.11. The analysis on land suitable ror extension has also been done ownershipwise separately for Jalpaiguri Sadar and Alipurduar Sub-division vide Table-16(a) and Table-16(b)

Table—16(a)

Land Suitable for Extension of Tea Area by Ownership in Jalpaiguri Sadar

Status of Ownership	Number of Estate	Average Grant Area Per Estate (Hectares)	Land Suitable for extension Per Estate (Hectare)	Percentage of Land Suitable for Extension to Total Grant Area
Proprietory	2	354.71	188.66	53.19
Parteership	1	570.63	40.00	7.01
Private Ltd.	10	592.90	79.62	13.43
Public Ltd. FERA	7	980.94	17.56	1.79
Non-FERA	27	727.81	41.03	5.64
Public Sector	4	641.94	39.71	6.19
Total	51	711.65	51.04	7.17

Table—16(b)

Land Suitable for Extension of Tea Area by Ownership in Alipurduar

Status of Ownership	Number of Estate	Average Grant Area Per Estate (Hectars)	Land Suitable for Extension Per Estate (Hectare)	Percentage of Land Suitable for Extension to Total Grant Area
Proprietory	—	—	—	—
Partnership	2	638.22	95.00	14.89
Private Limited	6	588.36	95.84	16.29
Public Ltd. FERA	1	871.62	5.13	0.59
Non-FERA	30	851.68	75.61	8.88
Public Sector	1	98.37	45.00	45.75
Total	40	783.18	77.09	9.84

Ownershipwise analysis revealed that Proprietory concern in Jalpaiguri Sadar and Public Sector undertakings in Alipurduar Sub-division had the maximum proportion of land suitable for extension under the total grant. In both the Snb-divisions estates under FERA company had the least proportion of land for extension. The survey therefore, recommsnds that Public Sector units in Alipurduar Sub-division may undertake suitable programme for identifying land suitable for extension within the grant on a priority basis,

1.12. It is estimated that around 6500 hectares of land could be available for extension planting within the leasehold grant of tea estates in Dooars. Bringing some areas under tea cultivation were reportedly constrained by various factors such as acquisition of land by the State Government under Estates Acquisition Act, protracted dispute and litigction over the lands vested with State Govt. under Land Ceiling Act, soil erosion problems otc. In consideration of the dearth of additional land for tea in Dooars such problems whereever possible need to be sorted out through mutual consultation with the appropriate authorities.

1.13 The North Bengal rivers generally originate from the hills of Darjeeling district and Bhutan Hills and flow through Terai and Dooars. Such rivers pose constant threat of flooding and erosion to the tea estates. Due to high intensity run-off from the catchments and steeper landslope, the rivers develop a tendency to widen the waterways resulting in bank erosion and change in the river courses. The rate of aggravation of certain rivers such as Pana, Pagli, Dumchi Suriti, Sukha, etc. are very high for their extensive bed load due to large scale deforestation, increase of human habitation etc. Moreover, due to extraction of minerals, blasting in the hills etc. by the Bhutan Govt. for their cement factory the catchment areas are losing their physiographical balance resulting in more bed material deposits and siltation in the river. A possible solution to the problem of soil erosion may take shape in the form of long term measures by taking up the matter appropriately with the Bhutan Govt. and a large scale soil conservation scheme may be evolved to maintain the hydrological balance. Immediate short term measures in the form of palliative works are however found imperative for saving the tea estates in Dooars from severe soil erosion problems. A short term anti-soil erosion scheme needs to be workd out jointly by the Government and the industry on top priority basis.

Progress of Extension, Replanting & Replacement:

1.14. An analysis has been made regarding the performance of extension planting replanting and replacement planting by the sample tea estates during 1986-90 separately in respect of sizegroup and status of ownership.

Table—17(a)

Extension, Replanting and Replacement Carried Out During 1986-90

Size-Group (Hectares)	EXTENSION				REPLANTING			REPLACEMENT			
	Number of Estates Undertaking Extn.	Area Extended in Last 5 years (Hectars)	Percentage to Total Planted Area	Percentage to Area Suitable for Extn.	Number of Estates Undertaking Replanting	Area Replanted in Last 5 years (Hectars)	Percentage to Total Planted Area	Number of Estates Undertaking Replacement	Area Replacd in last 5 years (Hectars)	Percentage to Total Planted Area	Percentage to Area Suitable for Extn.
Above 8 09-50	1	2.00	7.89	4.60	Nil	—	—	Nil	—	—	—
Above 50-100	1	8.70	10.04	8.70	Nil	—	—	Nil	—	—	—
Above 100-200	1	14.10	3.18	4.76	2	18.87	6 67	Nii	—	—	—
Above 200-400	11	201.85	3.46	21.71	12	240.62	4.13	1	6.30	0.11	0.68
Above 400	30	539.84	2.42	27.35	22	473.32	2.13	4	140.32	0.63	7.11
All Groups	44	766.49	2.68	22 92	36	732.71	2.56	5	146.62	0.51	4.39

Adequate data on actual performance on extension/replanting/replacement were not available. In fact only 61 out of the total 91 respondent tea estates made available relevant data. It may be seen from the above table that around 72% of the respondent sample tea estates carried out extension planting during 1986-90 covering a total area of 766.49 hectares. Most of the tea estates (30 in number) taking to extension activity belong to the sizegroup above 400 hectares. The number of tea estates taking to extension planting was found to be insignificant below the size-group of 200 hectares. On an overall basis the area under extension planting during 1986-90 was found to be 2.68% of the total area under tea. The percentage of area extended during the last 5 years over the total existing area suitable for extension was found to increase with the increase in size-group. This percentage was found to be maximum 27.35% for the size-group of above 400 hectares followed by the size-group of 200 to 400 hectares (21.71%), 50 to 100 hectares (8.70), 100 to 200 hectare (4.70%) and 8.09 to 50 hectares (4.60%). Such analysis indicates that resource mobilisation in regard to extension planting was greater in respect of higher size-groups.

1.15. The progress of replanting activity in Dooars was not proportionate with the old age of the existing bushes. It was found that while there was over 47% of the total planted area having bushes above 50 years of age, in less than 3% of such area replantiug was carried out within 1986-90. It was also noteworthy that only 5 tea estates undertook replacement planting during 1986-90 covering 0.46% of the total area tea. Replacement activity was carried out only by the estates above 200 hectares of size.

1.16. Ownership wise analysis revealed that the percentage of area extended over last 5 years to total existing extensible area was highest in respect of FARA companies and lowest in respect of Partnership firms. For Public Sector undertaking there was lesser utilisation of available extensible area for new plantation in comparison to other Public Limited companies. Further, Table-16(a) and Table-16(b) indicate that estates under non-FERA ownership and Public Sector undertakings had lesser availability of land suitable for extension in respect of Jalpaiguri Sadar than Alipurduar Sub-division. It may, therefore, be recommended that

the Public Sector undertakings and non-FERA companies may initiate suitable programme of new plantation within the grant with due priority for their estates in Alipurduar Sub-division.

1.17. Replanting activity for the Public Sector tea estates was found to be lesser in comparison to other category of ownership. Sample estates under such ownership revealed that only 3.48% of the total planted area was replanted during last 5 years while as much as 46% of the total planted area contained bushes above 70 years of age. It may, therefore, be recommended that planters in Dooars particularly Public Sector undertakings may lay due emphasis on replanting operation in order to boost up yield rate.

CHAPTER— II

Field Practices and Cultural Operation :

Age Composition of bushes :

2.1. Table-18(a) below will reflect the age composition of bushes according to size-wise classification of the sample estates. It was observed that while 57% of the total area under tea contained bushes over 50 years of age Over 23% of the total tea area contained bushes above 70 years of age. Around 6% of the total planted area contained young tea aged up to 5 years and in another 6% of the planted area bushes were between 5 to 10 years of age. Mature tea bushes having age between 10 to 50 years accounted for 41% of the total planted area. Such a analysis indicates that replantation activity in Dooars maintained a slow pace which needs to be accelerated in view of the old age of bushes in sizeable area. On enquiry it was learnt that the estates were not generally in favour of uprooting the old bushes fearing crop loss, particularly in the price boom situation. Moreover, there was a general feeling that a majority of the bushes over 70 years continued to produce good yield. The survey team is of the opinion that in the interest of long term growth of the Dooars tea industry, replanting activity is essential rather than depending too much on the tenacity of the old bushes. It is suggested that rates of replantation subsidy offered by Tea Board may be revised suitably commensurate with the current cost of replantation so as to induce the planters to take advantage of the Replantation Subsidy Scheme in a bigger way.

Table—18(a)

Age Composition of Bushes with Proportion of Planted Area by Size-Groups

(Figurs in Percentage)

(Jalpaiguri and Alipurduar Combined)

Size-Group (in Hectare)	Upto 5 years	Above 5 to 10 years	Above 10 to 30 years	Above 30 to 50 years	Above 50 to 70 years	Above 70 years	Total
Above 8.09 to 50	18.23	54.70	—	22.92	4.15	—	100
Above 50 to 100	5.15	1.08	0.54	9.86	56.57	26.80	100
Above 100 to 200	4.33	4.51	28.84	17.54	24 79	19.99	100
Above 200 to 400	7.43	4 55	22.75	17.86	30.74	16.67	100
Above 400	6.40	6.72	26 37	13.73	20.91	25.87	100
Overall	6.55	6.18	25.48	14.84	23.50	23.45	100

2.2. Table-18(b) below would indicate the age composition of bushes classified according to ownership status :

Table—18(b)

Age Composition of Bushes with Proportion of Planted Area by Ownership

(Figures in Percentage)

(Jalpaiguri and Alipurduar Combined)

Size-Group (in Hectares)	Upto 5 pears	Above 5 to 10 years	Above 10 to 30 years	Above 30 to 50 years	Above 50 to 70 years	Above 70 years	Total
Proprietory	Nil	Nil	9.68	52.50	23.20	14.62	100
Partnership	3.88	2.16	25.65	25.03	9.71	33.57	100
Private Limited	7.49	5.51	22.20	10.39	39.42	14.99	100
Public Ltd. FERA	6.85	4 88	29 39	15.00	13.20	30.68	100
Non-FERA	6.63	6.75	25.19	15.18	24.40	20.05	100
Total Pub. Ltd.	6 50	6.46	25.74	15.15	22.66	23.39	100
Public Sector	7.99	6.38	31 23	6.07	2.59	45.74	100
Overall	6 55	6 18	25.48	14.84	23.50	23.45	109

It is observed from the above table that estates under FERA ownership have the least percentage (44%) of area above 50 years of age among all other ownerships (excepting Proprietory). It is also noteworthy that despite having the maximum percentage (14%) of area under bushes below 10 years of age public Sector undertaking had as much as 48% of the area with bushes above 50 years. This indicated a greater need fof replanting operation in respect of the estates under Publc Sector undertaking.

2.3. Wider spacings were found to be prevalent in Dooars tea estates. In 21.88% of the total planted area the spacing was $4\frac{1}{2}' \times 4\frac{1}{2}'$. in 20.07% of the plantation spacings was $5' \times 5'$ followed by 7.48% with $5' \times 2\frac{1}{2}'$ ard 5.13% with $4' \times 4'$ spacing. The balance (45 52%) was accounted for by other spacings like $4' \times 2' \times 2'$, $4' \times 2\frac{1}{2}' \times 2\frac{1}{2}'$ $4' \times 3'$, $4' \times 2'$, $3\frac{1}{2}' \times 2\frac{1}{2}' \times 2\frac{1}{2}$, $4\frac{1}{4}' \times 2\frac{1}{2}$ etc. (in both regular square and staggered).

Tacle—19

Common Spacings Adopted By the Sample Tea Estates

Spacings	*Percentege to Total Area*
1. $4' \times 4'$	21 88
2. $5' \times 5'$	20.07
3. $5' \times 2'$	7.48
4. $4' \times 4'$	5.13
5. $4' \times 2, \times 2'$	3.89
6. $3' \times 4'$	2.99
7. $4' \times 2'$	1.58
8. Others	36 98
	100 00

It is felt that rejuvenation and consolidation with inter row planting would be helpful in the sections having wider spacing for improving the bush density and productivity of tea from a unit area.

Progress of Infilling and Vacancy Ratio :

2.4. Table-20(a) indicates detailed position regarding infilling operations undertaken in Dooars during 1986 to 1990 alongwith the average number of existing bushes per hectare, estimated maximum number of bushes per hectare classified according to different size-groups.

Table—20(a)

Vacancies and Progress of Infilling by-Size Groups During 1986-90

Size-Groups	Average Existing Bushes/ Hectare of Planted Area	Estimates of Maximum No. of Bushes Per Hectare Based on Spacing Adopted	Percentage of Vacancy	Avarage Nuæber of Plants/ Hectares Infilled During 1986-90	Percentage of Plants Infillied/ Hectare to Total No. of Existing Bushes/ Hectare
Above 8.09 to50	5900	7572	22 08	—	—
Above 50 to 100	5324	6655	20.00	—	—
Above 100 to 200	7069	8199	13 78	1766	26 32
Above 200 to 400	7553	8825	14 41	862	15 29
Above 400	9312	11217	16.98	1330	17 99
All Groups	8408	10003	15 94	1239	18 36

2 5. The above table reveals that the average number ot existing bushes per hectare of planted area was 8408 while the estimated maximum number of bushes per hectare based on the existing spacings worked out

as 10003. Therefore, the overall percentage of vacancy is estimated at around 15.94%. The survey reveals that on an average 1239 number of plants were infilled per hectare during 1986 to 1990. The percentage of infilling during the last 5 years to total existing bush population was estimated at 18.36%. The size group of above 100 to 200 hectares revealed the least percentage of vacancy at 13.78%. Among the estates above 100 hectares, those above 400 hectares showed a maximum percentage of vacancy of 16.98%. Estates within 100 to 200 hectares of size infilled maximum proportion of bushes (26.32%) over total existing bushes while the estates in the largest size-group had as much as 17% vacancy despite having substantial infilling performance over the 5 years period 1986-90. It may, therefore, be recommended that the largest size-group may continue their infilling programme in order to reduce the percentage of vecancy substantially. Thc smaller tea estates may initiate massive infilling programme to reduce the percentage of vacancy for increasing the yield rate.

2.6. The above analysis. when performed on the basis of ownership status, revealed that the percentage of vacancy was maximum (43.99%) for Proprietory firms followed by Partnership (22.08%). FERA companies showed lowest percentage of vacancy at 11.89% among all other size-groups. Public Sector companies revealed a vacancy percentage as high as 20.14% and none of the sample estates under such ownership reported any infilling operation done within the period 1986-90 It is recommended that infilling may be given priority for the estates under Public Sector undertaking to reduce the percentage of vacancy substantially. Judicious approach may be necessary in the matter of selection of sectors to be infilled as over 48% of the total area under Public Sector Estates contained bushes above 50 years of age.

Table—20(b)

Progress of Infilling of Bushes and Vacancy by Types of Ownership (1986-90)

Ownership	Average Existing Bushes Per Hectare of Planted Area	Estimated of Maximum No. of Bush Per Hectare Based on Spacings Adopted	Percentage of Vacancy	Average No. of Plants Per Hectare Infilled During 1986-90	Percentage of Plants Infilled Per Hectare to Total No. of Existing Bushes Per Hectare
Proprietory	4010	7160	43.99	—	—
Partnership	5900	7572	22.08	—	—
Private Ltd.	5018	6166	18.61	496	9.88
Public Ltd. FERA	7365	8359	11.89	529	7.18
,, ,, Non-FERA	11131	13171	15.49	1022	9.18
Total Pub. Ltd,	9959	11669	14.65	980	9.84
Public Sector	5774	7230	20.14	—	—
Overall	8508	10003	15.94	932	11.01

Irrigation :

2.7. The average rainfall in Jalpaiguri Sub-division was 421 cms. during 1988, 483 cms. during 1989 and 390 cms: during 1990, while for Alipurduar Subdivision these averaged to 544 cms., 436 cms. and 449 cms. respectively. Thus Alipurduar Sub-division happens to be more rain fed than Jalpaiguri Subdivision. Rainfall pattern in the district was reportedly sporadic and unevenly distributed. Occasional spells of drought affected the production in this district, Out of the 91 respondent tea estates as many as 69 had artificial irrigation facility in the form of sprinklers. A few smaller sized tea estates reported lack of adequate funds for installation of irrigation equipment.

2.8. All the estates surveyed used chemical fertilisers with varying doses, the common types of which were SOA, Super Phosphate, Rock Phosphate, MOP, etc. Besides, same organic manures like cow dung, oilcakes, etc. were used in the case of young teas.

Control of Weeds, Pests and Diseases :

2.9. All the sample tea estates in Dooars were affected by weeds of various types. Application of chemical weedicides was prevalent. Incidence of pests attack particularly by Red-spider, Helopelties, Scarlet Mite, Thrips, Purple Mite, Red slug and other Caterpillers pests was very common, The chemical pesticides generally used in Dooars tea estates were Thiodine, Ethion, Ekalux, Kelthane, Tedion, etc.

2.10. Apart from weeds and pests the common diseases that were found to infect tea bushes were Black rot, Redrust, Blister Blight, Fungus, Brown Rot, etc. Shade trees in many tea estates were found to be affected by Canker. In order to control the diseases copper Fungicides were nsed in varying proportions according to the intensity of attack.

2.11. Almost all the sample tea estates were found to adopt plant protection measures based on scientific norms and doses as per T.R.A.'s recommendations. In many of the tea estates particularly in the larger size-groups scientific advice regarding input application was obtained from private professionals know as Visiting Agents (V.A.). It is suggested that in regard to such advisory services T.R.A. should be given preference as the prime source of scientific and technical advice which are based on appropriate scientific reserch. Adequacy of technical know-how and experience should be taken into consideration for appointment of professional advisers in case such appointments are unavoidable. It was reported by many small sized tea estates that membership fee of T.R.A. was high and hence they could not afford to incur high expenditure in respect of scientific advisory services. The survey team recommends that T.R.A may offer such scientific advice at a concessional rate to the weaker estates.

Pruning Cycle :

2.12. In Dooars more than 50% of the sample tea estates were found to adopt 4 year pruning cycles mainly LP-UP-DS-UP-LP, LP-UP-MS-MS-LP, LP-UP-MS-UP-LP etc. while there were many other tea estates who adopted 3 year cycles lkie LP-UP-UP-LP, LP-UP-MS-LP etc. depending upon the climatic and bush codditions The pruning operation was guided by TRA recommendations in almost all the tea

estates. In a few Public Sector estates some deviation was noticed where pruning cycle varied widely

Plucking Round :

2.13. The plucking rounds adopted by the some tea estates had a seasonal variation but, in general, well calculated rounds were adopted based on rainfall, age of the bushes and also market conditions, During January to March a majority of the tea estates practised 8 to 10 days plucking rounds, during April to June 9 to 11 day during July to September 8 to 10 day and during October to December 10 to 12 day rounds. There having a direct impact of adoption of appropriate plucking round on the health of the bushes as well as the bearing of the bushes tea estates in Dooars were found to get all such technical advice by TRA which has its branch office at Nagrakata.

Standard of Plucking :

2.14. An analysis of the standard of plucking has been made on the basis of data furnished by the sample tea estates separately in respect of Jalpaiguri Sadar and Alipurduar Sub-divisions. The following table illustrates the position in respect of Jalpaiguri Sadar based on sizewise classification :

Teble—21(a)

Standard of Plucking and Average Yield of Green Leaf Per Bush During 1990 at Jalpaiguri Sadar by Size-Group

Size-Group (Hectare)	Average Bush Per Hectare	Plucking of Green Leaves (KG/HC)				Average Yield of Green Leaves Per Bush	Average Yield of Made Tea (Kg. Hectar)
		Two and A Bud	Three and A Bud	Others	Total		
Above 8.09	—	—	—	—	—	—	—
Above 500-100	5344	2141 (45.00)	1665 (35.00)	951 (20.00)	4757 (100.00)	0.89	1126
Above 100-200	6185	1735 (29.84)	3484 (59.93)	595 (10.23)	5814 (100.00)	1.12	1338
Above 200-400	7177	1956 (28.44)	3357 (40.24)	3030 (36.32)	8343 (100.00)	1.18	1821
Above 400	8434	2568 (32.50)	4000 (50.61)	1335 (16.89)	7903 (100.00)	1.04	1815
All Groups	7610	2349 (29.73)	3779 (47.82)	1774 (22.45)	7902 (100.00)	1.09	1788

(Figures in Brakets Indicate the Percentage to Total Quantum Plucked)

2.15 Finer pluckings like two leaves and a bud accounted for nearly 30% of the total crops harvested whereas it was 22% in Alipurduar during the year 1990. It was observed that the proportion of firer plucking was less for larger-sized estates (above 200 hectares) in comparison to lower size-groups. Plucking of three leaves and a bud was found to be widely practised. In some cases more case more than three and a bud dominated.

Table—21(b)

Standard of Plucking and Average Yield of Green Leaf Per Bush During 1990 at Alipurduar by Size-groups

Size-Group (Hectrae)	Average Bush Per Hactar	Plucking of Green Leaves (Kg/Hect.)				Avarage Yield of Green Leave Per Bush	Avarage Yield of Made Tea Kgs./Hectar
		Two and A Bud	Three and a Bud	Others	Total		
Above 8.09-50	12142	780 (13.87)	2810 (50.00)	2031 (36.13)	5621 (100.00)	0.45	1070
Above 50-100	8046	1564 (35.00)	1788 (40.00)	1117 (25.00)	4469 (100.00)	0.55	1122
Above 100-200	5223	1099 (20.97)	1758 (33.54)	2385 (45.49)	5243 (100.00)	1.05	1525
Above 200-400	8367	1494 (17.40)	4184 (48.74)	2906 (33.86)	8584 (100.00)	1.21	2155
Above 400	8066	1910 (23.60)	3539 (43.72)	2646 (32.68)	8095 (100.00)	1.08	1800
Overall	8213	1815 (22.50)	3584 (44.42)	2669 (33.08)	8068 (100.00)	1.05	1843

(Figures in brackets indicate the percentage to total quantum plucked).

2.16. Overall three and a bud pluckings constiude 70% and 77% of the total pluckings in Jalpaiguri Sadar and Alipurduar respectively.

2.17. Yield of green leaf during 1990 worked out to be around 7902 kgs. per hectare for Jalpaiguri Sadar and 8068 kgs. per heetare for Alipurduar. For both Jalpaiguri Sadar and Alipurduar Sub-divisions the yield of green leaf was found to be highest for the size-group of 200 to 400 hectares. This size-group also showed the highest average of green leaf per bush at 1 18kgs. and 1.21 kgs, respectively for the two Subdivisions.

2.18. This shows that the estates within size-group of 200 to 400 hectares despite having the same level of vacancy percentage as other size-groups enjoyed maximum yield of green leaf per hectare due to better upkeep and nurture of bushes in comparison to other size-groups.

2.19. Similar analysis when carried out on the basis of ownership revealed that average yield of green leaf per bush for Public Sector undertaking was lowest at 0.63 kgs. in spite of having largest average bush per hectare in both Jalpaiguri and Alipurduar Sub-divisions. The Survey therefore recommends that Public Sector undertaking should lay due stress on better upkeep of bushes together with adoption of proper plucking rounds and pruning schedules in order to improve the yield rates. The average yield of made tea in Dooars on the basis of the sample worked out to be around 1788 kgs. per hectare for Jalpaiguri and 1843 kgs. per hectare in Alipurduar Sub-division. The average yield at 1917 kgs. per hectare was found to be maximum in respect of FERA ownership among the estates in Alipurduar Sub-divison while the Private Limited Companies showed highest yield of 1840 kgs. per hectate in respect of Jalpaiguri Sub-division. The analysis on standard of plucking and yield rates for Jalpaiguri and Alipurduar Sub-divisions is given separately below vide Table Nos. 22(a) and 22(b).

Table – 22(a)

Standard of Plucking and Average Yield of Green Leaf Per Bush During 1990 at Jalpaiguri Sadar by Ownership

Ownership	Average Bush Per Hectare	Plucking of Green Leaf (Kg/Hect.)				Average Yield of Green Leaf Per Bush (Kg.)	Average Yield of Made Tea (Kg./Hect.)
		Two and a Bud	Three and a Bud	Other	Total		
Proprietory	2787	1755 (35.88)	2733 (55.89)	402 (8.23)	48.90 (100.00)	1.76	1153
Partnership	N.A.	2015 (40.00)	1679 (25.00)	3022 (45.00)	6716 (100.00)	N.A,	1480
Private Limited	6368	1940 (17.31)	6245 (55.71)	3024 (26.98)	11209 (100.00)	1.76	1840
Public Ltd.-FERA	8060	3048 (38.44)	3579 (45.14)	1301 (16.42)	7928 (100.00)	0.98	1811
Non-FERA	7765	2264 (28.61)	3766 (47.60)	1882 (23.79)	7912 (100.00)	1.02	1805
Total Public Ltd.	7853	2497 (31.54)	3710 (46.86)	1710 (21.60)	7917 (100.00)	1.01	1807
Public Sector	8789	3051 (40.79)	3195 (42.72)	1233 (16.49)	7480 (100.00)	0.85	1732
Overall	7632	2438 (29.73)	3921 (47.82)	1841 (22-45)	8200 (100.00)	1 07	1788

(Figures in brackets indicate the percentage to total quantum plucked)

Table—22(b)

Standrd of Plucking and Average Yield of green Leaf Per Bush During 1990 at Alipurduar by Ownership

Ownership	Average Bush Per Hectare	Plucking of Green Leaf (Kg./Hect.)				Average Yield of Green Leaves Per Bush (Kg.)	Average Yield of Made Tea (Kg./Hect.)
		Two and a Bud	Three and a Bud	Others	Total		
Properietory	—	—	—	—	—	—	—
Partnership	9333	1595	3440	283	5318	0.57	1195
		(29.99)	(64.69)	(5.32)	(100.00)		
Private Ltd.	7346	1546	3581	1689	6816	0.93	1388
		(22.68)	(52.54)	(24.78)	(100.00)		
Public Ltd. FERA	8887	3357	3776	1259	8392	0.94	1917
		(40.00)	(45.00)	(15.00)	(100.00)		
Non-FERA	8045	2028	3814	3121	8963	1.11	1911
		(22.63)	(42.55)	(34.82)	(100.00)		
Total Public Ltd.	8090	2099	3812	3021	8932	1.10	1911
		(23.50)	(42.68)	(33.82)	(100.00)		
Public Sector	18643	786	3942	3145	7863	0.42	1400
		(10.00)	(50.00)	(40.00)	(100.00)		
Overall	8076	2008	3769	2747	8524	1.06	1817
		(23.56)	(44.22)	(32.22)	(100.00)		

(Figures in brackets indicate the percentage to total quantum plucked)

Shade Trees :

2.20. The condition of shade trees was found to be good and well maintained. The common varieties of shade trees were Albizza odoratissima, Indigoferra tesmani, Derris robasta. In most cases the average spacings of shade trees was reported to be 40' x 40' but in quite a number of estates closer spacings were adopted for newly planted parmanent shade trees at 20' x 20', 20' x 30', 30' x 30', etc.

CHAPTER— III

Tea Machinery and Manufacturing of Tea :

Factory Operation :

3.1. All the surveyed tea estates in Dooars, with the exception of four had factories of their own to process the green leaf. Out of 87 tea estates having factories, 64 produced exciusively CTC and the rest produced CTC as well as other categories of tea.

Factories in Dooars were found to be fairly well equipped with upto-date machinery and a majority of them were in the process of modernisation. However in a few cases replacement of worn out machinery and augmentation of the number of machinery units was felt necessary. Power supply was an acute problem. In all the surveyed estates stand by generators were found to be used which rendered the cost of manufacture of tea high In the remote Western Dooars belt including the areas adjacent to Bhutan border absence of grid supply had been a chronic problem although tea estates in such areas were performing reasonably well. It is, therefore, recommended that as a basic necessity State Etectricity Board may look into the problem of inadequate power supply so that all the tea manufacturing units in Dooars are provided with adequate grid power supply,

3.2. The following table indicates the comparative position regarding production of CTC, Orthodox and Green tea by the sample tea estates classified under different ownerships.

Table—23

Manufacture of Teas by Different Methods During 1990

(In Percentage)

Ownership	C.T.C.	Orthodox	Green Tea	Total
Proprietory	100.00	Nil	Nil	100.00
Partnership	99.86	0 14	Nil	100.00
Private Limited	96.57	2,37	1.06	100.00
Public Ltd.-FERA	100 00	Nil	Nil	100 00
Non-FERA	96.36	2.17	1,47	100.00
Total Public Ltd.	97.27	1 63	1.10	100 00
Public Sector	100.00	Nil	Nil	100.00
Overall	97.25	1.71	1.04	100.00

It will be revealed from Table-23 that as much as 97% of the total manufacture was in the form of C.T.C. 2% Orthodox and the remaining 1% was in the form of Green tea. Ownershipwise analysis indicated that the entire manufacture of FERA and Public Sector tea estates was of C.T.C. variety while Green tea was manufactured by Piivate Ltd. and Non-FERA companies. The analysis, therefore, indicates that tea manufacture in Dooars has been almost entirely switched over of C.T.C. method and no immetiate plan was reported by the tea estates to switchover to any other form of manufacture. Withering arrangement was found to be satisfactory in most of the sample tea estates excepting a few in the Public Sector who reported inadequate space and inadequate number of witharing troughs. Some tea estates in the Public Sector and Private Ltd, undertakings reported lack of funds for improving and modernising withering arrangement.

3.3. Floor fermenting was found to be a fairly common practice in Dooars tea factories. The fermenting process in general was good with reasonable control of humidity and temperature. In a few tea estates under Public Ltd, Companies mono-rail system was in operation in order to optimise the quantum of fermenting per unit time as also to eliminate the idle time in the process. It would be desirable to install mono-rail system of fermenting by othar tea factories also so that manufacturing process can be improved upon with ultimate reduction in the cost of manufacture.

CHAPTER—IV

Labour

4.1. The average number of daily labour employed in Dooars during 1990 was 162680. Out of this 147558 (90·70%) worked in field and 15122 (9·30%) worked in factory. Of the total labour force, females comprised 44·93%. The number of resident and outside workers were 137589 and 25091 respectively. The average labour per hectare employed works out to 2 4 while the annual output per labour averaged at 702 kgs. These figures compare with the whole of North India at 2·36 and 677 kgs. and with all India at 2·37 and 730 kgs. respectively

4 2. The above is the profile on land labour-ratio on the basis of average daily employment in Dooars. The same study was also carried out on the basis of average labour on roll obtained from the surveyed tea estates taking into account diffrent sizegroups as well as ownerships.

Table—24

Average Number of Labour on roll per Hectare of planted area as on 31.12.90 and estimated average output of made Tea per Labour by Size—Group.

Size-Group	Average Labour on roll per hectare			Average Estimated output of made Tea per Labour (Kgs.)
	Permanent	Casual*	Total	
Above 8 09 to 50	2·11	0 18	2·29	533
Above 50 to 100	2·50	0·17	2·67	419
Above 100 to 200	2 16	0·24	2·40	549
Above 200 to 400	2 37	0·43	2 80	675
Above 400	2·34	0·59	2·93	635
Overall	2·34	0·53	2·87	641

* Based on average daily Casual Labour employment.

4.3. The above table indicates that the estimated overall average labour on roll per hectare as on 31.12.90 was 2·87. Sizegroupwise no noticeable variation in the average labour on roll was observed. The highest average labour on roll per hectare was found to be 2·93 for the size-group of above 400 hectares. Overage output per labour worked out to 641 kgs. The sizegroup of 200 to 400 hectare had maximum average labour productivity of 675 kgs. whereas the lowest average labour productivity of 419 kgs. has observed for the sizegroup of 50 to 100 hectares.

4·4 While the overall permanent labour per hectare was estimated at 2·34, such average employment was observed to be highest at 2 50 for the lowest sizegroup of above 50–100 hectares. Casual labourers ware engaged by all the sample tea estates. The average casual labour employment in Dooars was estimated at 0 53. It was revealed that casual labour employment per hectare increased with the increase in size-group of 200 to 400 hectares showed the highest labour productivity (675 kgs) despite having lesser casual labour employment (0 43%) than the district average (0 53).

4 5. The same analysis on the basis of ownership of the sample tea estates may be given as per Table 25.

Table—25

Average Number of Labour on roll per hectare of planted area as on 31.12.90 and estimated average output of made Tea per Labour by ownership.

Ownership	Average Labour on roll per hectare			Average estimated output of made Tea per Labour (Kgs.)
	Permanent	*Casual	Total	
Proprietory	1·94	0·74	2·68	430
Partnership	2·82	Nil	2·82	461
Private Ltd.	2·26	0·46	2·72	718
Pub. Ltd.—FERA	2·42	0·41	2·83	657
Non-FERA	2·32	0·58	2·90	647
Total Public Ltd	2·34	0·56	2·90	648
Public Sector	2·35	0·47	2·82	465
Overall	2·34	0·53	2·87	641

* Based on average daily casual labour employment.

4.6 It is observed from the above table that there was no significant variation in permanent employment over the different ownership classifications. Among the Private Ltd., Public Ltd. and Public Sector tea estates the average permanent labour employment per hectare was found to be highest (2·42) for FERA companies. Estates under FERA companies were found to employ the least number of casual labour per hectare (0·41) among all other ownerships. The average labour on roll per hectare was highest (2·90 for Public Ltd. Companies followed by Public Sector (2 82). Partnership (2·82), Private Ltd. (2·72) and Proprietory (2·68). The average

output of made tea was found to be maximum (718 kgs,) for Private Ltd. Ownership followed by FERA companies (657 kgs.). Average labour employment of Public Sector estates (2·82) being almost at par with the district average (2·87), labour productivity per hectare was lowest for Public Sector (465 kgs.) which was 38% lower than the district average, which implies that the estates under Public Sector undertakings need to increase the productivity of labour substantially by identifying unproductive job components, minimising idle time, optimum utilisation of resources, modernisation of equipment and motivational approach in labour management.

4.7. The average employment of permanent labour was more than casual labour. The employment of female casual labour per hectare was found to be more than male casual labour per hectare since casual labourers were mostly engaged for plucking. Child employment was made more on casual basis than permenent. It was reported that employment of casual labour was made mainly during peak plucking seasons.

4.8 Distribution of man-days spent on different types of field operations is given below :-

Table – 26

Distribution of man-days spent on different types of field oprerations during 1990.

Field Operations	Percantage to Total
1. Pluking	52·68%
2. Manuring	2·03%
3. Weeding	4·79%
4. Irrigation	1 02%
5. Disease Control	1·35%
6. Pruning	4·47%
7. Pest Control	3·25%
8. Others	30·41%
Total	100·00%

4 9. It was observed from the above table that 53% of total mandays was spent in plucking operation followed by 17% for the field operation like manuring, weeding, irrigation, pruning and plant protection. Other field operations for which the break up was not available constituted about 30% of the total mandays utilised in field practice.

4.10. As plucking happens to be the major field operation a detailed analysis is shown below regarding mandays spent on plucking alongwith other operations by size-group in the following table.

Table—27

Mandays Spent on pluking and other field Operations by size groups

Size-Groups (Hect.)	Field operations (In percentage)		
	Plucking	Others	Total
Above 8 09 to 50	90·18	9·82	100·00
Above 50 to 100	70·40	29·60	100·00
Above 100 to 200	54·13	45·87	100·00
Above 200 to 400	57·52	42·48	100·00
Above 400	51·23	48·77	100·00
Total	52·68	47·32	100·00

4 11. The above table indicates that utilisation of mandays in plucking was more in respect of lower sized estates compared to larger sized ones

4.12. The above analysis may also be made on the basis of ownership for which Table--28 and the following analysis are given below :

Table—29

Mandays spent on different types of factory operations

Factory operations	Percentage to Total
Withering	18·11
Rolling	18·37
Fermenting	12 49
Drying	12·86
Weighing/Sorting/Cutting	9·39
Packing	7 82
Others	20·96
Total	100·00

4·14 Based on available data from the surveyed tea estates, as reflected in the Table—29, it is observed that the maximum porportion of mandays was spent on withering and rolling (36%). Fermenting and drying operations constituted 12% and 13% respectively and the other operations like weighing/sorting packing etc. took altogether 38% of the total mandays spent. The survey recommends that in order to make the best use of available resources and optimum capacity utilisation, work study personal may be engaged to study the existing methods and to formulate ways and means for improving efficiency at the factory level.

4 15 Rates of daily wages for the tea workers in Dooars as on 1.6.91 including Dearness Allowance was Rs. 17 90

4.16 The Table - 30 below would show the distribution of daily wages and other amenities to labourers during the years 1988-90.

Table—29

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4.16 The Table 30 below would show the distribution of daily wages and other amenities to labourers during the years 1988-90.

Table—30

Percentage Distribution of wages and other amenities to labour during 1988-90

Item	Period			Average of 3 years from 1988 to 1990
	1988	1989	1990	
Wages & D. A.	74·81	74·07	72·26	73·71
Bonus & Others	25·19	25·93	27·74	26·29
Total	100 00	100·00	100 00	100·00

4.17 The above table indicates that wages and D.A. accounted for about 74% of the total wages bill and balance 26% was accounted for by other amenities like Bonus, Food concession etc.

4.18 Almost all the sample tea estates in Dooars offered fringe benefits to the workers like medicals and housing facilities, creche, subsidised ration, etc. In addition, recreational facilities were provided by the estates in different forms.

CHAPTER—V

Marketing :

5.1. Information collected from the sample tea estates revealed that on an average more than 75% of the teas produced was sold through auctions at Siliguri and Calcutta and a negligible quantity at Guwahati auction. The remaining quantity was sold ex-garden by way of private sales for domestic market and direct exports. Bulk of the domestic private sales constituted sales in consumer poly packs of different sizes. The following table illustrates the disposal of crop through auctions in India as well as other modes of sales during the three year period 1988-90,

Table—31

Primary Marketing of Tea During 1988—90

(Figures in Percentage)

Year	Sold Through Indian Auctions			Other Modes of Sales*	Overall
	Calcutta	Siliguri	Total		
1988	11·38	71·68	83·06	16·94	100
1989	11·28	63·89	75·17	24·83	100
1990	5·99	68·23	74·22	25·78	100
Average of 3 years.	10·41	67·88	78·29	21·71	100

Note : * Disposal by private sales (domestic), direct export, trade samples, gift to employees and sales through overseas auction.

5.2 It is revealed that on an average domestic auctions accounted for 78% of the total marketing of tea. The share of Siliguri auction was nearly 68% while Calcutta auction shared 10% of the total quantity sold.

5.3. It will be observed from Table – 31 that proportion of teas sold other than in auctions increased from 17% to 26% over the period 1988-90. The proportion of sales through Calcutta auction showed a declining trend over this period.

5.4. Average prices realised by the surveyed estates at different point of sales are shown in Table-33 below :

Table-32

Average Price Realised During 1988-90

(Figures in Rs Per Kg)

Years	Sold Through Indian Auctions			Other Modes of Sales	Overall
	Calcutta	Siliguri	Total		
1988	23 92	23·16	23·26	26 97	23·88
1989	33·28	36·97	36·41	42·05	37·80
1990	44·60	42·45	42·62	36 89	41·14
Average of 3 years	30·16	31·87	31·74	36·11	32·61

The average price per kg. of tea sold other than in auctions worked out to Rs. 36·11 during 1988-90 while the average price per kg. of tea sold through Indian auction was Rs. 31 74. The dominance of price through non-auction sales over the auction sales was observed during 1988 and 1989 while thereafter the auction prices dominated over non-auction prices. Since Dooars is traditionally a CTC - producing district the survey recommends that there should be a larger through-put of Dooars teas at Indian auctions in order to facilitate balance in demand supply equation in the domestic market and also to derive maximum advantage of auction as an organised mode of disposal

5.5. The overall price at Calcutta auction during 1988 to 1990 averaged to Rs 30.16 per kg. while at Siliguri the price was Rs. 31 87 per kg. During 1990 the average price at Calcutta auction was Rs. 44·60 per kg. which was higher than the price at Siliguri by Rs. 2·15. Thus, despite having a scope of better prices Calcutta auction attracted only 6% of the total disposal of Dooars tea during 1990. Higher transport cost and other incidental charges were reported to be the main causes for lesser throughput at Calcutta auction. Apart from this the surveyed estates complained about bad condition of roads which make smooth transportation of teas to distant auction centres difficult.

5.6 Primary marketing of tea by estates belonging to different ownerships during the period 1988 to 1990 is illustrated in the following Table :—

Table-33

Primary Marketing of Tea by Ownership During 1988-90

(In Percentage)

Status of Ownership	Sold Through Indian Auctions			Not sold through auction	Overall
	Calcutta	Siliguri	Total		
Proprietory	Neg.	32·21	32·21	67 79	100
Partnership	Nil	80·45	80·45	19·55	100
Private Ltd.	0·10	86·73	86 83	13·17	100
Pub. Ltd. FERA	13·20	56·54	69·74	30·26	100
Non-FERA	12·29	66·48	78·77	21·23	100
Total Pub. Ltd.	12·49	64·35	76·84	23·16	100
Public Sector	33·45	65·48	98·93	1·07	100
Average of years	10'41	67·88	78·29	21·71	100

Neg. : indicates Neglible

It is seen from the above table that on an average during the period 1988 to 1990 the proportion of disposal of crop through auction was minimum at 70% for FERA ownership and maximum at 87% for Private Limited, ownership. Percentage through-put at Calcutta auction was found to be maximum at 13% for FERA ownership. It can also be inferred from the above analysis that the sample estates above 200 hectores, which were mainly concentrated under Public Ltd. ownership status sent less proportion of teas to auctions in comparison to estates under other ownerships. The survey recommends that estates under different ownerships with non-FERA ownership in particular, may opt for increasing their offerings at auctions both quantitatively and qualitatively so as to fetch a remunerative price.

5.7. Average prices realised by the surveyed estates for different types of ownership are given below :

Table—34

Ownershipwise average price realised by estates

During 1988—90 (Figures in Rs./Kg.)

Status of Ownership	Sold through Indian Auctions			Not sold Through Auctions	Overall
	Calcutta	Siliguri	Total		
Proprietory	29·58	32·96	32 96	31·98	32·30
Partnership	Nil	32·56	32·56	33·37	32·71
Private Ltd.	38·53	34·77	34·77	27·17	33·77
PUB LTD—FERA	35·16	38·45	37·83	41·11	38·82
Non-FERA	28·69	29·55	29·42	35·43	30·69
Total Pub. Ltd.	30·15	30·22	21·05	37·01	32·42
Public Sector	33·74	34·36	34·15	36·40	34·17
Average	30·16	31·87	31·74	36·11	32·61

Table—34 throws light on the point that average auction price realisation by Private Ltd. Companies was Rs. 34·77 per kg. which was higher than the prices through non-auction sales by Rs. 7·60, For all other ownerships the prices through auctions remained less than those realised through non-auction marketing channel. The dominance in non-auction price over the prices through auctions was more in respect of non-FERA ownership as compared to FERA ownership. Since a major portion of the total sales accounts for auction the survey recommends that quality improvement for teas meant for auctions may be stressed upon so as to match with the higher prices at other private channels.

5.8. A major share of CTC teas produced in Dooars finds its way to domestic market. With a view to ensuring remunerative and stable price realisation in the domestic market, it is suggested to adopt a calculated approach in the matter of optimum product-mix decision on various grades and quality-characteristics vis-a-vis market supply and demand. It is recommended that a market intelligence study may be undertaken by some appropriate apex body to formulate advisory recommendations under different circumstances.

CHAPTER—VI

Cost of Production

6.1. There was considerable difficulty in obtaining the cost data and the Profit and Loss A/C Statements from the tea estate/companies. Even though they were available, in quite a number of cases, the information was so kept that it was difficult to isolate the data on a particular aspect. On the basis of information obtained from only a few tea estates/companies, an attempt has been made to analyse and highlight different cost components with a comparison between the cost of production and price realisation.

Table—A

Cost of Production of Made Tea During 1988-90

(IN RS/KG.)

Sl. No.	Item of Expenditure	1988	1989	1900	Overall	
					Rs./Kg.	Percentage
1.	Establishment at Garden	1·24	1·71	2·44	1·80	6·71
2.	Cultivation	3·03	3·10	3·71	3·28	12·23
3.	Plucking	2·27	2·29	2 65	2·40	8·95
4.	Manufacturing	2·66	2·77	3·63	3·02	11·27
5.	Maintenance and Repairs	1·08	1·64	1·32	1·35	5·04
6.	Packing	2·06	2·31	1·98	2·12	7·91
7.	Freight & Transport	0 35	0·36	0·47	0·39	1·45
8	Duties & Taxes	0·66	1·25	1·39	1·10	4·10
9.	General Charges	6·13	5·82	6·98	6·31	23·54
10.	Office Expenses	3·39	3·60	2·22	3·07	11·45
11.	Selling Expenses	1·76	1·89	2·27	1·97	7·35
	Total	24·63	26·74	29·06	26·81	100·00

(General charges include interest on capital, managerial remuneration, audit charges, welfare expenses and other miscellanous expenses.)

The above analysis reveals that cost of production per kg of made tea in respect of estates under survey increased over the period from 1988 to 1990. The unit cost of production during the year 1988 was estimated at Rs. 24·63 per kg. which increased to Rs. 26·74 per kg in 1989 and further to Rs. 29·06 per kg. in 1990.

6.2. It was noticed that there was an increase in cost for each of the cost components except packing and office expenses. The average expenditure for the period 1988 to 1990 was found to be highest in respect of general charges (Rs. 6·31), followed by cultivation (Rs. 3·28) office expenses (Rs. 3·07), plucking (Rs. 2·40), packing (Rs. 2·12) and selling expenses (Rs. 1·97). The lowest average expenditure (Re. 0·39) was observed in the case of freight and transport. The average expenditure on duties and taxes worked out to Rs. 1·10 per kg.

6.3. The proportion of different items of expenditure to total cost of production per kg. of made tea by different size groups revealed that the proportion of expenditures incurred on cultivation to total cost of production was maximum at 15·34% in the estates within the size groups of 50 to 100 hectares, while it was minimum at 6·18% for the size group of 100 to 200 hectares. In fact, the proportion of different cost items were found to have a fluctuating trend among the size groups, particularly in respect of establishment at garden, general charges, packing, office expenses and selling expenses. Manufacturing cost accounted for 14% in the size group 100 to 200 hectares as also in the size groups 8·09 to 50 hectares followed by 13% in the size group 50 to 100 he ctares and 12% in each of the size groups above 200 hectares. The table below shows the details :

Table-B

Proportion of different items of expenditure to total cost of production per kg. of made tea in different size group (Average of 1988-90)

(Figures in Percentage)

SL. No.	Item of Expenditure	Size — Group (Hectares)					
		8·09 To 50	50 To 100	100 To 200	200 To 400	Above 400	Overall
1.	Establishment at garden	7·82	8·05	8·72	7·13	5·26	5·85
2.	Cultivation	14·86	15·34	6·18	13·44	11·20	11·94
3.	Plucking	9·44	9·74	9·42	9·06	8 41	8·33
4.	Manufacturing	13 60	13·56	13·73	11·89	12·32	10 66
5.	Maintenance & repairs	14·72	3·36	7·68	7·65	4·61	5·42
6·	Packing	8·59	11 17	3·94	5·12	9·23	8·60
7.	Freight and transport	1·69	1·73	2·49	1·67	2·58	1·65
8.	Duties & Taxes	2·25	1·16	2·23	2·20	4·23	3·88
9.	General charges	2·74	23·05	34·22	23 13	22·03	23·44
10.	Off ce expenses	15·49	8·24	9 42	15·41	12·20	13·11
11.	Selling expenses	8·80	4·60	1·97	3·30	7·93	7·12
	TOTAL ...	100·00	100·00	100·00	100 00	100 00	100·00

6.4. Ownershipwise, the proportion of cost of cultivation was highest for Partnership followed by Non-FERA Public Limited Companies, the FERA Companies, the Private Ltd. Companies and the Public Sector Undertakings. The proportion of office expenses was found to be highest at 23% for Public Sector Undertakings. PSUs incurred as much as 29% of the expenditure on general charges. It may be recommended that the estates under Public Sector Undertakings may identify unproductive/infructuous items overheads so as to reduce the cost of production of made tea and augment their profit realisation.

6.5. In order to assess the economic viability of the tea estates in Dooars, an analysis has been made to study the sale-cost differential on ownershipwise basis.

Table – C

Estimated cost price and sale price by status of ownership for 1988–90 **(In Rs./Kg.)**

Status of Ownership	Cost Price	Sale Price	Sale—Cost Differential
Proprietory	N A.	31·30	N A.
Partnership	N.A.	32·71	N A.
Private Limited	23·66	33·77 (+)	10·11
Public Limited FERA	27·59	38·82 (+)	11·23
Non-FERA	29·53	30·69 (+)	1·16
Public Sector	26·64	34·17 (+)	7·53
Overall	26·81	32·61 (+)	5·80

It may be seen from the Table above that sale-cost differential for the period 1988—90 was maximum at Rs. 11·23 for estates under FERA Companies, followed by Rs. 10·11 for Private Limited ownership and Rs. 7·53 in respect of Public Sector Undertakings. The performance in regard to the sale-cost differential was found to be less than encouraging in respect of Public Sector Undertakings under the State Government. The performance by the estate under FERA Companies was found better than any other undertaking. On enquiry it was known that such better performance was not only due to effective cost management system but also due to qualitative improvement.

CHAPTER – VII

Finance and Profitability

7.1. Non availability of sufficient number of balance sheets and P & L Account Statements was a deterrent factor in compilation of the financial information necessary for the survey. Financial information could be collected from only a limited number of companies. Prima facie, it was observed that nearly 70 to 75% of the respondent tea companies during 1990—91 made profits. A comprehensive analysis has been carried out based on some standard financial ratios which would reveal certain highlights on the financial performance situation by the tea companies The values of the ratio are summarised in the following table.

Ratio Analysis

	1988—89	1989—90	1990—91
1. Working Capital Ratio	1·89	1·74	1·57
2. Profit after tax as percentage of net worth	38%	33%	26%
3. Debt—equity ratio	2·11	1·79	4·22
4. Debt net worth ratio	0 41	0·30	0·50
5. Profitability ratio	30·39%	51·28%	36·35%
6. Return on Capital employed	47·30%	61·34%	55·53%
7. Profit before tax as % of sales	20·85%	28·73%	26·25%
8. Profit retained as % of profit after tax	28·21%	20·43%	4·19%

Interpretation of the Ratios

A. Working capital ratio $= \frac{\text{Current Assets}}{\text{Current liabilities \& Provisions}}$

B. Net worth = Capital + Reserve + Surplus

C. Debt Equity Ratio $= \frac{\text{Secured loans}}{\text{Paid up share capital}}$

D. Debt net worth ratio $= \frac{\text{Secured Loans}}{\text{Net worth}}$

E. Profitability Ratio $= \frac{\text{Profit before tax + interest}}{\text{Net worth + Secured loans}}$

F. Return on capital employed $= \frac{\text{Profit before tax + interest}}{\text{Capital employed}}$

Where,

Capital employed=Total assets—current liabilities

G. Retention=Profit after Tax less appropriation plus depreciation.

7.2. **Working Capital Ratio (Acid Test Ratio)** as an indicator of liquidity strength of the tea companies actually declined from 1·89 during 1988—89 to 1·57 during 1990—91. This explained increasing dominance of current liabilities over current assets. The declining trend in the solvency situation indicated floundering position in the availability of working capital which is poised to adversely affect the sustenance and development of tea economy in Dooars unless effective/corrective steps are immediately taken to root out the problems.

7·3 It is also seen that profit after tax as a percentage of net worth also slided down from 38% to 26% during 1988—89 to 1990—91 This indicated declining performance of capital productivity of Dooars Tea companies over the years. It is recommended that immediate steps need to

be taken in the matter of reducing unproductive expenses with a clear identification of high cost areas in order to reduce unit cost of production. Improvements of quality standard also seems to be of utmost importance to augment the sale-cost differential which would give impetus to the much needed improvement in profitability, attract larger investment and ensure better capacity to bear the cost of capital.

7.4 Debt-Equity Ratio of the tea companies was actually doubled during the year 1990—91 from the level of 2·11 during 1988—89. Such increase in debt equity ratio in the face of stagnant profitability situation shows the industry's failure in generation of internal resources and the consequent over - dependence on borrowed funds. Apparent fall in the debt equity ratio during 1989-90 could be attributable to lower emphasis on the funds from borrowed sources in that year.

7.5 Return on capital employed was estimated at 47·30% during the year 1988–89 which increased to 61·34% in the following year but subsequently came down to 55·53%. Profit before tax as a percentage of net sales showed a similar trend of fluctuation over the three year period.

7.6 Profitability ratio was 30·39% in the year 1988-89 which substantially increased to 51·28% in the following year. The down-swing in profit after tax as a percentage of net worth over the three years when compared to the profitability ratio profile during the same period reveals the contribution of tax provision factor in the over all declining profitability. It is recommended that State Govt. may consider suitable ways and means to reduce the rate of Agricultural Income Tax on tea in consideration of the constrained economy of the Dooars Tea Industry.

7.7 Capital structure of the tea companies in Dooars seems to be highly geared with increased employment of secured loan over the years which failed to improve the profitability situation. While such phenomenon was observed in respect of a majority of the tea copanies except a few well-managed FERA and Public Ltd. companies, it is apprehended that such situation would usher in possible debt-trap in the near future with a steady increase in the cost of capital unless positive strategy is adopted in reduction of cost and judicious balance between debt-financing and effective equity management.

PART III

Summary of
Findings and Recommendations

PART—I

CHAPTER—II

Survey Design and Distribution of the Sample

Out of the 96 sample tea estates only 91 have responded. The largest concentration was noticed in Public Ltd. companies.

.... Among the 5 sample tea estates under Public Sector, 2 were owned and managed by State Govt. undertaking while 3 were under Central Govt. undertaking. (2-6)

.... Dooars Tea Industry was dominated by large holdings under Public Ltd. Companies. The operation of Proprietory, Partnership and Pvt. Ltd. holdings, was found to be in a lesser preportion. (2-7)

..... The size-groups of above 400 hectares accounted for nearly 73% of the total area under tea followed by 23% in the size-groups above 200 to 400 hectares. (2-8)

..... Out of the total 91 respondent tea estates all were reported to have membership of producers Associations viz. DBITA, TAI, and ITPA. As many as 79 were reported to be the members of TRA.

..... In consideration of wide coverage and location of the large number of tea estates in far flung areas, the present infra-structure of the Siliguri Sub-Regional Office was inadequate which needed to be further strengthened. Alternatively, it is recommended that a new Sub-Regional Office of Tea Board may be opened at Jalpaiguri to facilitate timely monitoring of tea development schemes for the Dooars Tea Industry which will be particularly beneficial to the tea estates under Alipurduar Sub-Division. (2-13)

PART—II

CHAPTER - I

Mode of Utilisation of Grant Area

Tea was cultivated in 40,175 hectares out of the total grant of 67,621 hectares of surveyed estates indicating 59% utilisation of the total grant by way of tea cultivation.

..... As much as 23,916 hectares remained as "other areas" containing forests, fallow and waste land, factory buildings, staff and labour quarters, bungalows, road, bridges, culverts etc. The survey could reveal that around 28% of such "other area" could be made use of suitable for tea cultivation. (1·1)

..... The percentages or area utilisation within the two size-groups of above 50 to 100 hectares and above 100 to 200 hectares were found to be low in comparison to other size-groups.

..... There is a greater scope for the estates above 200 hectares to identify the available areas within the grant in order to take up extension planting. (1·2)

..... It is imperative to extend tea cultivation within the available grant for all categories of ownership. Along with it, greater emphasis needs to be taken by Public Sector undertaking for meticulous upkeep of bushes, proper irrigation and use of high yielding planting materials in order to improve the low yielding pattern of this category of tea estates. (1.4)

..... Tea was cultivated in an average area of 441·48 hectares per estate constituting 59% of the total grant.

..... Such observations therefore indicates that the utilisation of grant area for tea cultivation by an average estate was comparatively more for the estates above 200 hectares than those below 200 hectares. (1·5)

..... Among the Public Ltd. companies the FERA companies seemed to have larger average non-tea area per estate than non-FERA companies. The Public Ltd. companies including the Public Sector have more non-tea area within the grant as compared to other categories of ownership. Such ownership had largest scope of extension of tea cultivation provided the available lands within the grant are suitable for tea. (1·6)

..... There is a greater scope of bringing more areas under tea cultivation in Jalpaiguri Sadar than in Alipurduar. (1·7)

..... For the estates in Jalpaiguri Sadar the quantum of land per estate suitable for extension planting was highest for the size-group of above 100 to 200 hectares. It may be suggested that the estate under this size-group may lay emphasis on identification of suitable area for extension within the grant on a priority basis. (1·8)

... . Public Sector undertakings in Alipurduar Sub-Division had the maximum proportion of land suitable for extension under the total grant. Public Sector units in Alipurduar Sub-Division may undertake suitable programme for identifying land suitable for extension within the grant on a priority basis. (1·11)

..... Around 6,500 hectares of land was said to be readily available for extension planting within the leasehold grant of tea estates in Dooars. Bringing some areas under tea cultivation were reportedly constrained by various factors such as acquisition of land by the Govt. under Estates acquisition Act. protracted dispute and litigation under the Govt's Land Ceiling Act, Soil erosion problems etc. In consideration of the dearth of additional land for tea in Dooars such problems wherever possible need to be sorted out through mutual consultation with the appropriate authorities. (1·12)

..... The progress of replanting activity in Dooars was not in confermity with the old age of the existing bushes. It was found that while there was over 47% of the total planted area having bushes above 50 years of age. less than 3% of such area replanting was carried out during the five year period from 1986 to 1990. (1·13)

..... Estate under non-FERA ownership and Public Sector undertaking had lesser availability of land suitable for extension in respect of Jalpaiguri Sadar than Alipurduar Sub-Division.

..... The Public Sector undertakings end non-FERA companies may initiate suitable programme of new plantation within the grant with due priority for their estates in Alipurduar Sub-Division. (1·14)

..... Replanting activity for the Public Sector tea estates was found to be lesser in comparison to other category of ownership.

..... Planters in Dooars particularly the Public Sector undertakings may lay due emphasis on replanting operation in order to boost up yield rate. (1·15)

..... The North Bengal rivers generally originate from the hills of Darjeeling district and Bhutan Hills and blow through Terai and Dooars. Such rivers pose constant threat of flooding and erosion to the tea estates. Due to high intensily run off from the catchment's and steeper land slope, the rivers develop a tendency to widen the waterways resulting in bank erosion and change in the river courses. The rate of aggravation of certain rivers such as Pana, Pagli Dumchi, Surti, Sukha, etc. are very high for their extensive bed load due to large scale deforestation, increase of human habitation etc. Moreover, due to extraction of minerals, blasting in the hills etc. by the Bhutan Gvt. for their cement factory the catchment areas are losing their physiographical balance resulting in more bed material deposits and siltation in the river. A possible solution to the problem of soil erosion may take shape in the form of long term measure by taking up the matter appropriately with the Bhutan Gvt. and a large scale soil conservation scheme may be evolved to maintain the hydrological balance. Immediate short term measeres in the form of palliative works are however found imperative for saving the tea estates in Dooars from severe soil erosion problems. A short term antisoil erosion scheme needs to be worked out jointly by the Gvt. and the industry on top priority basis. (1·13)

CHAPTER—II

Field Practice and Cultural Operation

..... Over 23% of the total area contained bushes above 70 years of age. .....Replanting activity maintained a slow pace while such activitiy was badly needed due to the presence of sizeable area under age-old bushes.....In the interest of long term prospects and potential future growth of the Dooars Tea Industry replanting activity is essential rather than depending too much on the tenacity of the old bushes. It is suggested that rates of subsidy offered by Tea Board may be revised sutiably in conformity with the current cost for uprooting and replanting activities so as to induce the planters to take advantage of the Replantation Subsidy Scheme in a bigger way. (2 1)

..... Public Sector undertaking had as much as 48% of the area with bushes above 50 years. This indicated a greater need for replanting operation in respect of the estates under Public Sector undertaking and as such the estates under such ownership may undertake replantation on a priority basis. (2·2)

..... Wider spacing were found to be prevalent. In 21·88% of the total planted area the spacing was $4\frac{1}{2}' \times 4\frac{1}{2}'$. In 20·70% of the plantation spacings was 5' × 5' ..... It was therefore felt that rejuvenation and consolidation with interrow planting was necessary for improving the bush density and field productivity. It is recommended that tea estates in Dooars may avail subsidy under Tea Area Rejuvenation and Consolidation Subsidy Scheme of Tea Board. (2 3)

..... Average number of existing bushes per hectare of planted area was 8,408..... .....the overall percentage of vacancy was around 15-94%.

.... The percentage of infilling during last 5 years to total existing bush population was estimated at 18 36%.

..... Largest sizegroup may continue their infilling programme in order to reduce the percentage of vacancy substantially. The smaller tea estate needs to initiate massive infilling progamme to reduce the percentage of vacancy to bring it at par with the larger tea estates and boost up their yield rate. (2·5)

..... On the basis of ownership status, infilling operation may be given priority for the estates under Public Sector undertaking to reduce the percentage of vacancy substantially. Judicious approach is necessary in the matter of selection of sectors to be infilled since more than 48% of the total area under Public Sector estates contained bushes above 50 years of age. (2·6)

..... Alipurduar Sub-Division happens to be more rain fed than Jalpaiguri Sub-Divition. Rainfall pattern in the district was reportedly sporadic and unevenly distributed. Occasional spells of drought affected tea production in this district. Out of the 91 respondent tea estate as many as 69 had artificial irrigation facilities mainly in the form of sprinklers. A few smaller sized tea estates reported lack of adequate fund for installation of irrigation device (2·7)

..... All the estates surveyed used chemical fertilisers with varying doses, the common types of which were SOA, Super Phosphate, Rock Phosphate, MOP etc. Besides, some organic manures like cow dung, oilcake etc., were used in the case of young teas. (2·8)

..... Apart from weeds and pests the tea plantation in Dooars was affected by fungal diseases like Black rot, Redrust, Blister blight, Brown Root rot etc. (2·10)

..... In regard to advisory service requiremnt. TRA should be given preference as the prime source of scientific research. Adequacy of technical-know-how and experience should be taken into consideration for appointment of professional advisers in case such appointments are unavoidable. It was reported by many small sized tea estates that membership fee of TRA was high and as such they could not afford to incur high expenditure in respect of scientific advisory services. The survey recommends that TRA may offer such scientific advice at a concessional rate to the weaker estates. (2·11)

..... In Dooars more than 50% of the sample tea estates were found to adopt 4 years pruning cycles. Other tea estates adopted 3 year cycle (2·12)

..... The plucking round adopted by the sample tea estates had a seasonal variation but in general, calculated round were adopted based on rainfall, age of the bushes and also market conditions. (2·13)

..... Finer pluckings like two leaves and a bud accounted for nearly 30% of the total crop harvested in Jalpaiguri Sadar whereas it was 22% in Alipurduar. (2·15)

..... For both Jalpaiguri and Alipurduar Sub-Division the yield of green leaf was found to be highest for the sizegroup of 200 to 400 hectares having also largest average of green leaf per bush at 1·18 kgs. and 1·21 kgs. respectively. (2·17)

..... Estates within sizegroup of 200 to 400 hectares despite having same level of vacancy percentage as other size groups enjoyed maximum yield of green leaf per hectare due to better upkeep and nurture of bushes in comparison to other size groups. (2·18)

..... Average yield of green leaf per bush for Public Sector undertaking was lowest at 0·63 kg., in spite of having largest average bush per hectare in both Jalpaiguri and Alipurduar sub-Division. The survey therefore recommends that Public Sector undertaking should lay due stress on better upkeep of bushes together with adoption of proper plucking round and pruning schedules in order to improve their yield rates. The average yield of made tea in Dooars on the basis of sample worked out to be around 1,788 kgs. per hectare for Jalpaiguri and 1,843 kgs per hectare in Alipurduar Sub-Divison. (2 19)

CHAPTER – III

Tea Machinery and Manufacturing of Tea

..... Out of 87 tea estates having factories, 64 produced exclusively C.T.C. and the rest produced C.T.C. as well as other categories of tea. General condition of the factories in Dooars was found to be fairly well with upto date machinery and a majority of them were in the process of modernisation..... ....Inadequate power supply was an acute problem. In all the surveyed estates stand by generator sets were found to be used which rendered the cost of manufacture of tea high.

..... As a basic necessity State Electricity Board may look into the problem of power supply, so that all the tea manufacturing units in Dooars are provided with adequate grid power supply. (3·1)

..... As much as 97% of the total manufacture was in the form of C.T.C. 2% Orthodox and the remaining 1% in the form of Green tea.....Withering arrangement was found to be satisfactory in most of the sample tea estates excepting a few in the Public Sector who reported inadeqate space and inadequate number of withering throughs. (3·2)

Floor fermenting was found to be a fairly common practice in Dooars tea factories. The fermenting process in general was good with reasonable control of humidity and temperature. It would be desirable to install monorail system of fermenting by all the tea factories as used in the large sized and Public Ltd Companies so that the manufacturiug process can be improved upon with the ultimate reduction in the cost of manufacture. (3·3)

CHAPTER—IV

Labour

..... the estimated overall average labour on roll per hectare was 2·87. Overall average output per labour worked out to be 641 Kgs. (4·3)

..... the overall permanent labour per hectare was estimated at 2·34. (4·4)

..... the estates under Public Sector undertakings need to increase the productivity of labour substantially by identifying unproductive job components, minimising idle time, optimum utilisation of resources, mordernisation of equipment and motivational approach in labour management. (4 6)

..... 53% of total mandays was spent in plucking operation followed by 17% for the field operation like manuring, weeding, irrigation, and plant protection. Other field operations constituted about 30% of the total mandays utilised in field practice. (4·9)

..... Utilisation of mandays in plucking was more in respect of lower sized estates as compared to larger sized ones. (4·11)

..... The survey recommends that the estates under Public Sector undertaking may lay greater stress on the essential field operations like irrigation, manuring, pruning, weed control and pest control, nature of tea plantation etc (4·12)

..... The survey recommends that in order to make the best use of available resources aud optimum capacity utilisation, work study personnel may be engaged to study the existing methods and to formulate ways and means for improving efficiency in the factory level. (4·14)

..... wages and D.A accounted for about 74% of the total wages bill and the balance 26% was accounted for by other amenities like bonus, food concession etc. (4 17)

CHAPTER—V

Marketing

..... On an average more than 75% teas produced was sold through auctions at Siliguri and Calcutta. (5·1)

..... Since, Dooars is traditional a C. T. C. tea producing district the survey recommends that there should be a larger throug-put of Dooars teas at Indian auctions in order to facilitate balance in demand supply equation in the domestic market and also to drive maximum advantage of auction as an organised mode of disposal. (5 4)

..... Despite providing a scope of better prices Calcutta auction attracted only 6% of the total disposal of Dooars tea..... Higher transport cost and other incidental charges were reported to be the main causes for lesser through-put at Calcutta auction. Apart from this the surveyed estates complained about bad condition of roads for smooth transportation of teas to distant auction centres (5·5)

..... Sample estates above 200 hectares which were mainly concentrated under Public Ltd. ownership sent lesser proportion of teas to auctions in comparison to estates under other ownerships.....The survey recommends that estates under different ownership, with non-FERA ownership in particular may opt for increasing their offerings at auctions both qualitatively and quantitatively so as to fetch remunerative prices. (5 6)

.... The dominance in non-auction price over the prices through auctions was more in respect of non-FERA ownership as compared to FERA ownership. Since a major portion of the total sales accounts for auction the survey recommends that quality improvement for teas meant for auctions may be stressed upon so as to match with the higher prices at other private channels. (5·7)

.... A major share of C. T. C. teas produced in Dooars finds its way to domestic market with a vew to ensuring remunerative and stable price realisaton in the domestic market. It is suggested to adopt a calculated approach in the matter of optimum product-mix decision on various grades and quality characterestics vis-a-vis markets supply and demand. A market intelligence study may be undertaken by some appropriate apex body to formulate advisory recommendations under different circumstances. (5·8)

CHAPTER—VI

Cost of Production

..... The average expenditure for the period 1988 to 1990 was found to be highest in respect of general charges (Rs 6·31) followed by cultivation (Rs. 3 28), office expenses (Rs. 3·07), plucking (Rs. 2·40), packing (Rs. 2·12) and selling expenses (Rs 1·97). The lowest average expenditure (Re. 0 39) was observed in the case of freight and transport. The average expenditure on duties and taxes worked out as Rs 1·10 per Kg. (6·2)

... . The proportion of office expenses was found to be highest at 23% for Public Sector undertakings. PSU's accounted for as much as 29% of the expenditure on general charges. It may be recommended that the estates under Public Sector undertakings may identify unproductive and infructuous items of expenditure so as to reduce the cost of production of made tea and augment the price realisation (6·4)

.... Sale-cost differential (on an average for the period 1988-90) was maximum at Rs. 11·23 for estates under FERA Cos. followed by Rs. 10·11 for Private Ltd. ownership and Rs. 7·53 in respect of Public Sector undertakings .. .. the performance in regard to the sale-cost differential was found to be less encouraging in respect of Public Sector undertakings under the State Govt. in comparison to those under Central Govt. The performance by the estates under FERA Cos. was found better than any other undertakings On enquiry, it was known that such better performance was not only due to effective cost management system but also due to qualitative improvement. (6 5)

CHAPTER—VII

Finance and Profitability

..... nearly 70 to 75% of the respondent tea companies made profits during 1990-91. (7·1)

..... Working capital ratio (acid test ratio) as an indicator of liquidity strength of the tea companies actually declined from 1·89 during 1988-89 to 1·57 during 1990-91. This explained increasing dominance of current liabilities over current assets. The declining solvency indicated a floundering position in the availability in the working capital which is poised to adversely affect the sustenance and development of tea economy in Dooars unless effective/corrective steps are immediately taken to root out the problems. (7·2)

..... Profit after tax as a percentage of net worth also slided down from 38% to 26% during 1988-89 to 1990-91. This indicated declining performance of capital productivity of Dooars Tea Companies over the years .....Immediate steps need to be taken in the matter of reducing unproductive expenses with a clear identification of high cost areas in order to reduce a unit cost of production. Improvement of quality standard also seems to be of utmost importance to augment the sale-cost differential which would give impetus to the much needed improvement in profitability, attract larger investment and ensure better capacity to bear the cost of capital. (7·3)

Debt Equity Ratio of the tea companies was actually doubled during the year 1990-91 from the level of 2·11 during 1988-89. Such increase in debt equity ratio in the face of stagnant profitability situation shows the industry's failure in generation of internal resources and the consequent over-dependence on borrowed funds. (7·4)

It is recommended the State Govt. may consider suitable ways and means to reduce the rate of Agricultural Income Tax on tea in the consideration of the constrained economy of the Dooars Tea Industry. (7·6)

Capital Structure of the tea companies in Dooars seems to be highly geared with increased employment of secured loan over the years which failed to improve the profitability situation. While such phenomenon was observed in respect of of a majority of the tea companies except a few well-managed FERA and Public Ltd. companies it is apprehended that such a situation would usher in a possible debt-trap in the near future with steady increase in the cost of capital unless positive strategy is adopted in reduction of cost and judicious balance between debt financing and effective equity management. (7 7)

APPENDIX

APPENDIX

VARIATION IN YIELD RATES.

Statistical tests on variability in yiled rates and fertiliser inputs in respect of block, sub-division and ownership wise classification on a comparison of a three year profile, nearly, 1988, 1989 and 1990 revealed the following :-

I. The analysis of variance showed that the yied rate had a significant variation over the three years. The yield rate varied also over the ten blocks and over the 5 different ownerships.

II. There was a significant variation in rainfall over the years but the rainfall did not vary significantly over the different blocks. This means that the wide variation in yield from block to block is attributable to controllable factors like management practices, input practices, caltural operation, manufacturing operetion, etc. The above information may be revealed from annuexures I, II, and III.

ANNEXURE—I

VARIABILITY IN YIELD RATES AND FERTILISER INPUTS PER HECTARE (Sample standard deviations)

A) Sub-division wise

Sub-divisions/	S.D of yield rate/ha			S D. of inputs/hect. during 1990		
	1988	1989	1990	N	P	K
Mal	444·12	385 92	468 22	35·93	28·80	46·34
Matelli	328·83	255·79	412 18	56·19	42·45	19·32
Jalpaiguri	307 84	262 46	243·32	35·93	18·19	46 82
Nagrakata	423·34	363·22	480·36	54 06	49·10	50·54
Dhupguri	271·45	300·89	560·12	25·41	27·60	17 71
All Jalpaiguri Sadar	382·23	337·68	422 49	40 38	34·83	41·66
Alipurduar						
Falakata (One estate)	—	—	—	—	—	—
Madurihat	357·42	381·70	385 90	28·77	35·61	20·17
Kalchini	476·06	444·53	541·27	29·66	37·58	30·32
Alipurduar	206·04	147·46	502·64	14 01	79·69	16·07
Kumargram	265 27	236·40	264·76	46 61	13·79	40 90
All Alipurduar	386·53	400·01	449·70	32·41	42·82	28·63
Overall Dooar	383·21	363·64	435 08	37 46	37·86	38·61

B) Ownershipwise.

Status of Ownership	S.D. of yield rate/ha			S.D. of inputs/ha during 1990		
	1988	1989	1990	N	P	K
Proprietery	164·76	342·24	111·02	60·10	33·94	70 71
Partnership	277·48	214·11	441·61	0·71	36 67	17·04
Private Ltd.	287·44	344·25	448 13	50·37	47·70	54 93
Public Ltd.						
FERA	225·80	252·82	426·80	51·49	17·21	22·99
Non-FERA	338 53	319·47	365·31	29·26	37·81	32·31
Total Public Ltd	321·16	310·77	365·81	31·75	36 84	31·62
Public Sector	406 47	454·05	433 06	31·40	22·26	32·58
Over all	383 21	363·64	435·08	37 46	37·86	38·61

ANNEXURE—II

ANALYSIS OF VARIANCE (YIELD RATE)

Source of Variation	d.f	S.S.	M.S.	F	
				Calculated	Tabulated (at 5% level)
Between years	2	4244689	2122344	* 7·81	3·00
Between blocks	9	67071086	7452343	* 27·43	1·88
Between ownership	4	11610069·00	2902517	* 10 68	2·37
Error	254	68995652	271636		
Total	262	151921496			

* Significant at 5% level of Significance

ANNEXURE—III

ANALYSIS OF VARIANCE (RAINFALL)

Source of Variation	d.f.	S S.	M.S.	F	
				Calculated	Tabulated (at 5% level)
Between years	2	85234·76	42617 38	* 3·77	3·00
Between blocks	8	111108 78	13888 60	1·23	1·94
Error	235	2653507·46	11291·52		
Total	245				

* Significant at 5% level of Significance.

ANNEXURE—IV

JALPAIGURI

L.Y. = LOWEST YIELD
H.Y. = HIGHEST YIELD

Name of the Block	Status of Ownership	Estate with	Area under Tea (Hect.)	Yield (Kg./Hect.)	Rainfall (in CM)	Facility of Artificial Irrigation	Source of Technical Assistance	Pruning Cycle Adopted	Percentage of area Having Bushes above 50 Years.
1990									
Mal	Prop.	L.Y.	136 42	1063 (1699 969)	434	No.	TRA	4 Years	Nil
	Pub. Ltd.	H.Y.	256·55	2831 (2456,2663)	346	Yes	TRA	4 Years	Nil
Matelli	Pub. Ltd.	L.Y.	872 05	923 (1646,1339)	542	Yes	TRA	4 Years	46·76
	FERA	H.Y.	800·79	1987 (1777,1737)	153	Yes	TRA	4 Years	40·80
Jalpaiguri	Pub. Ltd.	L Y.	308·35	1603 (1392.1678)	443	Yes	TRA	4 Years	7·03
	Pub. Ltd.	H.Y.	262 40	2058 (1867,2234)	299	Yes	TRA	4 Years	27·41
Nagrakata	Pub. Ltd	L.Y.	310 00	729 (653,755)	452	Yes	TRA	3-4 Yrs	N.A.
	Pvt. Ltd.	H.Y.	348·91	2185 (1830,2253)	363	No.	TRA	3-4 Yrs	44·98
Dhupguri	Pvt. Ltd.	L.Y.	160·99	973 (1023.1139)	418	Yes	TRA	4 Years	31·34
	FERA	H.Y.	742 48	2258 (2171,2038)	458	Yes	TRA	3-4 Yrs	48·62

1989

Mal	Pvt Ltd.	L.Y.	97·69	1004	(1118)	691	No.	TRA	4-5 Yrs	77·51
	Pub. Ltd.	H Y.	501 64	2519	(2407)	435	Yes	TRA	3-4 Yrs	51·87
Mate.li	FERA	L.Y.	489 24	1540	(1449)	421	No.	TRA	3-4 Yrs	40·12
	Pub, Ltd.	H.Y.	102·87	2247	(2248)	623	Yes	TRA	3 Years	62·67
Jalpaiguri	Pub. Ltd.	L.Y.	308 35	1392	(1678)	422	Yes	TRA	4 Years	7·03
	Pub. Ltd.	H.Y.	262·40	1867	(2234)	409	Yes	TRA	4 Years	27·41
Nagrakata	Pub, Ltd.	L.Y.	310·00	653	(755)	551	Yes	TRA	3-4 Yrs	N.A.
	Pvt. Ltd.	H.Y.	425·80	1848	(2006)	435	Yes	TRA	3 Year.	29·18
Dhupguri	Pvt Ltd.	L.Y.	160·99	1023	(1139)	414	Yes	TRA	4 Years	31·34
	FERA	H.Y.	742 48	2171	(2038)	482	Yes	TRA	3-4 Yrs	48 62

1988

Mal	Prop.	L.Y.	136·42	969		380	No.	TRA	4 Years	NIL
	Pub. Ltd.	H.Y.	256 55	2663		322	Yes.	TRA	4 Years	NIL
Matelli	Pub. Ltd.	L.Y.	872·05	1339		521	Yes.	TRA	4 Years	46·76
	Pub. Ltd.	H Y.	104·78	2248		486	Yes	TRA	3 Years	62·67
Jalpaiguri	Pub. Ltd.	L.Y.	308 35	1678		383	Yes.	TRA	4 Years	7·03
	Pub. Ltd.	H.Y.	262·40	2234		349	Yes.	TRA	4 Years	27·41
Nagrakata	Pub. Sec.	L.Y.	310·00	755		416	Yes.	TRA	3-4 Yrs	N A.
	Pvt. Ltd.	H.Y.	348 91	2253		401	No.	TRA	3-4 Yrs	44·98
Dhupguri	Pvt. Ltd.	L.Y.	160·99	1139		442	Yes	TRA	4 Years	31·34
	FERA	H.Y.	742·48	2038		511	Yes	TRA	3-4 Yrs	48·62

Note : Figures in brackets indicate corresponding last year(s) yield rate(s).

ANNEXURE—V

ALIPURDUAR

L.Y. = LOWEST YIELD
H.Y. = HIGHEST YIELD

Name of the Block	Status of Ownership	Estate with	Area under Tea (Hect)	YIELD (Kg /Hect.)	Rainfall (In CM.)	Facility of Artificial Irrication	Source of Technical Assistance	Pruning Cycle Adopted	Percentage of Area Having Bushes above 50 Years
1990 :									
Falakata	Pub. Ltd.	One Garden was Surveyed	220	1733 (1213, 1637)	461	Yes	Own	4 Years	Nil
Madarihat	Pvt Ltd.	L. Y.	87	1122 (958 1318)	600	Yes	TRA	4 Years	89·96
	Pub. Ltd.	H. Y.	660	2354 (2329, 2384)	381	Yes	TRA	3 Years	59 68
Kalchini	Partnership	L. Y.	23	620 (908. 900)	490	Yes	TRA	4 Years	9·69
	Pub Ltd.	H. Y.	638	2376 (2201, 2406)	418	No.	TRA	4 Years	27·42
Alipurduar	Pub. Ltd.	L. Y.	319	1525 (1521, 1447)	400	Yes	TRA	3-4 Yrs	82·47
	Pub. Ltd.	H. Y.	354	2528 (1809 1856)	418	Yes	TRA	3 4 Yrs	60·28
Kumargram	Pub. Ltd.	L. Y.	580	1590 (1603. 1446)	391	Yes	Own	4 Years	59·16
	Pub Ltd.	H. Y.	402	2244 (2235, 2127)	485	Yes	TRA	4 Years	27·03

1989 :										
Falakata	Pub Ltd.	One Estate Surveyed	220	1213	(1637)	356	Yes	Own	4 Years	Nil
Madarihat	Pvt. Ltd.	L. Y.	87	958	(1318)	657	Yes	TRA	4 Years	89·96
	Pub Ltd.	H. Y.	658	2329	(2384)	388	Yes	TRA	3 Years	59·68
Kalchini	Partnership	L. Y.	23	908	(900)	406	No.	TRA	4 Years	9·69
	Pub. Ltd.	H. Y.	705	2283	(2164)	460	Yes	TRA	4 Years	27·42
Alipurduar	Pub. Ltd.	L. Y.	319	1521	(1447)	354	Yes	TRA	4 Years	82·47
	Pub. Ltd	H. Y.	316	1809	(1856)	406	Yes	TRA	3-4 Yrs	60·28
Kumargram	Pub. Ltd.	L. Y	571	1603	(1446)	433	Yes	Own	3-4 Yrs	59 16
	Pub. Ltd.	H. Y.	405	2235	(2127)	461	Yes	TRA	4 Years	27 03
1988 :										
Falakata	Public Ltd.	One Estate Surveyed	220	1637		320	Yes	Own	4 Years	Nil
Madarihat	Pvt. Ltd.	L. Y.	185	1160		727	No.	TRA	4 Years	74·46
	Pub. Ltd.	H. Y.	660	2384		446	Yes	TRA	3 Years	59·68
Kalchini	Partnership	L. Y.	23	900		547	No.	TRA	4 Years	9 69
	Pub. Ltd	H. Y.	622	2406		485	No.	TRA	4 Years	27·42
Alipurduar	Pub. Ltd.	L. Y.	319	1447		496	Yes	TRA	4 Years	82·47
	Pub. Ltd.	H. Y.	316	1856		667	Yes	Own	3-4 Yrs	60·28
Kumargram	Pub. Ltd	L. Y.	570	1446		667	Yes	Own	3-4 Yrs	59·16
	Pub. Ltd.	H. Y.	405	2127		581	Yes	TRA	4 Years	27 03

Note : Figures in brackets indicate corresponding last year(s) Yield Rate(s)

ANNEXURE—VI

AREA AND PRODUCTION OF THE TEA ESTATES IN DOOARS OF WEST BENGAL

Sl. No.	Area under Tea as on 31.12.92	Production of made Tea in 1992 (in Kg.)
1.	544·93	11,78,556
2.	778·30	15,09,061
3.	723·30	15,22,658
4.	617 21	13,16,265
5.	537·24	8,97,875
6.	939·28	18,00,148
7.	460·49	7,40,049
8.	755·60	15,78,932
9.	512·40	7,44,174
10.	631·30	18 88,401
11.	440·54	6,60,159
12	686·35	9,48,144
13.	472·98	8,60,353
14.	765·19	15,80,621
15.	561·03	6 85 000
16.	197·37	3,17,634
17.	602 66	11,63 694
18.	673·12	10,03 983 *
19.	697·80	14,12,139
20.	259·40	7,89 029
21.	493·72	9,24,664
22.	430·18	7,12,336
23.	25·33	12,668
24.	659·90	15,25,432
25.	419·05	8,97,952

Contd.

Sl. No.	Area under Tea as on 31.12.92	Production of made Tea in 1992 (in Kg.)
26.	203 85	2,50,017
27.	278·10	5,35,472
28.	695 94	9,76,490
29.	257·15	7,20,502
30.	393·80	6,12,970
31.	643·41	12,92.073
32 /33.	1234·75	22,85 417
34.	307·35	7,58,048
35.	319·02	4,90,227
36.	197·47	1,99,826
37.	608·01	9,10,254
38.	500·36	9,39,264
39.	514·74	8,58,460
40.	387 20	6,70,544
41.	487 88	6,47,585
42	600·00	9,20,582
43.	363·57	6 78,520
44.	418·20	7,98,890
45.	130·90	2,63,781
46.	144·35	3 08,633
47	339 32	4,70,631
48.	86 66	96 184
49	491·70	5,38 322
50.	332·23	6 00,429
51.	460 00	8,01 012 (1990-91)
52.	781·21	13,36,875
53.	649·96	11,99,888
54.	314·79	N. A.
55.	886·81	18,91,036
56.	203·83	2 96,859
57.	145 78	76,293
58.	353·07	7,55,692
59.	427·03	9,00,000 (1990-91)

Contd.

Sl. No.	Area under Tea as on 31.12.92	Production of made Tea in 1992 (in Kg.)
60.	482·26	5,27,778
61.	275·01	5,33,788
62.	34·00	2,71,282 *
63.	110·41	76,000 (1990-91)
64.	748 90	11,93 373
65.	405·14	7,39,325
66.	765·95	16,06,582
67.	240·26	4,51,645
68.	619·45	12,89,790
69.	618·00	12,34 883
70.	555·25	5,65,493
71.	599·26	11,59,397
72.	384 04	10,54,197
73.	413·15	4,81,313
74.	539 93	7,96,130
75.	782·43	16,94,540
76.	610 35	14,97,916
77.	421·31	7,71,249
78.	814·45	15,87,616
79.	559·31	5,50,385
80	480 82	9,61 927
81.	247·77	4,83,871
82.	604·84	9 70,720
83.	374·52	6,78,421
84.	714·07	13 00,000 (1990-91)
85.	556 82	11,43,875
86.	553 63	9,96,663
87.	552 85	8,94,950
88.	708 87	12,64 187
89.	869 09	16,80 104
90.	669·83	13,41 310
91.	269·79	6,24 233
92.	499·29	10,21,026
93.	527·86	8 83,341

Contd.

Sl. No.	Area under Tea as on 31.12.92	Production of made Tea in 1992 (in Kg.)
94.	325·83	6,93,820
95.	335·03	6,13,822
96.	160 99	56,902
97.	278·05	4,80,438
98.	470 48	5,21,253
99.	239·06	3,60,936
100.	418 87	6,18 876
101.	97 69	1,10,207
102.	302·11	5,35,747
103.	313·78	4,18,679
104.	354·25	8 07,339
105.	389·36	5,42,262
106	239·83	4,07,899
107.	228 64	51,630
108.	63·80	N. A.
109.	410·14	8,32,851
110.	64·71	1,32,791 (1989)
111.	10·12	N. A.
112.	310 36	5,21,101
113.	283 01	3,96,368
114.	390·68	5,83,998
115.	279 06	9,52,402
116.	358·53	10,60,584
117.	142·36	1,30,490
118.	377·32	7 14,979
119.	407·52	6,73,287
120.	248·80	3,81,197
121.	453·92	9,76,697
122.	343 53	6 24,116
123.	319 82	6 74,934
124.	438·58	7,30,330
125.	172·16	2,53 840
126.	109·14	1,68 231
127.	310 00	13,434

Contd.

Sl. No.	Area under Tea as on 31.12.92	Production of made Tea in 1992 (in Kg.)
128.	194·12	10,18,241 *
129.	417·49	5,00,188
130.	205·91	3,47,058
131.	193·63	3,25,263
132.	293·60	5,51,474
133.	391·86	6,88,929
134.	584·03	8,69,788
135.	348 13	6,90,095
136.	633·08	13,84,396
137.	362·84	4,60,954
138.	1132·58	16,01,139
139.	277 00	N. A.
140.	577·39	11,49,209
141.	459·26	9,42,758
142.	313 00	6 51,469
143·	504·99	9,96,469
144.	872 05	8 16,470
145.	429·56	8,20,587
146.	501·64	12,43,099
147.	599·79	13,97,575
148.	523·94	8,46,500
149.	472 51	N. A.
150.	614·10	12,43,800
151.	435·21	6,29 426
152.	286·92	3 50 000 (1990-91)
153.	199·34	3,51,262 (1990-91)

* indicates quantity of Green Leaf.