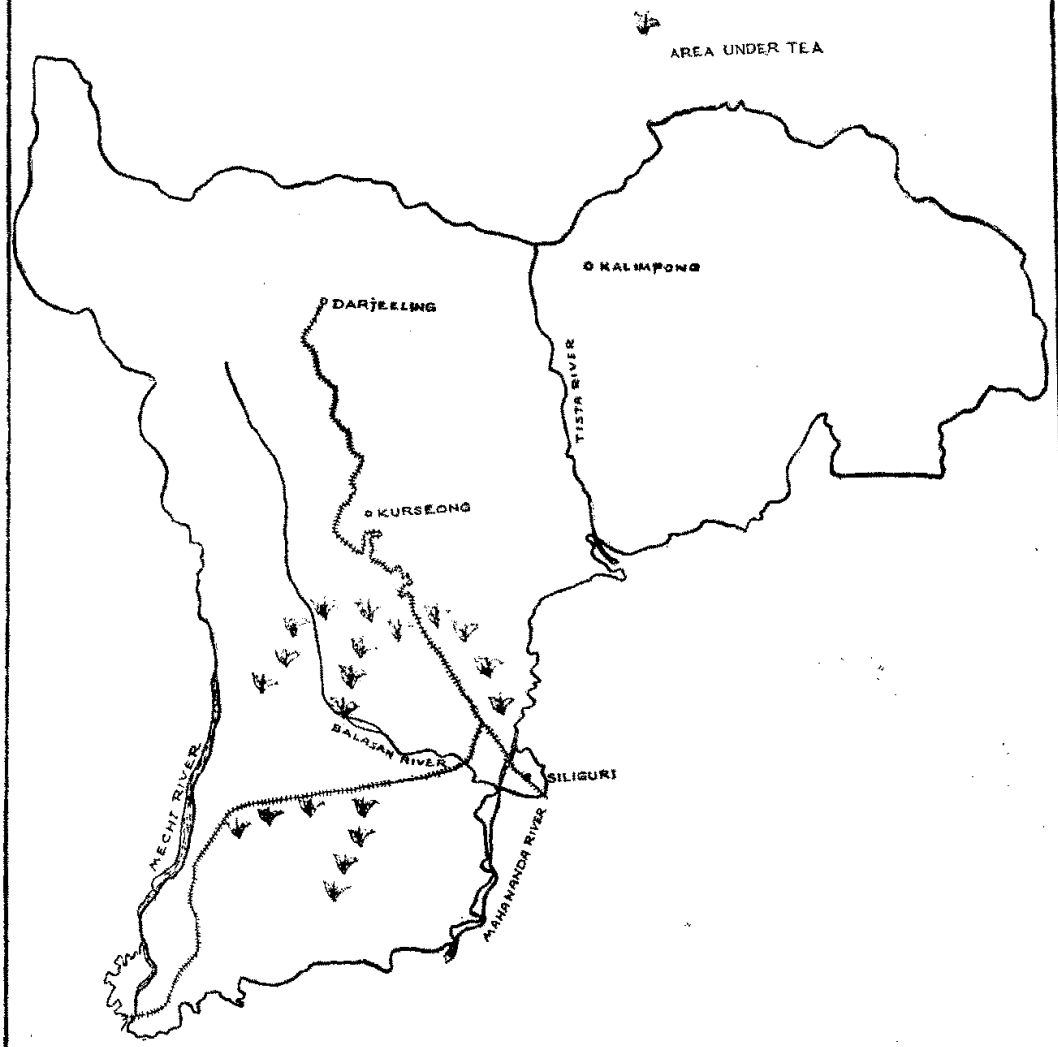
TEA MAP OF TERAI



REPORT ON
TECHNO-ECONOMIC SURVEY
OF
TERAI TEA INDUSTRY

ISSUED BY THE TEA BOARD OF INDIA

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Survey Team

Statistician	K. N. Namboodiri
Senior Investigator	G. Bandyopadhyay
Investigators	Apurba Ganguly
	Asit Ganguly
	K. L. Ghosh
	K. Ramadasan

Foreword

The Techno-Economic Survey report of Terai Tea Industry is the Sixth of the series of reports brought out by the Tea Board during the last four years.

Identifying the Techno-economic conditions of the tea industry of any region requires collection and collation of data along with its examination and analysis. Much care and attention have been given by the team of officials in presenting the report in precise form. The main recommendations of the report relate to stepping up of the pace of replantation, augmenting the facilities for irrigation and drainage, improving the factory conditions and installation of a centralised processing unit which should help the tea growers, particularly the smaller sized tea estates, to improve their economic viability. One uncontrovertible fact which emerges from the survey is that Terai Tea industry is not as healthy or viable as its counterpart in Assam. A well-co-ordinated effort on the part of tea industry in Terai, the State Govt. and the Tea Board is required to improve the economic viability of the industry.

It is hoped that the survey brings about an awareness for the need and urgency to put the Terai tea industry on sound economic footing.

B. K. GOSWAMI
Chairman
TEA BOARD

September, 1982
Calcutta.

Introduction

During the last several years the Tea industry of Terai has been beset with several problems. Our Techno-Economic Survey of this region has attempted to identify many of the problems and has suggested suitable remedial measures. The findings and recommendations are given in the last part of the report. Size-groupwise and managementwise analysis have also been attempted in areas where such analysis is felt necessary by the survey team. The major recommendations contained in the report relate to stepping up of the pace of extension, replantation and replacement, augmenting irrigational facilities by harnessing the rivers wherewer necessary; improvement of drainage; improvement of factory conditions and setting up of a centralised processing unit under co-operative management at a suitable place somewhere in Bagdogra. The survey team also found that establishment of an auction centre at Siliguri did not have a positive impact on the marketing of Terai teas in view of certain inherent disadvantages of auction sales like loss in sampling, brokerage charges and extra charges for transportation and warehouses apart from the time lag involved in realisation of sales proceeds. It was, therefore, found that nearly three-fourths of the total production of the sample estates was sold ex-garden during 1976-80. The price realisation from ex-garden sales was, however, found to be lower than the price realisation at auctions. Another finding of the survey was that a sizeable amount of tea was sent out in the form of ungraded teas from the factories particularly those belonging to the small sized gardens. While this impaired the quality of the produce, the producers were deprived of the benefit which would otherwise have accrued to them if grading was also undertaken by them.

Our investigators had to face innumerable difficulties in the collection of requisite data. Nevertheless, every effort has been made to present the report in a lucid and concise form highlighting the manifold problems of the industry in Terai.

I must also put on record the services rendered by the survey team of the Board, the producers' associations, garden managers, the Board's Field Advisory Officer at Siliguri and also Shri R. N. Mondal, Controller of Licensing, for bringing out the survey report in a record time of nearly seven months.

K. N. Namboodiri
Statistician

September 1982
Calcutta.

Contents

PART I

General

CHAPTER—1

Back-ground of Terai Tea Industry

1.1. The foothills of north-eastern part of the Himalayas are popularly known as Terai which include Siliguri Subdivision and its surrounding areas of Darjeeling district. Geographically this region is bounded by Kurseong Subdivision on the North, West Dinajpur on the South, Naxalbari and Kharibari on the West and Jalpaiguri district on the East. This plain region of Darjeeling district is well connected with transport and communications. The chief crops produced in this region are rice, potato, wheat, tea etc. The annual rainfall varies from region to region but on an average it was found to be about 300 c.m. in 1980. The soil in Terai is composed of alluvium; light sandy loam being most common.

1.2. Darjeeling district comprises Darjeeling Sadar and three other subdivisions of (i) Siliguri, (ii) Kurseong and (iii) Kalimpong. Darjeeling district has two distinct topographical features; Darjeeling Sadar, Kurseong and Kalimpong occupy the hilly tracts of the district and Siliguri at the foot hills has plain stretches of land.

1.3. Mountaineous Darjeeling is not suitable for growing agricultural crops; the stretches of plain land at the foot hills are mainly utilised for growing rice. The slopes of the mountain are full of jungles; tea is grown along the gentler slopes and on the terraced surface.

History of tea cultivation :

1 4. The history of tea cultivation in Terai is originally associated with the introduction of tea in Darjeeling district by Dr. Campbell in 1839. Tea seeds were first attempted in 1835 in an experimental nursery at Lebong where the growth was found to be encouraging. Thereafter, a large number of tea growers began to emerge and the area under tea cultivation started increasing in the hills. From Darjeeling hills, tea cultivation spreaded to Terai in 1862 under the initiative of the British planters. After independence, the European planters started selling their tea estates to the local entrepreneurs and by mid 1950's a good number of tea estates changed hands. With the passage of time the number of Indian-owned tea estates began to increase.

1.5. Tea Plantation in Terai region is wholly concentrated in Siliguri Subdivision of Darjeeling district. However, there is only one tea estate in Islampur of West Dinajpur sub-division. According to published information, available with the Tea Board, there are 46 tea estates in Terai region including the one in West Dinajpur. Among them all the tea estates except one have factories of their own. These estates covered an area of 11.5 thousand hectares with an annual production of 16.4 million kgs. in 1980. It accounts for 3.79 per cent of total area under tea in North India and 3.72 per cent of total North Indian tea production. The yield rate of Terai worked out to 1429 kgs. per hectare in 1980. A majority of tea estates in Terai belongs to the size-group of 200 to 400 hectares, accounting for 58.0% of the total area under tea. Estates under the size-group of above 100 to 200 hectares constitute 25.7% of total tea area. About 22 thousand workers were directly employed in tea industry in this region during 1979.

Area, Production and yield of tea :

Table 1

Area, Production and yield of tea.

YEAR	Terai (incl. W. Dinajpur)			West Bengal			North India		
	Area (th. hect.)	Prod. (m. Kg.)	Yield (Kg./hect.)	Area (th. hect)	Prod (m. Kg)	Yield (Kg/ hect.)	Area (th. hect.)	Prod (m. Kg.)	Yield (Kg/ hect.)
1970	10.7	12.0	1117	88.0	101.2	1150	280.1	317.3	1133
1971	10.8	13.0	1203	88.5	104.0	1176	282.7	332.3	1175
1972	10.8	12.7	1177	88.6	108.6	1226	284.7	352.7	1239
1973	10.9	13.5	1245	89.1	110.5	1241	286.1	368.1	1287
1974	10.9	14.3	1315	88.2	118.0	1388	287.5	389.8	1356
1975	10.9	13.1	1197	88.8	111.9	1260	289.5	380.6	1315
1976	11.0	13.7	1235	88.9	117.7	1326	290.1	400.7	1381
1977	11.0	15.0	1361	89.3	128.7	1442	291.9	427.8	1465
1978	11.1	16.7	1512	90.0	131.9	1466	294.6	433.4	1471
1979	11.5	14.5	1268	91.0	124.0	1362	298.9	404.6	1353
1980*	11.5	16.4	1429	91.5	129.2	1411	303.3	440.6	1452

*Provisional.

1.6. It will be seen from the table above that in the last decade the percentage increase in area under tea in Terai is 7.5% as compared to 4.0% in West Bengal. The increase is 8.3% for North India during this period. The picture is somewhat different for production. For production, the percentage increase is 36.7% in the case of Terai; it is 27.9% in West Bengal and 38.9% in North India. The contributing factor towards increase in production is the considerable increase in the production per hectare.

Size-wise distribution of tea estates :

1.7. Size-wise distribution of tea estates shows that concentration is more in the size-group of above 200 to 400 hectares numbering 20 tea estates (out of a total of 46) followed by 18 estates in the size-group of

above 100 to 200 hectares. As indicated earlier, the area covered by the former size-group is 6,653 hectares (accounting for 58.0% of the total area) while the area covered by the latter is 2,953 hectares (representing 25.7%). Estates in the size-group of above 50 to 100 hectares and above 400 hectares constitute 2.3% and 13.6% respectively. Small estates with a size-group of 'above 8.09 to 50 hectares', however, account for a very negligible portion of total area. The details are shown in the table below :-

Table 2

Size-wise distribution of estates in 1979.

Size-group (hect.)	Total No. of tea estates	Total area (hect.)	% age to total
Above 8.09 to 50	2	41	0.36
Above 50 to 100	3	268	2.34
Above 100 to 200	18	2,953	25.74
Above 200 to 400	20	6,653	57.99
Above 400	3	1,557	13.57
All Groups	46	11,472	100.00

1.8. It will be interesting to examine the relationship between the size of the estate and yield per hectare. The table below gives the details :-

Table 3

Size-groups and yield per hectare in 1979.

Size-group (hect.)	Yield (kg/hect.)
Above 8.09 to 50	463
Above 50 to 100	1,294
Above 100 to 200	1,268
Above 200 to 400	1,202
Above 400	1,563
All groups	1,268

It may be seen from the table that yield per hectare is substantially higher in the case of estates whose size exceeds 50 hectares. Estates in the size-groups of 50-100 hectares. 100-200 hectares and 200-400 hectares do not, however, display any positive correlation between size and productivity. Estates above 400 hectares are found to be having considerably higher yield rate as compared to other groups apparently in view of the advantages arising out of economies of scale obtaining in the larger estates.

Age-group of bushes :

1.9. It would be evident from the table below that 63.5% of the total area in Terai contained bushes in the age group of less than 50 years. The distribution of the area under different age of bushes along with the size of the tea estates is not available. As such, it is hardly possible to draw any conclusion about the reasons of having similar or higher productivity for different size of tea estates.

Table 4

Age-group of bushes during 1980 in Terai

Age-group	Area covered (hect.)	% age to total
Below 5 years	722	6.73
6 to 10 years	807	7.52
11 to 20 years	1,799	16.77
21 to 30 years	1,115	10.40
31 to 40 years	648	6.04
41 to 50 years	1,722	16.06
Above 50 years	3,912	36.48
All groups	10,775	100.00

(Figures of area will not tally with the figures given in Table-2 due to incomplete coverage)

Primary marketing :

1.10. Majority of Terai teas were sold through ex-factory and private and 35% was sent for auctions at Calcutta, Siliguri and Gauhati. Of the total auction sales, Calcutta and Siliguri shared larger proportion while at Gauhati it was insignificant. During the period from 1976 to 1980, total quantity of Terai teas sold through auction has declined from 38.7% of the production to 29.8%. It may be pointed out that although the setting up of Siliguri auction centre in 1976 facilitated marketing of Terai teas, it did not eventually led to any increase in the quantum of Terai teas sold through auctions. There has, however, been a diversion of Terai teas from Calcutta auctions to Siliguri auctions. The following table brings out the quantum of Terai teas sold through auctions :

Table 5

Quantities of Terai teas sold at Calcutta, Siliguri and Gauhati auctions.

Year	Calcutta auction	**Siliguri auction	Gauhati auction	Total auction	%age to production
1976	4,387	665	238	5,290	38.73
1977	3,395	2,732	209	6,336	42.23
1978	2,858	1,970	965	5,793	34.62
1979	2,349	2,057	667	5,073	34.88
1980*	1,691	2,991	208	4,890	29.84

*Provisional

**Siliguri auction started on 29-10-76.

Incidentally, it may be pointed out that due to imposition of rural employment of cess at specified rates, by the Government of West Bengal in April, 1981, on despatches of teas produced in West Bengal for sale through sources other than auctions in West Bengal, there had been an improvement of sale of teas through Siliguri auctions. This position has not figured in the report as the survey relates up to the year 1980.

1.11. Average price realisation of Terai teas sold at Calcutta auctions has always been higher than that sold through Siliguri auction. The price differential was in the neighbourhood of Rs. 1.10 per kg. Moreover, there has not been any significant variation in price-differential over the last three years, except in 1979. This, prima facie, may lead to presume that the same quality of teas were offered for sale at both the auction centres for which there had not been any change in the price differentials. The details are shown below :—

Table 6

Average price of Terai teas at auctions

(Rs./Kg.)

Year	Auction		
	Calcutta	Siliguri	Gauhati
1976	10.74	10.96	10.44
1977	14.89	13.28	11.68
1978	11.83	10.65	11.38
1979	10.96	10.63	12.15
1980*	12.12	11.00	12.66

*Provisional

CHAPTER—II

Designing of the Survey :

2.1 According to information available with the Tea Board there are 46 tea estates in Terai region including West Dinajpur. The survey, however, was confined to Siliguri only - the foothills of Himalayas - which comprises 44 tea estates. Because of the time limit and cost involved, the sample units were limited to 28 estates with factories. The population was stratified according to the size of the tea estates. The complete enumeration was made for the size group 100 hectares and the total tea estates were 4 in number - one upto 50 hectares and 3 for 50-100 hectares. The remaining 24 sample units were drawn from the different strata, namely 100-200 hectares, 200-400 hectares and above 400 hectares. This was drawn on the basis of size of the population under each strata. For estates above 400 hectares the population figure was five and all the estates were taken for survey in order to give a representative picture. For tea estates 100-200 hectares and 200-400 hectares, the sample was drawn on proportionate basis.

2.2 The field survey was undertaken by the Investigators of the Techno-Economic Survey cell of the Statistics Branch, Tea Board, Calcutta in two phases, first in February and then in November, 1981. The data were collected from the sample tea estates on the basis of designed questionnaire. These were sent to the tea estates owners well in advance so as to provide them sufficient time to keep the information ready

required for the survey. The possible date and time of the visit of the Investigators were also intimated to the tea estates. Accordingly the Investigators visited the estates for canvassing of data according to questionnaire and made an on the spot study of the various problems. They also had detailed discussions with the estate - managers and collected additional information particularly their views on the economic conditions of their respective estates. Regarding collection of data on finance and disposal of teas from the head offices of the tea estates, it was observed that more time was taken by them. Even then information from a few estates could not be collected. Nevertheless, every care had been taken to make the data as representative as possible.

2.3 Incidentally, it may be pointed out that at the first phase the Statistician of the Board visited Terai and held discussion with the Tea Producers' Associations and made a beginning of the survey. Some estates were also visited by him so as to gather first hand knowledge of the techno-economic condition of tea estates in Terai. In the second phase, the Research Officer (Economics) visited the estates and held discussion with the tea interests in Terai.

PART II

Analysis of Data

Field Practices :

1.1. As stated in earlier paragraph, the survey was confined to 28 tea estates in Terai. The data were collected from these estates. The various features of the data collected are presented below.

The distribution of the sample estates according to size-groups and types of ownership is shown below :—

Table I

Distribution by size-groups and types of ownership

Size-group (hect.)	Ownership				%age to total	%age of total area under tea.
	Part.	Pvt. Ltd. Co.	Pub. Ltd. Co.	Total		
Above 8.09 to 50	1	—	—	1	3.6	0.3
Above 50 to 100	1	2	—	3	10.7	3.9
Above 100 to 200	2	3	7	12	42.9	25.8
Above 200 to 400	—	2	5	7	25.0	30.5
Above 400	1	1	3	5	17.8	39.5
All Groups	5	8	15	28	100.0	100.0
%age to total	17.9	28.5	53.6	100.0		
%age to total area under tea.	13.6	26.1	60.1	100.0		

1.2. It may be seen that 42.9% of the total number of sample tea estates fall in the size-group of 100-200 hectares followed by 25.0% in the next higher size-group. Only 17.8% of the tea estates fall in the size-group of above 400 hectares. The balance 14.3% of the estates belong to the size-group of 8.09-100 hectares. Ownershipwise, about 53.6% of the tea estates are managed by Public Limited companies, while 28.5% by Private Limited companies. The remaining 17.9% of the estates are managed by Partnership firms.

1.3. Regarding area under tea in different size-groups and ownership, the size-group of above 400 hectares accounted for 39.5% of the total area under tea followed by 30.5% in the size-group of above 200-400 hectares. Tea estates having an area of 100-200 hectares covered 25.8% of total area under tea while estates upto 100 hectares accounted for the balance of 4.2%. In terms of ownership, about 60.1% of the total tea area is owned by the estates under the management of Public Limited companies. Estates owned by Private Limited companies and Partnership firms constituted 26.1% and 13.6% of the total tea area respectively.

1.4. Since the estates of above 100 hectares accounted for 85.7% of the total estates and 95.8% of the total area, the tea economy of Terai largely depends on the efficient functioning of the bigger size-units. The smaller size-units, however, act as a supplementary base to accelerate the growth of the economy.

Commencement of production :

1.5. Tea industry in Terai is fairly old, It has crossed more than 100 years. The table below shows distribution of sample estates according to year of commencement of production.

Table 2

Sample tea estates classified according to year of commencement of production.

	Number of tea estates	%age to total
Upto 1880	3	10.7
1881 to 1890	2	7.1
1891 to 1900	4	14.2
1901 to 1910	3	10.7
1911 to 1920	8	28.8
1921 to 1930	6	21.4
Unspecified	2	7.1
Total	28	100.0

It will be seen from the above table that out of 28 sample estates 26 (92.9%) estates commenced production over 50 years ago. A further break-up shows 9, (32.0%) estates have already attained an age of 80 years. It has further been observed from the analysis of data that all the tea estates (6) belonging to the latest year group of 1921 to 1930 are now being managed by limited liability companies - 2 under Private Limited and 4 under Public Limited. According to the reports made available to the survey tea no Partnership firm had developed after 1921 in the management of the tea estates.

Change in ownership :

1.6. The survey revealed that out of 28 sample estates, change in ownership took place in the case of 5 estates during the last 10 years, of which one fell in the size-group of above 50-100 hectares, 2 each in above 200-400 hectares and above 400 hectares. It may be stated that the frequent changes in ownership which seems to be detrimental to the smooth and efficient functioning of the estates did not occur in the case of Terai, Tea Industry.

Membership of Associations :

1.7. All the surveyed estates in Terai were found to be members of one or other Producers' Associations. At the time of the survey five Producers' Associations have been found to be functioning in this

region. viz., Indian Tea Association, Tea Association of India, Terai Indian Planters' Association, Indian Tea Planters' Association, and another association has recently been formed under the name "North Bengal Small Tea Growers' Association" to look into the problems of small growers.

Since all the sample estates have taken the membership of various producers' associations it is felt that the tea industry in Terai has a common platform for solving problems which are of a general nature like those occurring in the supply of essential inputs, matters arising from Government policies from time to time and also issues connected with transport and communications etc.

1.8. The Tea Research Association which is established by the tea industry at Tocklai (Jorhat) is an unique institution for all the research activities for tea in North India. Of course, very recently Tea Board has opened a research centre on tea at Kurseong. One of the branches of TRA is located at Nagrakata near Jalpaiguri for providing technical know-how to Terai planters in respect of farm and factory management. By availing the membership of Tea Research Association, tea estates in this region can have the benefit of the advisory facilities given by the association which in turn would help in improving the condition of the estates. The following table shows the number of tea estates which availed membership of the Tea Research Association :—

Table 3

Membership of Tea Research Association - Estate classified according to size-groups.

Size-group (hect.)	No. of Surveyed Estates.	No. of estates which are members of Tea Research Association	%age of estate which took membership of Tea Research Association to total estates surveyed.
Above 8.09 to 50	1	—	—
Above 50 to 100	3	3	100.0
Above 100 to 200	12	6	50.0
Above 200-400	7	6	85.7
Above 400	5	4	80.0
All Groups	28	19	67.9

It will be observed from the table that 67.9% of the total surveyed tea estates were members of the Tea Research Association, while the remaining 32.1% were reported to have not taken the membership. Size-group wise, all the sample tea estates in the size-group of above 50-100 hectares took membership of association, while this was 50.0% in the case of estates in the size-group of above 100-200 hectares; 85.7% in the size-group of above 200-400 hectares and 80.0% in the size group of above 400 hectares. During the discussions with the planters in Terai, it has been reported that advisory services of the Tea Research Association should be made extensive, acceptable and adoptable for the planters in this region. It is, therefore, suggested that Tea Research Association may take necessary steps to enlarge their activities taking into account the conditions and economies of the estate in question. They may also take steps to enlist more and more tea estates in Terai under their membership so that they could utilise the fruits of research and improve the condition of tea estates.

1.9. Ownership-wise, about 60% of the total estates managed by Partnership firms were members of Tea Research Association while it was 75.0% and 66.7% in the case of Private and Public Limited companies respectively. It is suggested that Tea Research Association may take the initiative in this regard in consultation with Producers' Associations. It is felt that Producers' Associations should also encourage their members to get the advice of Tea Research Association in the improvement of economies of the tea estates.

Utilisation of grant area :

1.10. The following table shows the distribution of total grant area (as on 1. 4. 1980) according to size-groups and categories of utilisation.

Table 4a

Share of different size-groups to total grant area of 28 tea estates.

Category of Utilisation	Size-Group (hect.)						%age to total
	Above 8.09 to 50	Above 50 to 100	Above 100 to 200	Above 200 to 400	Above 400	Total	
1. Area under tea	17.00	252.75	1674.09	1994.49	2577.81	6516.14	59.0
2. Area under nursery							
(a) Seedlings :	0.16	2.45	12.34	16.01	2.00	32.96	0.3
(b) Clones	—	0.03	5.70	9.35	25.08	40.16	0.4
3. Fallow	—	9.00	259.99	296.08	288.96	854.03	7.7
4. Area under rice	—	8.00	141.64	268.37	571.37	989.38	9.0
5. Area under other crops	—	—	—	3.30	—	3.30	Neg.
6. Forest & Waste land.	1.68	125.69	202.04	226.92	257.47	813.80	7.4
7. Other areas	2.03	59.30	493.88	434.12	802.83	1792.16	16.2
Total Area under Grant	20.87	457.22	2789.68	3248.64	4525.52	11041.93	100.0
%age to total	0.2	4.1	25.3	29.4	41.0	100.0	—

It may be seen from the table that out of the total grant of 11,041.93 hectares, 6516.14 hectares were planted with tea and 73.12 hectares were utilised for nursery. Fallow area accounted for 854.03 hectares. Area under rice was reported to be 989.38 hectares whereas a very negligible area of 3.30 hectares was under cultivation of other crops. Land under forest and waste land was 813.80 hectares, while other areas comprising factory buildings, staff quarters, labour lines, bungalows, play ground etc., stood at 1792.16 hectares. Since a considerable portion of total grant belongs to forest and waste land and other areas (23.6%), the tea estates in this region may think of converting a part of such land into area under tea. The availability of land suitable for tea cultivation from forest, waste land and other areas has been analysed separately. Size-group wise, tea eastates of above 200 hectares covered an area of

7774.16 hectares representing 70.4% of the total grant, while estates below 200 hectares covered 3267.77 hectares constituting 29.6% of the total. In general, percentage of grant area utilised has been found to be increasing with increase in size-group, as brought out in the table below.

Table 4b

Proportion of grant area under size-groups utilised for different categories.

(in %age)

Category of utilisation	Size-group (hect.)					
	Above 8.09 to 50	Above 50 to 100	Above 100 to 200	Above 200 to 400	Above 400	Total
1. Area under tea	81.5	55.3	60.0	61.4	57.0	59.0
2. Area under nursery						
(a) Seedlings	0.8	0.5	0.5	0.5	Neg.	0.3
(b) Clones	—	Neg.	0.2	0.3	0.6	0.4
3. Fallow	—	2.0	9.3	9.1	6.4	7.7
4. Area under rice	—	1.7	5.1	8.3	12.6	9.0
5. Area under other crops	—	—	—	0.1	—	Neg.
6. Forest & Waste land	8.0	27.5	7.2	7.0	5.7	7.4
7. Other areas	9.7	13.0	17.7	13.3	17.7	16.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

1.11. It may be seen from the table that in general 59.0% of the total grant was planted with tea. Size-group wise, percantage of area under

tea cultivation was 81.5% in the size-group of above 8.09 to 50 hectares. As this relates to only one sample unit, the comparison of this utilisation with that for other areas may not be meaningful. At any rate, the area utilised for tea is more or less progressively increasing over the size-groups. Area utilised for nursery was less than one percent among all the size-groups. Percentage of area lying fallow was relatively higher in the size-groups of above 100-200 hectares and above 200-400 hectares as compared to other size-groups. A considerable percentage of grant area had been utilised for rice cultivation as this was possibly meant for supplementing the supply of cereals to the labourers. The estates in the size-group of above 400 hectares devoted maximum percentage of area under rice cultivation, while it was minimum for estates in the size-group of above 50-100 hectares. Percentage of area under forest and waste land was found to be 27.5% in the size-group of above 50-100 hectares, while it accounted for a lower percentage in other size-groups. 'Other' areas accounted for an equal percentage (17.7%), in both the size-groups of above 100 - 200 and above 400 hectares, followed by 13.0% and 13.3% in the size-groups of above 50-100 and above 200-400 hectares respectively. The planters may think of bringing certain percentage of the land under forest and waste land and other areas into tea cultivation.

1.12 Management-wise analysis of total grant area revealed that Public Limited companies covered more area as compared to Private Limited companies and Partnership firms. It was 6488.73 hectares (58.7%) for Public Limited companies, 2843.84 hectares (25.8%) for Private Limited companies and 1709.36 hectares (15.5%) for Partnership firms.

As regards category-wise utilisation of total grant, it was revealed that in absolute terms area under tea, nursery and fallow were higher in the case of estates managed by Public Limited companies than those of Private Limited companies and Partnership firms. Area under rice was however, higher in Private Limited companies, as compared to Public Limited companies and Partnership firms. Forest, waste land, and 'other areas' were found to be higher in the Public Limited companies, as compared to Private Limited companies and Partnership firms. The details are geven in the table below :—

Table 5a

Share of different types of ownership to total grant area of 28 tea estates.

(in hect.)

Category of Utilisation	Ownership				%age to total
	Partnership	Pvt. Ltd. Cos.	Pub. Ltd. Cos.	Total	
(1)	(2)	(3)	(4)	(5)	(6)
1. Area under tea	899.28	1701.23	3915.63	6516.14	59.0
2. Area under nursery :					
(a) Seedlings	3.66	9.54	19.76	32.96	0.3
(b) Clones	11.98	15.48	12.70	40.16	0.4
3. Fallow	130.80	153.22	570.01	854.03	7.7
4. Area under rice	177.03	503.67	308.68	989.38	9.0
5. Area under other crops	—	—	3.30	3.30	Neg.
6. Forest & Waste land	277.69	145.25	390.86	813.80	7.4
7. Other areas	208. 92	315.45	1267.79	1792.15	16.2
(1)	(2)	(3)	(4)	(5)	(6)
Total area under grant	1709.36	2843.84	6488.73	11041.93	100.00
%age to total	15.5	25.8	58.7	100.0	

Apparently estates under the management of Public Limited companies have a wider choice about more utilisation of grant area as compared to estates in Private Limited companies, and Partnership firms.

1.13. The ratio of utilisation of grant area by different types of ownership is presented below :-

Table 5b

Proportion of grant area under different types of ownership utilised for different categories.

(in %age)

Category of Utilisation	Ownership			Total
	Partnership	Pvt. Ltd. Cos.	Pub. Ltd. Cos.	
1. Area under tea	52.6	59.8	60.3	59.0
2. Area under nursery				
(a) Seedlings	0.2	0.3	0.3	0.3
(b) Clones	0.7	0.5	0.2	0.4
3. Fallow	7.7	5.4	8.8	7.7
4. Area under rice	10.4	17.7	4.8	9.0
5. Area under other crops	—	—	0.1	Neg.
6. Forest & Waste land	16.3	5.1	6.0	7.4
7. Other areas	12.1	11.2	19.5	16.2
TOTAL	100.0	100.0	100.0	100.0

The proportion of area under tea was found to be more in the case of estates under Public Limited companies as compared to Private Limited companies and Partnership firms. Percentage of area lying fallow to total grant area was more or less same in case of estates under both the Public Limited companies and Partnership firms, while this was relatively low for estates under Private Limited companies. Forest and waste land was 16.3% for Partnership firms followed by 6.0% for Public Limited companies and 5.1% for Private Limited companies. Percentage of 'Other areas' was found to be 19.5% of the total grant for estates managed by Public Limited companies, 12.1% for Partnership firms and 11.2% for Private Limited companies. Thus, it appears that by and large, the estates under different types of management have the scope to bring more new areas under tea cultivation over the years.

1.14. In order to assess the area available for extension, attempt has been made to find out average of area under tea, area under grant and area other than planted with tea. The details are shown in the table below :

Table 6a

Average size of an estate, average grant area and average area other than tea according to different size-groups.

(in hect.)

Size-group (hect.)	No. of Estate	Total area under tea	Av. area under tea per estate	Total area under grant	Av. area under grant per estate	Av. area other than tea area (i. e grant area— tea area) per estate
Above 8.09-50	1	17.00	17.00	20.87	20.87	3.87
Above 50-100	3	252.75	84.25	457.22	152.41	68.16
Above 100-200	12	1674.09	139.51	2789.68	232.48	92.97
Above 200-400	7	1994.49	284.93	3248.64	464.09	179.16
Above 400	5	2577.81	515.46	4525.52	905.10	389.64
Over all	28	6516.14	232.71	11041.93	394.35	161.64

It may be seen from the table that in general, average area under grant for an estate was 394.35 hectares of which the average area under tea was 232.71 hectares and the average area utilised for purposes other than tea was 161.64 hectares. The total grant area per garden was utilised to the extent of 59.0% for tea cultivation and to the extent of 41.0% for other purposes. Size-group-wise, the estate below 50 hectares utilised 17.00 hectares for tea plantation out of its total grant of 20.87 hectares. For estates falling in the size-group of above 50-100 and above 100-200 hectares, the average area under tea for an estate was found to be 84.25 hectares and 139.51 hectares respectively. They constituted 55.3% and 60.0% of the respective average grant area. The balance of 44.7% and 40.0% belonged to average area other than tea. The average area under tea was 284.93 hectares accounting for 61.4% of the average grant area for estates in the size-group of above 200-400

hectares while it was 515.46 hectares representing 57.0% for estates of above 400 hectares. The remaining 39.6% and 43.0% formed average area other than tea in those size-groups. It, therefore, appears that percentage of land used for 'purposes other than tea' is relatively more in the size-groups of above 50-100 hectares (44.7%) and above 400 hectares (43.0%) as compared to other size-groups. In view of this it appears that a considerable portion of area not utilised for tea can be brought under plantation and the scope of it lies more with the bigger size groups. However, the position in relation to actual area suitable for tea cultivation is dealt with subsequently.

1.15. In terms of ownership, average area under tea for Public Limited companies was more as compared to Private Limited companies and Partnership firms. It was 261.04 hectares for estates under Public Limited companies, 212.65 hectares for estates under Private Limited companies and 179.86 hectares for Partnership firms. Further, the percentages of average area under tea to average grant area of Public, Private and Partnership firms were found to be 60.3%, 59.8% and 52.6% respectively. The balance of 39.7%, 40.2% and 47.4% area was utilised for purposes other than tea cultivation. Thus, management-wise, equal scope exists for all the estates to bring more area under tea cultivation, subject to the availability of land suitable for tea. This has been analysed in subsequent paragraphs.

Table 6b

Average size of an estate, average grant area, average area other than tea area according to ownership.

(in hect.)

Ownership	No. of Estate.	Total area under tea	Av. area under tea per estate.	Total grant area.	Av. area under grant per estate.	Av. area other than tea area (i.e.) grant area— tea area) per estate.
Partnership	5	899.28	179.86	1709.36	341.87	162.01
Pvt. Ltd. Cos.	8	1701.23	212.65	2882.93	365.48	142.83
Pub Ltd. Cos.	15	3915.63	261.04	6449.64	432.58	171.54
Over all	28	6516.14	232.71	11041.93	394.35	161.64

Land suitable for extension :

1.16. Table below shows the actual area reported to be suitable for extension of tea area from waste, forest and 'other area' of the total grant :

Table 7a

Area suitable for extension of tea area by size-groups.

Size group (hect.)	No. of estate	Land not utilised for tea.	Land suitable for extension.	
		Area per estate (hect.)	Area per estate (hect.)	%age of land suitable for extension to total area not utilised for tea.
Above 8.09 to 50	1	3.87	0.16	0.04
Above 50 to 100	3	68.16	6.38	9.36
Above 100 to 200	12	92.97	14.49	15.58
Above 200 to 400	7	179.16	52.04	29.04
Above 400	5	389.64	73.67	18.90
All Groups	28	161.64	33.45	20.69

It may be observed that the area suitable for extension has increased over the size of the tea estates. It was relatively more in the large groups. It was as much as 73.67 hectares per estate above 400 hectares and low as 6.38 hectares per estate in above 50-100 hectare group. So it is suggested that the bigger size group should take a lead in development of tea industry in Terai.

1.17 In terms of ownership, land suitable for extension per estate was found to be 44.66 hectares for estates under the management of Public Limited companies, accounting for 26.0% of the land not utilised for tea while it was 24.11 hectares representing 16.9% for estates under the management of Private Limited companies, and 12.78 hectares (7.9%) for estates under the management of Partnership firms. The table below shows the details :

Table 7b

Area suitable for extension of tea area by types of ownership

Ownership	No. of tea estate	Land not utilised for tea.	Land suitable for extension.	
		Area per estate (hect.)	Area per estate (hect.)	%age of land suitable for extension to total area not utilised for tea.
Partnership	5	162.01	12.78	78.8
Pvt. Ltd. Cos.	8	142.83	24.11	16.88
Pub. Ltd. Cos.	15	171.54	44.66	26.03
TOTAL	28	161.64	33.45	20.69

It may be seen from above that the tea estates under the Public Limited companies had larger area for extension as compared to the tea estates under other managements. It was 44.66 hectares per estate for Public Limited companies as compared to 24.11 hectares per estate for Private Limited companies and 12.78 hectares per estate for Partnership firms. It is, therefore, necessary that the Public Limited companies have to play a larger role to bring more tea areas under cultivation over the passage of time, so as to improve the over all health of the tea industry in Terai. The role of other categories of companies can not, however, be ignored because they also held some areas for tea extension. Collective efforts are likely to yield results in the years to come towards the improvement of the economies of scale for tea estates in Terai.

Progress of extension and replacement planting :

1.18. During the course of field survey, efforts were made to assess the progress of extension and replacement planting carried out by surveyed tea estates during the period from 1976 to 1980. The following table brings out the progress of extension and replacement planting by size-groups :

Table 8a

Extension and replacement carried out during 1976 to 1980.

Size-group (hect.)	Extension				Replacement			
	No. of estates under taken	Area covered in 5 years (hect.)	%age to total planted area	%age to total planted area plus area suitable for extension	No. of estate under-taken	Area covered in 5 years (hect.)	%age to total planted area	%age to total planted area plus area suitable for extension
Above 8.09 to 50	Nil	—	—	—	Nil	—	—	—
Above 50 to 100	1	5.00	1.98	1.84	Nil	—	—	—
Above 100 to 200	3	36.16	2.16	1.95	2	7.62	0.46	0.41
Above 200 to 400	5	98.04	4.92	4.16	1	7.69	0.39	0.33
Above 400	4	159.48	6.19	5.41	1	29.65	1.15	1.01
All Groups	13	298.68	4.58	4.01	4	44.96	0.69	0.60

It may be seen that in general 13 estates undertook extension planting out of a total of 28 estates surveyed. The area covered by extension in 5 years was 298.68 hectares. This accounted for 4.6% of the total planted area and 4.0% of the total planted area plus area suitable for extension. Size-group wise, none of the estates below 50 hectares undertook extension planting during the 5-year period from 1976 to 1980. It is interesting to note that extension planting is relatively more in the size-group of above 400 hectares as compared to other size-groups. It was 159.48 hectares accounting for 6.2% of the total planted area for largest size-group followed by 98.04 hectares (4.9%) for estates with a size of above 200-400 hectares and 36.16 hectares (2.2%) for above 100-200 hectares. However, area covered by extension planting to total planted area was, less than 2% for the estates below 100 hectares. In respect of replacement planting, 4 estates carried out such operation and covered an area of 44 96 hectares accounting for less than 1% of the

total planted area. Size-group wise, area covered for replacement planting was more (29.65 hects.) in the size-group of above 400 hectares while it was equal (7.62 hects.) for estates in both the size-groups of above 100-200 hectares and above 200-400 hectares. The estates below 100 hectares however, did not carry out replacement planting during the last five years.

1.19. Ownershipwise, none of the estates under the management of Partnership firms undertook extension planting during the period under review while 13 estates, from a sample of 28 estates, under the management of both Public and Private Limited companies carried out such operation. The area brought under extension planting was higher (238.76 hects.) for estates managed by Public Limited companies as compared to estates managed by Private Limited companies (59.92 hects). In terms of replacement planting, none of the estates belonging to Private Limited companies undertook such operation during the period under reference. The estates under Partnership firms and Public Limited companies brought 4.05 hectares and 40.91 hectares respectively under replacement planting. The table below shows the details :—

Table 8b

Extension and replacement carried out during 1976 to 1980 by types of ownership.

Ownership	Extension				Replacement			
	No. of tea estates	Area covered in 5 years (hect.)	%age to total planted area	%age to total planted area plus area suitable for extansion	No. of tea estates	Area covered in 5 years (hect.)	%age to total planted area	%age to total planted area plus area suitable for extansion
Partnership	Nil	—	—	—	1	4.05	0.45	0.42
Pvt. Ltd. Cos.	4	59.92	3.52	3.16	Nil	—	—	—
Pub. Ltd. Cos.	9	238.76	6.10	5.21	3	40.91	1.04	0.89
Total	13	298.68	4.58	4.01	4	44.96	0.69	0.60

1.20. During the period of field investigation it was brought to the notice of the survey team that lack of finance was considered to be the major problem faced by planters in undertaking extension and replacement planting. The high cost of extension and replacement planting over the years had prevented the producers from taking up such operations. Moreover, the uncertainties of the tea market arising out of steep fluctuations in prices have also reportedly affected the self financing capacity of the producers. The quantum of loans granted under Plantation Finance Scheme of the Board was reported to be inadequate when actual cost of new planting is taken into consideration. Besides the cost incurred in actual operation for new planting, there were other costs involved for this purpose particularly in respect of reclamation of land, preparation of approach road etc. It was also learnt that documentation and procedural formalities for obtaining loans from the Board were very rigid and elaborate which together involved much time lag. The floor level communication and less contacts were reported to be the factors preventing many of the producers from obtaining loans from the Board. It was also reported that the tenure of service of a Manager in most of the tea estates did not exceed more than 3 to 4 years. As a result the field and factory operations get disrupted and dislocated. Under these circumstances it is suggested that the quantum of loans under the plantation finance scheme for extension and replacement planting should be enhanced so as to cover a substantial part of the actual cost involved in undertaking such operations including the cost incurred in other ancilliary operations required for the purpose. It may, however, be pointed out that from early 1979 the quantum of loan per hectare under Plantation Finance Scheme and also the Replantation Subsidy Scheme has been revised upwards. The quantum of loan under Plantation Finance Scheme, according to the revised rates is Rs. 20,000 for plain and Rs. 25,000 for hill gardens. Similarly the subsidy per hectare for replantation has been revised upwards to Rs. 10,400/- for plains and Rs. 12,000 for hills. However, it was reported that a further revision is necessary so as to cover a substantial part of the cost. It is also relevant to point out in this context that documentation for obtaining plantation finance loan from the Tea Board should be simplified. Besides, the expenditures relating to panel inspector's charge, cost of preparing survey plan, which are usually

borne by the tea estate owners, may also be reduced, if not exempted, particularly for tea estates of smaller size upto 100 hectares. For the smaller estates it is also recommended that loan should be granted on a long term basis. For ensuring this, provisions should be made in the Plantation Finance Scheme of the Board in such a way that may be treated as 'soft loan', which will be made repayable over a longer period at a lower rate of interest. This will motivate the producers to take up extension and replacement planting on a larger scale and thereby improve the health of the tea bushes. In other words, such liberalisation (of loan) may also reduce the tendency of the planters towards obtaining loan from the financial institutions utilised for 'filler finance' on the one hand and the capacity to generate 'self finance' on the other. While suggesting this, it is important to strengthen the floor level communication between the implementing and functional agencise.

Age Composition of bushes :

1.21. In general, nearly 18% of the planted area contained young tea bushes of upto 10 years old of which around 8% covered relatively younger tea bushes of upto 5 years. The bushes of above 10-50 years old accounted for 45% of the total planted area. It was 38% in the case of bush population of more than 50 years old. The area under young tea bushes of upto 5 years covered almost an equal percentage (5%) for estates in both the size-groups of above 50-100 and above 100-200 hectares, while this was however, relatively higher (10%) for estates in the size-groups of above 200-400 hectares as compared to estates belonging to above 400 hectares (9%). The estates in the size-group of above 8.09 - 50 hectares did not contain any bushes within the age of 10 years. Similarly, the proportion of area covered by bush population of above 5-10 years was equal (6%) for size-groups of above 100-200 and above 200-400 hectares while it was 15% in the case of estates of above 400 hects. The proportion of area covered by bushes of 10-30 years was 11% and 17% for estates in the size-groups of above 8.09-50 hectares and above 50-100 hectares respectively, while it was 27% each in the size groups of above 100-200 hectares and above 400 hectares. The estates in the size-group of above 200-400 hectares, however, constituted 25% of the planted area. It was also found that percentage of

area covered by bushes of 30-50 years was maximum at 28% for estates in the size group of above 100-200 hectares while it was the minimum at 8% for estates in the size-groups of above 200-400 hectares. For bush population of 50-70 years, the proportion of area ranged from 21% to 51% among the different size-groups. The distribution of area having bushes of more than 70 years old was uneven among the size-groups. While it was highest at 66% for estates in the size group of above 8.09-50 hectares and lowest at 3% in the estates of above 400 hectares, it was nil in the case of estates in the size-group of above 200 to 400 hectares. The table below indicates the position :

Table 9a

Age composition of bushes in planted area by size-groups.

(in %age)

Size-group (hect.)	Age-groups						Total
	—Upto 5 years	Above 5—10 years	Above 10—30 years	Above 30—50 years	Above 30—70 years	Above 70 years	
Above 8.09 to 50	—	—	10.65	23.53	—	65.82	100.00
Above 50 to 100	4.75	—	17.12	21.49	37.57	19.07	100.00
Above 100 to 200	5.17	5.92	26.54	28.27	20.67	13.43	100.00
Above 200 to 400	9.98	5.80	24.79	8.62	50.81	—	100.00
Above 400	8.57	14.88	27.36	20.51	25.43	3.25	100.00
Over all	7.96	9.19	25.92	18.90	32.38	5.65	100.00

It is thus obvious that there is a dire need for replantation in the size-groups of ebove 8.09-50 hectares, above 50-100 hectares and above 200-400 hectares since the proportions of planted area covered by uneconomic age of above 50 years in these groups were found to be 66%, 57% and 51% respectively. Of course, the necessity of undertaking replantation in other size-groups, in general, can not be ruled out. The

high concentration of bushes more than 50 years in the size-groups upto 400 hectares is likely to affect adversely the yield rate, as explained in the later paragraphs.

1.22. In order to have a clear idea about the extent of replacement planting, replantation etc., which are required to be under-taken by the estates, the purcentage of area covered by bushes in the economic age group of 30-50 has also to be considered as a part of areas falling nearer the border group having tea bushes over 50 years. Assuming one-third of the area in the age-group of 30-50 years lie in the border age of 50 years, the percentage of area under bushes of 50 years and above were 74% for estates in the size-group of upto 50 hectares, 64% for estates in the size-group of above 50-100 hectares, 43% for estates in the size-group of above 100-200 hectares, 54% for estates in the size-group of above 200-400 hectares and 35% in the size-group of above 400 hectares. It may, therefore, be inferred that the estates in the size-groups of above 8.09-50 and above 50-100 hectares have an acute necessity of under-taking programmes of replantation/replacement planting. However, for estates in other size-groups, such operation in general is required.

1.23. Ownershipwise, the estates under the management of Public Limited and Private Limited companies constituted relatively higher percentage of planted area containing bushes in the age-group of 5 years as compared to partnership firms. On the contrary, the estates managed by Partnership firms accounted for higher proportion of planted area containing the bush population of 5-10 years than that of Private and Public Limited companies. The picture was the same for bush population of 10-30 years and 30-50 years. For bush population of 50-70 years, however, covered 35% of planted area in the estates of Private Limited companies, 37% for Public Limited companies and 9% for Partnership firms. The percentage of planted area did not differ significantly among the various ownership for bushes in the age-group of above 70 years. It may thus appear that estates under the management of Private and Public Limited companies have to undertake replanting/replacement planting on an urgent basis. The details are shown in table below —

Table 9b

Age composition of bushes in planted area by types of ownership.

(in %age)

Ownership	Age-groups						Total
	Upto 5 years	Above 5—10 years	Above 10—30 years	Above 30—50 years	Above 50—70 years	Above 70 years	
Partnership	3.36	29.47	28.23	24.33	8.56	6.05	100.00
Pvt. Ltd. Cos.	7.98	6.04	25.14	20.57	35.06	5.21	100.00
Pub. Ltd. Cos.	9.00	5.89	25.72	16.99	36.66	5.74	100.00
Over All	7.96	9.19	25.92	18.91	32.38	5.64	100.00

It may also be seen that estates in Terai, in general, accounted for about 38% of the total planted area which crossed the economic age group of over 50 years. The existence of such a large percentage of area could be attributed to the slow pace of replantation/replacement/infilling etc. undertaken by the estates. The progress of these operations for the surveyed estates is analysed in the following paras.

Progress of Replantation :

1.24. Out of 28 surveyed estates, only 14 estates undertook replantation during the period from 1976 to 1980. The area replanted by the sample estates was found to be 187.87 hect. and accounting for 2.9% of the total planted area. The proportion of replanted area to total planted area according to different size-gorups is presentedt in he table below :

Table 10a

Extent of replantation carried out during 1976 to 1980 by size-groups.

Size-group (hect.)	No. of estates undertaken	Area covered in 5 years (hect.)	%age to total planted area
Above 8.09 to 50	—	—	—
Above 50 to 100	1	18.00	7.12
Above 100 to 200	7	50.97	3.05
Above 200 to 400	5	89.87	4.51
Above 400	1	29.03	1.13
All Groups	14	187.87	2.88

None of the estates in the size-group of above 8.09-50 hectares had undertaken replantation during the period under reference. Only one estate with a holding of above 50-100 hectares undertook such operation and covered an area of 18.00 hectares constituting 7.1% of the respective planted area. Seven estates in the size-group of above 100-200 hectares carried out replantation with an area of 50.79 hectares (3.1%). Similarly 5 estates falling in the size-group of above 200-400 hectares replanted 89.87 hectares accounting for 4.5% of the respective area under tea. The size-group of above 400 hectares, however, undertook replantation of one estate which covered 29.03 hectares representing a negligible percentage (1.1%) of the respective area under tea. It may thus appear that percentage of replanted area to planted area is relatively low in the size-groups of 100-200 hectares and above 400 hectares as compared to other size-groups. Thus the tea estates in these size-groups may think of stepping up the pace of replantation, otherwise there will be a large concentration of uneconomic tea bushes in that group which in turn may adversely affect the economic viability of the estates.

1.25. In terms of ownership, estates under the management of Partnership firms replanted 41.29 hectares during 5 years period from

1976 to 1980 while it was 77.92 hectares for estates under Private Limited companies and 68.66 hectares for estates under Public Limited companies. The distribution of replanted area to total planted area of the respective companies is shown in the table below :

Table 10b

Extent of replantation carried out during 1976 to 1980 by types of ownership.

Ownership	No. of tea estates undertaken	Area covered in 5 years (hect.)	%age to total planted area
Partnership	3	41.29	4.59
Pvt. Ltd. Cos.	4	77.92	4.58
Pub. Ltd. Cos.	7	68.66	1.75
Total	14	187.87	2.88

It will be seen from the table that proportion of replanted area to total planted area is equal (5%) in the estates under management of Partnership firms and Private Limited companies while it was a about 2% in the case of estates managed by Public Limited companies. Incidentally it may be noted in this connection that percentage of planted area covered by uneconomic age group of over 50 years was found to be about 15% for Partnership firms, 40% for Private Limited companies and 42% for Public Limited companies. (Table 9b).

Spacings :

1.26. The prevalence of broader spacings were found to be dominating in Terai tea plantation. Modern concept of closer spacings to raise the productivity per unit of area has, of course, crept into some of the new plantings carried out in the recent past in this tea area. Table below indicates the relative position of different spacings in existence.

Table 11

Major spacings adopted by the sample estates.

Spacings	Area (hect.)	%age to total
$4\frac{1}{2}' \times 4\frac{1}{2}'$	2318.52	35.58
$4' \times 4'$	950.98	14.58
$5' \times 2\frac{1}{2}'$	487.55	7.48
$4\frac{3}{4}' \times 4\frac{3}{4}'$	467.54	7.18
$5' \times 5'$	438.53	6.73
$4' \times 2\frac{1}{2}'$	227.91	3.49
$4' \times 3'$	220.84	3.39
$4\frac{1}{4}' \times 4\frac{1}{4}'$	215.40	3.13
$4' \times 2' \times 2'$	191.93	2.95
$4' \times 2'$	131.72	2.02
$5' \times 2'$	115.13	1.77
Others	750.09	11.51
Total	6516.14	100.00

It may be seen from the above table that 36% of the tea areas of the sample estates contained spacings of $4\frac{1}{2}' \times 4\frac{1}{2}'$ and next in importance was $4' \times 4'$ which accounted for 15% of the total planted area. Other broader spacings viz., $4\frac{3}{4}' \times 4\frac{3}{4}'$, $5' \times 2\frac{1}{2}'$, $5' \times 5'$ and $4\frac{1}{4}' \times 4\frac{1}{4}'$ together constituted 25% of the area. These types of spacings occupied about three-fifth of the total plantation of estates. In areas where new plantings had been carried out, the spacings were found to be $4' \times 2\frac{1}{2}'$, $4' \times 2'$, $5' \times 2'$ and $4' \times 2' \times 2'$ and they jointly covered about 10% of the area. In view of taking the existing spacings into consideration about 35% of the bushes has already crossed the economic age, it is thus felt that planters in this region may think of conversion of broader spacing into closer spacing by way of infilling bushes in between the rows so as to have larger concentration and consequently raise productivity. It is, therefore, suggested that planters may obtain assistance from TRA and adopt a programme of intensive infilling with closer spacing.

At present, Tea Board has the scheme of 'consolidation and infilling'. Time has come to review the situation in the context of undertaking massive programme of infilling with new plants of high yielding varities. Tea Board may consider this aspect in reorientation of the developmental schemes in the changed context.

Progress of infilling and extent of vacancy :

1.27. The average number of existing bushes per hectare, the estimate of maximum number of bushes per hectare of different spacing and average number of plants infilled during the period from 1976 to 1980 have been worked out in the table below :—

Table 12a

Progress of infilling of bushes and vacancies by size-groups (1976-80).

Size-group (hect.)	Avg. size of an estates (hect.)	Avg. No. of existing bush/hect of planted area	Estimates of maximum No. of bush/ hect based on spacing adopted	Extent of vacancy (%age)	Avg. No. of plants infilled during 5 years from 1976 to 1980 per hect.	%age of plants infilled per hect. to total No. of existing bush/hect.
Above 8.09-50	17.00	4500	6292	28.48	441	9.8
Above 50-100	84.25	5406	6534	17.26	405	7.5
Above 100-200	140.09	5512	6665	17.30	1437	26.1
Above 200-400	284.93	6278	7225	13.11	995	15.9
Above 400	515.46	7104	8289	14.30	1231	17.3
All Groups	232.95	6370	7473	14.76	1178	18.5

It will be seen from the table that average number of existing bushes per hectare of planted area for all the estates was found to be 6370. Assuming the maximum number of bushes per hectare based on different spacing (7473), the extent of vacancy has been worked out to be 14.8%. Size-group wise, the vacancy has been fluctuating. It ranged from 13.1% to 28.5% among the size-groups. It is also noted from the table that average number of plants infilled during 5 years

period from 1976 to 1980 was 1178 per hectare which accounted for 18.5% of the total number of existing bushes. The proportion of plants infilled to total bush population per hectare was maximum at 26.1% in the size-group of above 100-200 hectares and minimum at 7.5% in estates below 100 hectares.

Although the vacancy is high in the size-group of above 8.09-50 hectares, the percentage of plants infilled per hectare to total bush population was very low, This simply indicated that tea estates under lower size-group were unable to undertake infilling operation in view of high cost. The estates under the size-group of above 100-200 hectares have a vacancy of 17.3%, while rate of infilling was 26.1% showing the capacity of the estates to take up such operation.

1.28. Ownership wise, the vacancy ratio was equal in the estates under the management of Partnership firms, Private and Public Limited companies. However, the progress of infilling was more satisfactory in the case of estates managed by Private Limited companies as compared to Partnership firms and Public Limited companies. The table below shows the details :

Table 12b

Progress of infilling of bushes and vacancies by types of ownership (1976-80)

Ownership	Av. size of an estate (hect)	Av. No. of existing bush/hect of planted area	Estimate of maximum No. of bush/ hect based on spacings adopted	Extent of vacancy (%age)	Av. No. of plants infilled during 5 years from 1976 to 1980 per hect.	%age of plants infilled per hect to total No. of existing bushes per hect.
Partnership	179.86	7,238	8,423	14.07	1295	17.9
Pvt. Ltd. Cos	212.65	6,325	7,390	14.44	1760	27.8
Pub. Ltd. Cos.	261.04	6,191	7,291	15.09	937	15.1
Overall	232.72	6,370	7,473	14.76	1178	18.5

This necessitates undertaking of massive infilling in the tea estates to raise the bush population from nearly 7,000 per hectare at present to about 14,000 per hectare. This would help in raising the productivity of the estates. The suggestion in this regard has been made earlier.

CHAPTER—II

Cultural Practices

Irrigation :

2.1. Data collected from sample estates showed that average annual rainfall was 260 cm. in 1978, 305 cm in 1979 and 300 cm in 1980. While the average rainfall was found to be more than 250 cm for the estates in the northern part of Terai i.e. at the foot hills of Himalayas, it was much less for estates in the southern part where the land is plain. It was reported during the course of survey that drought conditions before the on set of plucking season had become a feature for the estates in Terai, which was more acute in the southern part due to late arrival as well as uneven distribution of the rainfall. Indiscriminate deforestation was reported to have worsened the situation. Of the 28 sample estates 18 estates had some arrangements for artificial irrigation while the remaining 10 had to depend on rainfall. Tea estates at the foot hills undertook irrigation from the rivulets passing along the undulated surface. Large estates had pumps and sprinklers for irrigation, while majority of small estates had to depend on manual labour for carrying water. To encounter the difficulties created by drought, which was acute in the southern part of Terai, the tea gardens have to be provided with facilities for artificial irrigation. It is, therefore, suggested that State Government may consider the feasibility of construction of feeder canals under the Teesta/Mahananda Barrage Scheme so as to bring this area under irrigation. For the tea

estates at the foot hills, it is suggested that reservoirs may be constructed at strategic points so that surplus water can be stored at the time of rains which could be utilised during the months of December to May. State Government may take the necessary initiative in this regard in consultation with the Tea Producers' Associations.

Drainage :

2.2. Tea areas on the southern part did not face much problem of drainage. For estates in the northern part i.e. at the foot hills of Himalayas water logging during rainy season was reported to be a common problem. In fact, tea areas get innundated and as a result, the roads, bridges etc. within the estates used to get damaged. Due to piling up of boulders on the beds of rivulets, the carrying capacity of the rivulets often get reduced on the one side and on the other, the outlets of the surplus water were found to have been obstructed by the narrow culverts constructed on highway/railway lines. Widening of the culverts is, therefore, necessary in places where it obstructs the rush of water. It is, therefore, suggested that State Government in consultation with the railway authorities may take corrective measures so that the beds of the rivulets are cleared and suitable outlets for water are provided. In the case of estates located on the banks of the river, landslide was found to be a common problem particularly in times of rainy season when the rivers are in spate. In order to prevent landslides it is necessary to provide strong embankments for such estates. Attention of the State Government should be focussed on this area as well. Dredging of the Balasun river and also harnessing its water for utilisation in the estates needs to be given due attention.

Pruning Cycle :

2.3. Amongst the estates in Terai a pruning cycle of 4 years was found to have been practised by 16 estates out of the 28 estates surveyed. Of the remaining 12 estates, 6 estates followed a pruning cycle of 5 years and 4 estates a 3 year cycle. Two estates did not, reportedly, have any specific programme for pruning. Extended pruning cycle was tried by 5 estates and these estates were reported to have better crop.

Weeds, Plant diseases and Pest Control :

2.4. Almost all the estates in Terai were found to be affected by weeds. The most common weeds were Mikania and Bagracot. Along with these, thatch, sungrass, Baspata, Creeper and Fern, as are locally known, were also found. Sickling 3 to 4 rounds a year was found to be a common measure adopted for controlling weeds. A few estates also adopted 5 to 7 rounds of sickling a year. The other measure adopted for controlling weeds was chilling 2 to 3 rounds a year. Use of chemicals for controlling weeds was also prevalent. The most commonly used chemical weedicides were found to be Gramaxone, Dalapone, Paraquat and Fernoxone.

2.5. As many as 19 of the surveyed estates reported some incidence of plant diseases. The most common plant diseases were Red rust, Black rot and Blister Blight. Poria was also found in a few of the estates. To control plant diseases, Blitox was found to have been applied.

2.6. The incidence of pest attack particularly that of Red Spider, Thrips, Caterpiller and White Ant (Termites) were very common. Scarlet Mites, Mosquitoes and Purple Mites were also found to affect the crop. To control the pest attack, chemical pesticides like Thiodan, Tedion, Ethion, Kelthane, Cythion etc. were found to have been used by the estates.

2.7. Since the incidence of pest attacks was found to be quite common in Terai estates the Tea Research Association may consider the feasibility of rendering free advice to the estates particularly those belonging to the smaller size-groups. The Agriculture Department of the State Government may also consider the feasibility of providing necessary extension service to the tea estates in this regard.

Application of Fertilisers :

2.8. All the surveyed estates in Terai applied various types of chemical fertilisers. Of the 28 surveyed estates, 24 estates obtained fertilisers through local distributors of the Fertiliser Corporation of India located at Siliguri under tie-up arrangement. The remaining 4 obtained their requirements from open market. In obtaining fertilisers supplied by

F.C.I. the estates were found to face various problems. As many as 19 of the total surveyed estates had reported the difficulties of delayed supply by the dealers and lack of fund to lift the allotment. To obviate these problems the Fertiliser Corporation of India may take necessary steps to ensure that the allotment of fertilisers is made at the proper time. Moreover, they should also ensure that sufficient stocks are available with the dealers so that the estates can obtain their quota of supplies at the right time.

2.9. The following table illustrates the extent of application of fertilisers in the surveyed estates.

Table 13

Application of Chemical Fertilisers during 1979 by size groups

(Qty. in kgs./hect.)

Size-group (hect.)	Urea	S.O.A.	M.O.P.	S.P.	N.P.K.	Others
Above 8.09 to 50	100	—	—	—	—	59
Above 50 to 100	118	—	69	36	—	2
Above 100 to 200	84	90	43	11	1	7
Above 200 to 400	141	30	43	13	—	74
Above 400	90	27	21	20	—	1
Overall	105	43	35	16	0.3	25

It will be seen from the table that different types of chemical fertilisers were applied in various proportions among the different size-groups. The most common fertilisers applied in Terai were Urea, S.O.A. and M O.P. In 1979, average application of Urea per hect. amounted to 105 kgs and that of S.O.A. and M.O.P. was 43 and 35 kgs. respectively. Besides these types of fertilisers super phosphate (S.P.) was applied at the rate of 16 kgs. per hectare on an average. According to size-groups, there had not been any noticeable variation in the pattern of usage of fertilisers except for the tea estates in the size-group

of above 100 - 200 hectares. The estates in this size-group applied S.O A. at an average rate of 90 kgs. per hectare, whereas urea was 84 kgs. In all other size-groups, application of urea was significantly higher than any other types of fertilisers. None of the estates upto an area of 100 hectares was found to apply S.O.A.

2.10. On enquiry regarding selection of the type of fertilisers and determination of dose, it was observed that a good number of estates did not obtain suggestions from Tea Research Association regarding the application of fertilisers and had to depend mainly on their own assessment of the situation. The main difficulty standing in the way of obtaining advice from Tea Research Association was reported to be the cost factor. It is, therefore, suggested that in order to ensure judicious application of fertilisers by the estates in Terai, the Tea Research Association may consider the feasibility of rendering free advice to the estates particularly those belonging to the smaller size-groups.

Plucking round :

2.11. During April to June, usually called the "first flush period", plucking round of 8 to 9 days were found common. During autumn, i.e. October to December majority of the estates practiced plucking rounds of 11 to 13 days. It thus appeared that various plucking rounds are adopted at different periods of time. Since adoption of a particular plucking round has an impact on the health of the bushes as well as the quality of the green leaf plucked, it is desirable that the Tea Research Association may provide necessary guidance to the tea estates for selection of suitable plucking rounds for different periods of time.

Task :

2.12. Plucking task was normally fixed at 24 kgs. of green leaf for both male and female. In the case of children, the task was 18 kgs. Incentive given for plucking the green leaf more than the assigned quantities was 13 paise per kg.

Standard of plucking :

2.13. Finer plucking - two leaves and a bud was prevalent amongst Terai tea estates to the extent of 34.2%. The percentage of plucking three leaves and a bud was found to be 48.0% while it was 17.8% for other types of plucking. The following table shows the details :

Table 14

Standard of plucking and average yield of green leaf per bush during 1976 to 1980 by size-groups

Size-group (hect.)	Avg. bush per hect.	Plucking of green leaf (Kg/hect.) Two leaves and a bud	Three leaves and a bud	Others	Total	Avg. yield of green leaf/ bush (Kg)	Avg. yield of made tea (Kg/ hect)
Above 8.09 to 50	4500	578 (25.01)	1733 (74.99)	—	2311 (100.00)	0.51	*542
Above 50 to 100	5406	1615 (30.28)	3373 (63.24)	346 (06.48)	5334 (100.00)	0.91	1252
Above 100 to 200	5512	1377 (26.80)	2849 (55.44)	913 (17.76)	5139 (100.00)	0.93	1206
Above 200 to 400	6278	2580 (41.10)	2900 (46.19)	798 (12.71)	6278 (100.00)	1.00	1473
Above 400	7104	2127 (33.27)	2819 (44.10)	1447 (22.63)	6393 (100.00)	0.90	1500
All groups	6370	2049 (34.24)	2874 (47.96)	1065 (17.80)	5980 (100.00)	0.94	1404

(*Estimated at the ratio of 4.3 : 1 between green leaf and made tea.)

It may be seen from the table that proportion of finer plucking had been fluctuating over the size-groups and it ranged from 25% to 41%. The proportion of plucking three leaves and a bud, however, showed a negative correlation with the size-group - higher the size-group lower the proportion of plucking three leaves and a bud. However coarse plucking was also resorted to by some of the estates belonging to the higher size-groups.

2.14. The table further brings out that average yield of green leaf per hectare increased with the increase in size-group but except the size group of above 8.09 - 50 hectares, the difference was not significant in the group of above 100 - 200 hectares. Same was the case for the next two groups.

So far as the average yield of green leaf per bush is concerned, it may be seen that in the size-groups of above 50 - 100 hectares, above 100 - 200 hectares and above 400 hectares the yield was more or less the same with only slight variations from 0.90 kg. to 0.93 kg. Overall average yield of green leaf per bush worked out to 0.94 kg. Yield of made tea also was found to increase from 542 kgs. per hectare in the lowest size-group to 1,500 kgs. per hectare in the highest size-group. Overall average yield of made tea was found to bo 1404 kgs. per hectare. This trend has also been noticed in the yield rate worked out from the population.

Shade trees :

2.15. The most common shade trees in Terai are Albizzia Stipulate, Albizzia Odoratissima, Albizzia Procera, Albizzia Lebbek and Indigofera Teysmamii. These are planted with various spacings. The most common spacings are 40' × 40', 36' × 36', 20' × 20' etc. The trees are normally within the age group of 20 to 30 years.

CHAPTER III

Factory Operation :

3.1. All the estates surveyed, except one, were found to have factories for processing green leaf. The conditions in majority of the factories were poor. Most of the machinery in the factories were found to have been installed long time back and were on the verge of obsolescence. The machinery was also inadequate in many of the factories. Shortage of facilities for withering and fermenting was a common problem for almost all the tea estates. Of the 28 estates, only 9 estates were found to be connected with grid for regular supply of electricity. While it was observed that as many as 18 tea estates undertook the manufacture of C.T.C. teas, the Rotarvane machine, which is very essential for the manufacture of C.T.C. teas was not installed in majority of the factories.

3.2. Detailed examination of data collected in connection with the various aspects of factory operations brought out the fact that 70.6% of the total production of made tea of the surveyed estates was manufactured by C.T.C., method, 18.6% by orthodox and 10.8% green tea. Following table illustrates the position :

Table 15

Manufacture of tea by different methods during 1980

(in % age)

Size-group (hect.)	C. T. C.	Orthodox	Green	Total
Above 8.09 to 50	Factory not in operation.			
Above 50 to 100	36.46	55.92	7.62	100.00
Above 100 to 200	24.32	43.82	31.86	100.00
Above 200 to 400	73.61	15.39	11.00	100.00
Above 400	95.30	4.70	—	100.00
Overall	70.63	18.56	10.81	100.00

It may be seen from the above table that orthodox manufacturing of tea was more (i.e. 56% of the total production) for estates in the lower size-group of above 50 - 100 hectares, its proportion gradually reduced with the increase in the size of the estates. It was, however, only 5% of total production for estates in the highest size-group of above 400 hectares. Correspondingly, C.T.C. manufacture of tea for estates in the lower size-group accounted for 36% which rose to 95% for estates in the highest size-group of above 400 hectares. The table further reveals that green tea was produced by estates upto 100 hectares whereas estates above that size did not resort to production of green tea. Share of production of green tea was maximum at 32% of the total production of the estates in the size-group of above 100-200 hectares. It, however, recorded a lower proportion of 11% in the size-group of above 200-400 hectares and 8% in the size-group of above 50-100 hectares, The pattern of manufacture of black tea by different methods according to various size-groups broadly suggests that while the large estates could switch over their manufacturing process from orthodox to C.T.C. method in order to take advantage of the market conditions, for the smaller sized estates such switch-over was rather slow on account of their limited investment capacity.

3.3. A peculiar feature noted by the survey team has been that in Terai a sizeable amount of tea was sent out in the form of ungraded teas from the factories of those estates falling within the size of upto 200 hectares. Although the overall percentage of such teas to total teas was only 15%, the considerable quantum of ungraded teas sent out by the comparatively smaller gardens merits attention. The following table gives the particulars of ungraded tea sent out by the estates during 1980.

Table 16

Proportion of graded/ungraded tea during 1980.

(in %age)

Size-group (hect.)	Graded tea	Ungraded tea	Total
Above 8.09 to 50	Factory not in operation.		
Above 50 to 100	36.38	63.62	100.00
Above 100 to 200	46.49	53.51	100.00
Above 200 to 400	97.70	2.30	100.00
Above 400	100.00	—	100.00
Overall	84.85	15.15	100.00

It will be seen that in the case of estates belonging to the size-group of above 50-100 hectares, the proportion of ungraded teas was 64% and in the case of estates belonging to the size-group of above 100-200 hectares this proportion was 54%. The estates in the higher size-group, however, did not dispose of any tea ungraded. Ungraded tea is sent to Siliguri where there are units for undertaking grading. In these grading units the gradation is mostly done by manual labour. While this impairs the quality of Terai teas which will get itself reflected in the price realisation, the point that requires consideration is that the producers get deprived of the benefits which would otherwise have accrued to them had the process of grading also been undertaken by them. The solution lies in the setting up of a Centralised Processing

Unit where the economically weaker units can get their teas processed and graded and after that it can be disposed of so that the producers will be in a position to get the actual margin of profit. Necessary recommendations to this effect are made in para 3.9.

3.4. Arrangements for withering have been found to be unsatisfactory in most of the factories. Of the surveyed factories (26) as much as 14 factories did not have withering troughs and in such cases withering was undertaken on floor. It was also found that in the case of estates below 200 hectares as much as 80% of the green leaf was withered on floor or on racks which had undergone much wear and tear and required replacement. Proper withering facilities is an essential prerequisite for improving the quality of the teas processed in the factories. It is, therefore, suggested that the estates may give due consideration to this aspect.

3.5. As in the case of withering arrangement, fermenting arrangement was also found unsatisfactory in almost all the factories. In 5 of the factories fermenting was found to be undertaken with the help of troughs. Fermenting drums were used only in 1 or 2 factories. Shortage of space and unsatisfactory fermenting arrangement were found to be a common feature of the factories in Terai.

3.6. As regards the conditions of the machinery it was observed that while most of the factories required repair as well as replacement of the existing machinery the requirement of additional machinery was also reported by many of the factories. The additional machinery required by the factories were mostly driers, rollers, C.T.C. machine and sorters. Four of the factories reported the need for prime-movers as well. It is, therefore, felt that the tea estates in Terai should come forward to avail the facilities offered under the Tea Board's scheme of Tea Machinery Hire Purchase.

3.7. It is also felt that most of the estates in Terai were found to have been affected by shortage of electricity. Even in the case of 9 estates which had grid supply, they had to make their own arrangement for generators to supplement their requirement and also to meet the frequent power failures. Most of the tea estates, therefore, depend on generators for their requirement of power. Since lack of adequate supply

of power will adversely affect the quality of teas manufactured, provision of this basic facility is of utmost importance to augment the economic viability of the gardens in Terai. It is, therefore, suggested that the State Electricity Board may initiate suitable steps for the supply of power to the tea estates. The State Electricity Board may also quicken the processing of applications received from the tea estates for electric supply.

3.8. Most of the estates reported difficulties in obtaining their requirement of coal. The difficulties mostly related to inadequate availability of rakes and as a result the estates had to get their coal requirements transported by road which is expensive. It was reported that the coal dump at Matigara was unable to provide satisfactory services in so far as the supply of quality and quantity of coal is concerned. It is, therefore, suggested that Coal India Ltd., in consultation with Railway authorities and the Tea Board and tea industry would evolve suitable steps to supply quality coal to the estates in Terai in sufficient quantities without putting any extra burden on the estates. The availability of coal should also be ensured at the right time.

3.9. In view of the unsatisfactory processing facilities in Terai and also in view of financial constraints to avail of the H. P. Scheme of the Board, the survey team felt the need for a proposal to set up a Centralised Processing Unit under co-operative management at a suitable place somewhere in Bagdogra. This would enable the smaller sized units to get their green leaf properly processed and graded. This would enable them to fetch reasonable price for their graded product. The Centralised Processing Unit, if set up, is unlikely to face the problem of inadequacy in the volume of green leaf, as it is estimated that a quantum of 15 lakhs kgs. of green leaf would be available for processing at the first instance. It is, therefore, suggested that due consideration should be given to the proposal for the setting up of a Centralised Processing Unit in Terai by the State Government and Producer Association. Tea Board may provide necessary assistance, if necessary.

CHAPTER — IV

Labour :

4.1. Average number of daily labour employed in Terai including West Dinajpur during 1979 was estimated at 21,861 of which 19,640 (89.84%) worked in field and 2,221 (10.16%) in factory. The total labour force comprised male 9,981 (45.65%), female 10,073 (46.08%), adolescent 494 (2.26%) and children 1,313 (6.01%). The resident and outside workers were 16,221 (74.20%) and 5,641 (25.80%) respectively of the total labour force. The average labour per hectare employed in Terai was estimated at 1.91. Output per labour worked out to 665 kgs.

4.2. While the fore-going analysis on land-labour ratio and labour-out put ratio was made on the basis of average daily number of labour employed in tea plantation, an attempt has been made to evaluable the above parameters taking into account the number of labour on roll per hectare, only for the surveyed estates over the different size-groups and ownership. Overall average labour per hectare on roll as on 1-4-1981 was estimated at 2.17. Size-group wise, it did not differ much between the estates of above 50 to 100 hectares (1.97) and above 100-200 hectares (2.01). It was, however, same (2.24) for estates of above 200-400 hectares and above 400 hectares. The details are shown in the table below :—

Table 17

Average number of labour on roll per hectare of planted area as on 1-4-1981 and estimated average output of made tea per labour by size-groups.

Size-group (hect.)	Avg. Labour on Roll/hect.			Avg. estimated output of made tea per labour (Kgs.)
	Permanent	Casual	Total	
Above 8.09 to 50	0.82	0.76	1.58	*
Above 50 to 100	1.82	0.15	1.97	635
Above 100 to 200	1.64	0.37	2.01	600
Above 200 to 400	1.72	0.52	2.24	658
Above 400	1.75	0.49	2.24	670
Overall	1.71	0.46	2.17	647

* Green leaf sold to other estates.

It may be seen from the above table that large sized estates employed more labour per hectare as compared to the small ones. It increased from 1.58 in the lowest size-group to 2.24 per hectare in the highest size-group of above 400 hectares. Similarly, output per labour has increased with the increase in size of tea estates. It was 635 kg. per labour for the estates of above 50-100 hectares and 670 kg. per labour for estates above 400 hectares.

4.3. Classifying the labour into permanent and casual, permanent labour per hectare was found to increase with the increase in size-group. The overall average of permanent labour per hectare worked out to 1.71, as against 0.46 for casual labour force. It was highest at 0.76 for tea estates of above 8.09 to 50 hectares and lowest in the next group. For the tea estates above 100-200 hectares, the figures stood at 0.37 and for the subsequent groups they were at around 0.50 per hectare.

4.4. Average labour on roll per hectare according to different categories of workers has also been analysed. It would be seen from the table below that taking both permanent and casual labour into account, female worker per hectare was slightly higher (1.06) than male worker (0.99). The proportion of children worker was, however, very insignificant :

Table 18

Distribution of categories of labour per hectare of planted area

Category	Average labour on roll per hectare as on 1-4-1981		
	Permanent	Casual	Total
Male	0.83	0.16	0.99
Female	0.82	0.24	1.06
Children	0.06	0.06	0.12
Total	1.71	0.46	2.17

In respect of both male and female workers, average number of permanent labour per hectare was higher than that of casual labour. In the case of children, permanent and casual labour per hectare were the same.

4.5. Since the break-up figures for mandays spent on various field operations were not available, analysis has been confined to 'plucking' and 'other' operations only. The table below shows the details :-

Table 19

Mandays spent for plucking and other field operations by size-groups.

(in %age)

Size-group (hect.)	Field operations		
	Plucking	Others*	Total
Above 8.09 to 50	35.53	64.47	100.00
Above 50 to 100	49.77	50.23	100.00
Above 100 to 200	55.21	44.79	100.00
Above 200 to 400	61.33	38.67	100.00
Above 400	52.91	47.09	100.00
Over all	55.80	44.20	100.00

* Including manuring, irrigation, weed control, pruning, transportation of green leaf, uprooting of bushes, sowing etc.

It will be seen from the table that proportion of mandays spent on plucking operation increased with the increase in size of the estates. In the size-group of above 8.09 to 50 hectares it was 36% which rose to 61% for estates in the size-group of above 200-400 hectares. For the estates above 400 hectares the proportion was however, reduced to 53%. In respect of other field operations, the proportion of mandays spent showed a negative correlation with the increase in size-group. It declined from 64% to 39% for estates upto 400 hectares and further rose to 47% for estates above 400 hectares. It is thus observed that estates above 100 hectares had deployed more labour in plucking, it being the main operation related to immediate productivity as compared to other cultural operations having a long-term effect on productivity. The small sized units employ less labour in plucking operation.

4.6. Distribution of mandays spent for various types of factory operations is given in table below :—

Table 20

Mandays spent for different types of factory operations

Factory operations	% age to total
Withering	16.70
Rolling	20.58
Fermenting	8.29
Drying	12.66
Packing	4.52
Others	37 25
Total	100.00

In the surveyed estates rolling as a single item of operation consumed the highest percentage of total mandays, 21% followed by 17% for withering. Drying accounted for 13% of the total mandays while it was 8% for fermenting. Proportion of total mandays spent on packing was found to be 5%. In respect of 'other' operations for which detailed information was not available, it was 37% of the total mandays. Distribution of mandays spent for different types of operations according to various size-groups was not available.

4.7. The ratio of overall distribution of mandays spent for various operations in the field and factory worked out to 86.14. It was also noticed that of the total mandays spent by male workers, 74% was for the field and 26% for the factory. Female and children workers mostly were employed in the field. The details are given in the table below :—

Table 21

Distribution of total mandays spent in field and factory

(in %age)

Category	Field	Factory	Total
Male	73.80	26.20	100.00
Female	99.13	0.87	100.00
Children	99.60	0.40	100.00
Overall	85.98	14.02	100.00

4.8. Rates of daily wages including dearness allowances effective from 1st July 1980 for tea plantation labour in Terai were Rs. 8.04 for male, Rs. 7.87 for female and Rs. 4.12 for children. Besides wages, cereals are made available to labourers at Rs. 40.19 per quintals.

4.9. Distribution of wages and other amenities to labour during the period from 1976 to 1980 is given in table below :—

Table 22

Distribution of wages and other amenities to labour during 1976 to 1980.

(in %age)

Item	Period					Average of 5 years from 1976 to 1980
	1976	1977	1978	1979	1980	
Wages & D.A.	68.6	68.1	68.3	69.1	65.0	67.7
Value of food concession	15.3	12.4	10.6	10.5	18.6	13.5
Bonus	5.4	8.7	10.6	10.0	6.4	8.4
Others	10.7	10.8	10.5	10.4	10.0	10.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

It may be seen from the table that wages and D.A. accounted for nearly 68% of the total wages bill for the surveyed estates. Value of food concession and bonus constituted about 14% and 8% of the total wages bill. The balance of 10% was in the form of 'other amenities' like recreation facilities, medical expenses, housing etc.

4.10. Different types of accommodation provided to the staff as well as labour are given in the table below :—

Table 23

Distribution of types of accommodation provided to staff and labour

(in %age)

Accommodation	Staff	Labour	Total
Pucca quarters	80.5	41.4	42.7
Semi pucca quarters	18.4	8.7	9.1
Kutcha quarters	1.1	49.9	48.2
Total	100.0	100.0	100.0

It may be seen from the table that about 48% of the families including both staff and labour were provided with kutcha quarters, 43% pucca quarters and 9% semi-pucca quarters. About half of the total labour had kutcha quarters, while less than half had pucca quarters. A little percentage of labour had also semi-pucca quarters. As regards staff, about 80% had pucca quarters and 18% had semi-pucca quarters. Conversion of kutcha quarters into pucca quarters particularly for the labour according to the specification laid down in the Plantation Labour Act was reportedly very slow in view of the high cost involved in building up of pucca quarters. Moreover, various building materials like cement, bricks etc. were also not available as per the required amount. The State Government may, therefore, look into this aspect and render necessary assistance to the estates for providing quarters to plantation labour.

CHAPTER—V

Marketing :

5.1. Data collected from the sample estates in Terai revealed that on an average a little below three-fourth's of the total production of the sample estates was sold exgarden during 1976-80 and the balance through public auctions in India. A negligible quantity was sent to London auctions for sale. The share of disposals of teas of the surveyed estates through Siliguri auctions during the period under reference averaged 17%, followed by 10% at Calcutta auctions and 2% at Gauhati auctions. It may be noted here that an auction centre at Siliguri was set up in October 1976 to facilitate the sale of Terai teas through public auctions. The pattern of disposal of teas of the sample estates is illustrated below :—

Table 24

Primary marketing of tea year-wise.

(in %age)

Year	Ex-factory and Private sale	Auctions					All total
		Siliguri @	Calcutta	Gauhati	Total	London	
1976	78.6	9.3	10.9	1.2	21.4	—	100.00
1977	61.1	24.6	11.4	2.6	38.6	0.3	100.00
1978	69.7	16.1	8.4	2.7	27.2	3.1	100.00
1979	75.8	15 1	7.8	1.0	23.9	0.3	100.00
1980	69.5	20.4	9.3	0.6	30.3	0.2	100.00
Av of 5 years	70.7	17.1	9.5	1.7	28.3	1.0	100.00

@ Siliguri auction started on 29.10.1976.

It will be seen from the table that quantum of tea sold exfactory and private had increased from 61.1% in 1977 to 69.5% in 1980. (The year 1976 has been excluded for comparison purposes, as the Siliguri auctions were set up only in October 1976). The establishment of an auction centre at Siliguri, therefore, did not have a positive impact on the marketing of Terai teas in view of the fact that sales at this auction centre has declined from 24.6% in 1977 to 20.4% in 1980. Not only that, there has not been an increase in the overall quantum of Terai teas sold through auctions. The reasons for the decline in the quantum of tea sold at auctions could be attributed to the certain inherent disadvantages accrued to auction sales like loss in sampling, brokerage charges, extra charges for transportation and warehousing. Moreover, auction sales involved considerable time lag for realisation of the sale proceeds. However, there has been a lot of improvement of sales through Siliguri auctions since 1981 because of imposition of rural employment cess on tea by Govt. of West Bengal. This was discussed in earlier paragraphs.

5.2. The average price realised by surveyed estates at different points of sale are shown below :—

Table 25

Average price realised during 1976-80.

(Rs./kg)

Year	Ex-factory and Private sale	Auctions				Av. of ex-factory and auction sales
		Siliguri	Cal-cutta	Gau-hati	All auctions	
1976	9.44	10.51	11.38	10.07	11.00	9.74
1977	11.84	12.88	11.20	8.20	11.94	11.87
1978	8.94	9.47	9.81	9.92	9.67	9.12
1979	10.65	11.56	11.76	11.78	11.64	10.88
1980	10.87	9.64	11.36	11.29	10.29	10.70
Av. of 5 years	10.29	10.99	11.11	9.70	10.94	10.46

(Note : London price was not taken into account due to negligible quantity)

The overall average price of both ex-factory and auction sales during 1976-80 worked out to Rs. 10.46. Price fetched from ex-factory and private sales during the period averaged Rs. 10.29 per kg which was lower by 0.65 paise than the average price at all auctions. Over the years average prices realised through ex-factory and private sales were lower than prices at all auctions except in 1980 in which year ex-factory and private sale was higher at Rs. 10.87 as against Rs. 10.29 through all auctions. This was due to sharp fall in price realisation at Siliguri auction in 1980 compared to 1979. While in 1979 average price fetched at Siliguri auction worked out to Rs. 11.56 per kg , it was only Rs. 9.64 per kg. during 1980. The reason for price differential between auctions and ex-factory sales have also been discussed in earlier paragraphs.

5.3. Primary marketing of tea by estates belonging to different size-groups during the period 1976-80 is illustrated below :—

Table 26

Primary marketing of tea by size-groups
(Average of 1976-80)

(in %age)

Size-group (hect.)	Ex-factory and Private sale	Auctions				All total
		Siliguri	Cal-cutta	Gau-hati	Total	
Above 8.09 to 50@	nil	nil	nil	nil	nil	nil
Above 50 to 100	89.9	6.1	3.7	0.3	10.1	100.00
Above 100 to 200	79.6	14.3	6.1	—	20.4	100.00
Above 200 to 400	68.4	22.6	2.8	6.2	31.6	100.00
Above 400	67.1	17.5	14.6	0.8	32.9	100.00
Overall	70.7	17.1	9.5	1.7	28.3	100.00

(Note : London figure is not taken into account)

(@ green leaf is sold)

Above table reveals that for estates belonging to any size-groups, the proportion of sale through ex-factory during the period from 1976-80 was not less than 67% of the total disposal. The proportion was higher at 90% for estates in the lower size-group of above 50-100 hectares while it was 67% for estates in the largest size-group of above 400 hectares. Correspondingly auction sales for the estates in the larger size-groups was higher than the estates in the smaller size-groups. The estates in the highest size-group of above 400 hectares sent maximum tea to Calcutta auction which accounted for 15% as compared to 3% to 6% in the lower size-groups. For the same size-groups sale through Siliguri auction was 18%.

5.4. Average price realised by the surveyed estates of different size-groups is given below :—

Table 27

Average price realised by estates belonging to different size-groups during 1976-80.

(Rs./kg.)

Size-group (hect.)	Ex-factory and Private sale	Auctions				Av. of ex-factory and auction sales
		Siliguri	Calcutta	Gauhati	Overall	
Above 8.09 to 50@	nil	nil	nil	nil	nil	nil
Above 50 to 100	9.44	13.76	12.79	. .	13.39	9.89
Above 100 to 200	10.58	11.34	10.61	—	11.16	10.67
Above 200 to 400	10.21	11.06	11.97	9.26	10.79	10.39
Above 400	10.28	10.69	11.39	11.36	11.08	10.51
Overall	10.29	10.99	11.11	9.70	10.94	10.46

(Note : London price is not taken into account due to negligible quantities.)

(@ green leaf is sold)

In will be seen from the table that overall average price realised through ex-factory and auction sale was higher in the size-group of 100-200 hectares than any other size-groups. Average price fetched by ex-factory and private sale was lower than prices at both Calcutta and Siliguri auctions in all the size-groups. At Siliguri auction price realised by estates above 200 hectares was, however, lower than Calcutta auction.

Cost of production :

6.1. The survey team had to face difficulties in collecting data on cost of production from sample estates. However, data were collected from 26 estates out of 28 sample estates for the years 1978 and 1979. For the year 1980, data was available from 16 sample estates. Cost of production is an important parameter for determining the economic viability of a particular estate. It may be seen from the table below that cost of production gradually increased over a period of 3 years from 1978 to 1980. It was Rs. 9.14 in 1978 which rose to Rs. 11.47 in 1979 and Rs. 12.20 in 1980.

Table 28

Cost of production of made tea during 1978-80.

Item of expenditure	1978 (Rs/Kg)	1979 (Rs/Kg)	1980 (Rs/Kg)
1. Establishment at garden	0.79	0.90	1.02
2. Cultivation	1.52	1.85	1.78
3. Plucking	1.20	1.51	1.70
4. Manufacturing	1.18	1.58	1.78
5. Packing	0.44	0.52	0.57
6. Labour welfare	1.43	1.69	1.72
7. Maintenance and repair of factory & building	0.47	0.54	0.46
8. Duties & Taxes	0.53	0.57	0.56
9. Freight & Transport	0.24	0.30	0.29
10. H. O. & Selling expenses	0.61	0.80	0.74
11. General charges	0.73	1.23	1.58
Total	9.14	11.47	12.20

It was noticed that increase in cost per kg. was reflected in all items of expenditure. However, by and large. expenditure was found to be the highest in cultivation followed by labour welfare manufacturing and plucking. General charges and establishment at garden were the other items which involved higher cost. The expenditure for freight and transport was the lowest.

6.2. Attempt has been made to show the relationship between cost of production and size-group. For the purpose of analysis, the average cost for the years 1978 to 1980 was taken into account. The overall cost for the period averaged to Rs. 10.86 per kg. The estates in the size-group of above 50-100 hectares incurred a total cost of Rs. 10.46 per kg. which increased to Rs. 11.66 per kg. for estates in the size-group of above 100-200 hectares. Cost of production per kg. on all items was more or less same (Rs. 10.61 per kg.) for estates in both the size-groups of above 200-400 hectares and above 400 hectares. Itemwise expenditure revealed that estates falling in the size-group of above 50-100 hectares incurred higher cost on plucking as compared to estates in the other size-groups. Cost involved per kg. on items like cultivation, manufacturing, labour welfare, maintenance and repair of factory, buildings etc. and H.O. & Selling expenses were relatively higher in the estates of above 100-200 hectares than that of estates in other size-groups. Estates in the size-group of above 200-400 hectares incurred higher expenditure on items like establishment at gardens, packing and freight and duties as compared to estates of other size-groups. The estates in the largest size-group, however, spent more expenditure on duties and taxes and general charges as compared to estates belonging to other size-groups. The table below shows the details :—

Table 29

Cost of production per kg. of made tea by size-groups (Avg. of 1978-80)

(in Rs./Kg.)

Item of expenditure	Size-group (hect.)					
	Above 8.09-50	Above 50-100	Above 100-200	Above 200-400	Above 400	Overall
1. Establishment at Garden	—	0·98	1.17	1.20	0.66	0.94
2. Cultivation	—	1.30	1.91	1.62	1.71	1.70
3. Plucking	—	1.62	1.41	1.46	1.46	1.45
4. Manufacturing	—	1.58	1.70	0.97	1.55	1.49
5. Packing	—	0.27	0.31	0.56	0.56	0 51
6. Labour welfare etc.	—	1.89	1.98	1.60	1.48	1.61
7. Maintenance & repair of factory & building etc.	—	0.65	0.70	0.54	0.36	0.41
8. Duties & taxes	—	0.40	0.46	0.53	0.61	0.55
9. Freight & transport	—	0.21	0.19	0 31	0.28	0.27
10. H. O. & Selling expenses	—	0.39	0.78	0.73	0.69	0.81
11. General Charges	—	1.17	1.05	1.08	1.25	1.15
Total	—	10.46	11.66	10.60	10.61	10.86

6.3. Data further revealed that estates in the size-groups of above 50-100 hectares and above 100-200 hectares incurred maximum cost per kg. on labour welfare while it was minimum in the case of freight and transport. As regards estates of above 200-400 hectares and above 400 hectares, cost of production per kg. was maximum on cultivation and minimum for freight and transport.

6.4. The proportion of different items of expenditure to total cost of production per kg. of made tea by size-groups revealed that expenditure incurred on establishment at garden to total cost of production was maximum at 11.3% for estates in the size-group of above 200-400 hectares, while it was minimum at 6.2% for estates in the size-group of above 400 hectares. Proportion of total cost on item like cultivation was same (16%) for estates in the size-groups of above 100-200 hectares and above 400 hectares, while it was relatively low in other size-groups. Plucking

constituted 15.5% in the size-group of above 50-100 hectares followed by 13.8% each in the size-groups of above 200-400 hectares and above 400 hectares, and 12.1% in the size-group of above 100-200 hectares. The table below shows the details :-

Table 30

Proportion of different items of expenditure to total cost of production per kg. of made tea in different size-groups. Average of 1978-80

Item of expenditure	Size-group (hect.)					Overall
	Above 8.09-50	Above 50-100	Above 100-200	Above 200-400	Above 400	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Establishment at garden	—	9.4	10.0	11.3	6.2	8.7
2. Cultivation	—	12.4	16 4	15.3	16.2	15.6
3. Plucking	—	15.5	12.1	13.8	13.8	13 4
4. Manufacturing	—	15.1	14.6	9.2	14.6	13.7
5. Packing	—	2.6	2.7	5.2	5.3	4.6
6. Labour welfare etc.	—	18.1	17.0	15.1	13.9	14.8
7. Maintenance & repair of factory & building etc.	—	6.2	6.0	5.1	3.4	4.5
8. Duties & Taxes	—	3.8	3.9	5.0	5.7	5.1
9. Freight & transport	—	2.0	1.6	2.9	2.6	2.5
10. H.O. & Selling expenses	—	3.7	6.7	6.9	6 5	6.5
11. General charges	—	11 2	9.0	10.2	11.8	10.6
Total	—	100.0	100.0	100.0	100 0	100.0

It will be seen from the table that proportion of cost on manufacturing was very low for estates in the size-group of above 200-400 hectares while it hardly differed in the case of estates falling in other size-groups. Percentage of cost on packing to total did not differ between the estates of above 50-100 and above 100-200 hectares. The same trend was noticed for the remaining size-groups. The tea estates in lower size-group incurred higher percentage of total cost on labour welfare and

maintenance and repair of factory and buildings etc. as compared to other estates of different size-groups. Duties and taxes accounted for high percentage in the estates of relatively higher size-groups while freight and transport did not differ significantly among the size-groups. The proportion of expenditure on H.O. & selling expences was on high side for estates above 100 hectares. The general charges varied between 9.0% for estates in the size-group of above 100-200 hectares and 11.8% for estates above 400 hectares.

6.5. To assess the economic conditions of tea estates in Terai, attempt has been made to analyse cost-price relationship. It may be seen from the table below that sale price per kg. was lower for estates in the size-groups of above 50-100 hectares and above 100-200 hectares than the cost, resulting in losses of Rs. 0.78 per kg. and Rs. 1.18 per kg. respectively. Estates in the size-groups of above 200-400 hectares and above 400 hectares made a profit of Rs. 0.16 per kg. and Rs. 0.83 per kg. respectively as the sale price per kg. was higher than the cost. Taking all the size-groups into accounts, the surveyed estates made a marginal profit of Rs. 0.17 per kg. The table below shows the details :-

Table 31

Cost vs. sale price per kg. by size-groups
(Avg. of 1978-80)

(in Rs./kg.)

Size-groups (hect.)	Cost price	Sale price	Difference (sale-cost)
Above 8.09 to 50	—	—	—
Above 50 to 100	10.46	9.68	— 0.78
Above 100 to 200	11.66	10.48	— 1.18
Above 200 to 400	10.60	10.76	+ 0.16
Above 400	10.61	11.41	+ 0.83
Overall	10.86	11.03	+ 0.17

+ Profit, — Loss

It may be seen from above that the tea estates below 400 hectares were not in good shape. The steps necessarily have to be taken to reduce the per kg. cost of production by adopting suitable cultural practices in field and improving manufacturing at factory points. It is also necessary to improve the quality of tea for obtaining better prices. It is the responsibility of the tea estates to take a proper care of the estates, being owned by them. Only the assistance from the different institution will not help in this regard. The proper management of the estates, fruitful utilisation of available finance—small or big - and motivation are needed to make improvement in the condition of the tea estates.

CHAPTER—VII

Profitability Ratio :

7.1. An elaborate analysis of all the financial aspects of Terai tea industry is not possible because the number of estates furnishing balance sheets are very few. The effective sample for the purpose of financial analysis thus gets reduced to 23 estates in 1977, 14 estates in 1978 and 13 estates in 1979. In this analysis some well known profitability ratios have been computed which may throw light on the economic viability of tea estates in Terai. The table below shows the different profitability ratios.

Table 32

Profitability ratios

Ratio	1977 (23 estates)	1978 (14 estates)	1979 (13 estates)
1. Gross profit as % age of net sales	19.94	14.34	13.36
2. Gross profit as % age of net worth	30.36	19.68	17.36
3. Tax provision as % age of profit before tax	44.70	47.66	51.06
4. Profit retained as % age of profit after tax	52 36	43.35	23.37

N.B. : Gross Profit : Net sales minus direct expenditure relating to manufacturing of made tea.

Net worth : Capital plus Reserve & surplus.

Net sales : Gross sales minus excise duty minus cess minus discount minus rebate etc,

Retention : Profit after tax less dividends plus depreciation and development allowances.

7.2. It may be observed from the table at pre-page that gross profit as percentage of net sales showed a progressively downward trend during the three-year period from 1977 to 1979. The ratio was 20% in 1977 which declined to 14% in 1978 and further to 13% in 1979. On the other hand, there has been a progressive increase in the tax provision during the period under reference. Tax provision as percentage of profit before tax worked out to 45% in 1977 which rose to 48% in 1978 and 51% in 1979. Profit retained as percentage of profit after tax declined from 52% in 1977 to 23% in 1979. It was however, 43% in 1978.

7.3. Gross profit as percentage of net worth which explains the productivity of investment showed a declining trend over the years in question. It was 30% in 1977 which declined to 20% in 1978 and 17% in 1979. It is, therefore, apparent from the above analysis that the economic viability of Terai tea industry has been deteriorating over the years. There is, therefore, an urgent need for making all round efforts to keep the industry healthy. For this various agencies like State Government, tea industry, Central Govt. and financial institutions should work in cohesion. There is a need for working out a comprehensive plan for revitalisation of the tea estates in Terai.

PART III

Summary of Findings and Recommendations

CHAPTER—I

Field Practices

1. As much as 42.9% of the total number of sample tea estates belong to the size-group of 100-200 hectares followed by 25.0% in the next higher size-group. Only 17.8% of the estates fall in the size-group of above 400hectares. The balance 14.3% of the estates belong to the size-group of 8.09 to 100 hectares. Ownership-wise, about 53.6% of the Tea Estates are managed by Public Ltd. companies, while 28.5% is by Private Ltd., companies. The remaining 17.9% of the estates are managed by Partnership firms. (1.2)
2. ...the size-group of above 400 hectares accounted for 39.5% of the total area under tea followed by 30.5% in the size-group of above 200-400 hectares. Tea estates having an area of 100-200 hectares covered 25.8% of total area under tea while estates upto 100 hectares accounted for the balance of 4.2%. In terms of ownership, about 60.1% of the total tea area was owned by the estates under the management of Public Limited companies. Estates owned by Private and Partnership firms constituted 26.1% and 13.6% of the total tea area respectively (1.3)
3. Since the estates of above 100 hectares accounted for 85.7% of the total estates and 95.8% of the total area, the tea economy of Terai largely depends on the efficient functioning of bigger size-units.

The smaller size units, however, act as a supplementary base to accelerate the growth of the economy. (1.4)

4. Majority of the sample estates (92.9%) commenced production over 50 years ago. (1.5)

5. During the course of last 10 years, ownership of 5 estates had changed, of which 1 fell in the size-group of 50-100 hectares, 2 each in the size-groups of 200-400 hectares and above 400 hectares. Frequent change in ownership which seems to be detrimental to the smooth and efficient functional activities of the estates did not occur in the case of Terai tea industry. (1.6)

6. All the surveyed estates in Terai were found to be members of one or other Producers' Associations. Since all these estates have taken the membership of various Producers' Associations, it is felt that tea industry in Terai has a common platform to solve the general problems. (1.7)

7. ...about 67.9% of the total surveyed tea estates were members of the Tea Research Association, while the remaining 32.1% were reported to have not taken the membership. Size-group wise, all the sample tea estates in the size-group of 50-100 hectares took the membership of association, while this was 50% in the case of estates in the size-group of 100-200 hectares; 85.7% in the size-group of 200-400 hectares and 80.0% in the size-group of above 400 hectares. During the discussions with planters in Terai, it has been reported that advisory services of the Tea Research Association (TRA) should be made extensive, acceptable and adoptable for the planters in this region. It is, therefore suggested that TRA may take necessary steps to enlarge their activities taking into account the conditions and economies of the estate in question. They may also take steps to enlist more and more tea estates in Terai under their membership so that they can utilise the fruits of research and improve the condition of tea estates.

About 60.0% of the total estates managed by Partnership firms were members of Tea Research Association (TRA) while it was 75.0% and 66.7% in the case of Private and Public Limited companies respectively. It is suggested that T.R.A. may take the initiative in this regard in consultation with the Producers' Association. It is felt that Producers' Association should also encourage their members to get the advice of TRA in the improvement of economies of the tea estates. (1.8 & 1.9)

8. Percentage of area under forest and waste land was found to be 27.5% in the size-group of 50-100 hectares while it accounted for a lower percentage in other size-grcups. 'Other' areas accounted for an equal percentage (17.7%) in both the size-groups of 100-200 hectares and above 400 hectares followed by 13.0% and 13.3% in the size-groups of 50-100 and 200-400 hectares respectively. The planters may, think of bringing certain percentage of the land under "forest & waste land" and "other areas" into tea cultivation. (1.11)

9. Management-wise forest and waste land were found to be 16.3% for Public Limited companies and 5.1% for Private Limited companies. "Other areas" was found to be 19.5% of the total grant for estates managed by Public Limited companies, 12.1% for Partnership firms and 11.2% for Private Limited companies. Thus it appears that by and large the estates under different types of management have the scope to bring more new areas under tea cultivation over the years. (1.13)

10. Percentage of land used for 'purposes other than tea' was relatively more in the size-groups of 50-100 hectares (44.7%) and above 400 hectares (43.0%) as compared to other size-groups. In view of this, it appears that a considerable portion of area not utilised for tea can be brought under plantation and the scope of it lies more with the bigger size-groups. (1.14)

11. Management-wise percentage of land used for 'purposes other than tea' was found to be 39.7% for Public Limited companies. 40.2% for Private Limited companies and 47.4% for Partnership firms. Thus equal scope exists for all the estates to bring more area under tea cultivation. (1.15)

12. Area suitable for tea extension has increased over the size of the estates. It was relatively more in the large size-groups. It is thus suggested that bigger size groups should take a lead in development of tea industry in Terai. (1.16)

13. In terms of management, Public Limited companies had larger area for extension as compared to estates under other managements. It is, therefore, necessary that the Public Limited companies have to play a larger role to bring more tea areas under cultivation over the passage of time so as to improve the overall health of the tea industry in Terai. (1.17)

14. ...extension planting was relatively more in the size-group of above 400 hectares as compared to other size-groups. It was 6.19% of the total planted area for the largest size-group followed by 4.92% for estates with a size-group of 200-400 hectares and 2.16% for 100-200 hectares. In respect of replacement planting it was more in the size-group of above 400 hectares but equal for estates in both the size-groups of 100-200 hectares and 200-400 hectares. (1.18)

15. None of the estates under the management of Partnership firms undertook extension planting during the period under review. The area brought under extension planting was higher (238.76 hectares) for estates managed by Public Limited companies as compared to estates managed by Private Limited companies (59.92 hectares). In terms of replacement planting, none of the estates belonging to Private Limited companies undertook such operation. The estates under Partnership firms and Public Limited companies brought 4.05 hectares and 40.91 hectares respectively under replacement planting (1.19)

16. ....lack of finance was considered to be the major problem faced by the planters in undertaking extension and replacement planting. The high cost of extension and replacement planting over the years had prevented the producers from taking up such operations. Moreover the uncertainties of the tea market arising out of steep fluctuation in prices have also reportedly affected the self financing capacity of the producers. The quantum of loans granted under Plantation Finance Scheme of the Board was reported to be inadequate when actual cost of new planting is taken into consideration. .....the documentation and procedural formalities for obtaining loans from the Board were very rigid and elaborate..... The floor level communication and less contacts were reported to be the factors preventing many of the producers from obtaining loans from the Board..... Under these circumstances it is suggested that the quantum of loans under the Plantation Finance Scheme for extension and replacement planting should be enhanced so as to cover a substantial part of the actual cost involved in undertaking such operations including the cost incurred in other ancilliary purposes..... It is also relevant in this context to point out that documentation for obtaining Plantation finance loan from the Tea Board should be simplified. Besides, the expenditure relating to panel Inspector's charge, cost of preparing survey plan which are usually borne by the tea estate owners, may also be reduced, if not excmpted, particularly for tea estates of smaller size of upto 100 hectares. For the smaller estates it is recommended that loan should be granted on a long term basis. For ensuring this, provisions should be made in the Plantation Finance Scheme of the Board in such a way that the loan may be treated as 'soft loan' which will be repayable over a longer period at a lower rate of interest. This

will motivate the producers to take up extension and replacement planting on a large scale and thereby improve the health of the tea bushes..... (1.20)

17. In general, nearly 18% of the planted area contained young tea bushes of upto 10 years old while it was 45% for bush population of 10-50 years old and 38% for bush population of more than 50 years old. (1.21)

18. In order to have a clear idea about the extent of replacement planting,replanting etc.,the percentage of area covered by bushes in the economic age-group of 30-50 years has also to be considered as a part of areas falling nearer the border group having tea bushes over 50 years. Assuming one third of the area in the age-group of 30-50 years lies in the border age of 50 years, the percentage of area under bushes of 50 years and alone were 74% for estates in the size-group of upto 50 hectares, 64% for estates in the size-group of 50-100 hectares, 43% for estates in the size-group of 200-400 hectares and 35% in the size-group of above 400 hectares.

It may, therefore, be inferred that the estates in the size-group of 8.09-50 and 50-100 hectares have an acute necessity of undertaking programmes of replantation/ replacement planting. However, for estates in other size-groups, such operation should continue. (1.22)

19. Ownership wise, the estates under the management of Private and Public Limited companies have to undertake replanting/replacement planting on an urgent basis. (1.23)

20. None of the estates in the size-group of 8.09-50 hectares had undertaken replantation during the period under reference. Only one estate with a holding of 50-100 hectares undertook such operation and covered an area of 18.00 hectares (7.12%). Seven estates in the size-group of 100-200 hectares carried out replantation with an area of 50.79 hectares (3.05%). Similarly 5 estates in the size-group of 200-400 hectares and one estate in the size-group

of above 400 hectares replanted 89.87 hectares(4.51%)and 29.03 hectares (1.13%) respectively. It may, therefore, appear that percentage of replanted area to planted area is relatively low in the size-groups of 100-200 hectares and above 400 hectares as compared to other size-groups. Thus the tea estates in these size-groups may think of stepping up the pace of replantation, otherwise there will be a large concentration of uneconomic tea bushes in that group which in turn adversely effect the economic viability of the estate (1.24)

21. In terms of ownership, proportion of replanted area to total planted area is equal (5%) in the estates under the management of Partnership firms and Private Limited companies while it was about 2% in the case of estates managed by Public Limited companies. (1.25)

22. ...36% of the tea areas of the sample estates contained spaceings of $4\frac{1}{2}' \times 4\frac{1}{2}'$ and next in importance was $4' \times 4'$ which accounted for 15% of the total planted area. Other broader spacing viz. $4\frac{3}{4}' \times 4\frac{3}{4}'$, $5 \times 2\frac{1}{2}'$. $5' \times 5'$ and $4\frac{1}{2}' \times 4\frac{1}{4}'$ together constituted 25% of the area. These types of spacings occupied about three fifth of the total plantation of estates. In areas where new plantings had been carried out the spacings were found to be $4' \times 2\frac{1}{2}'$, $4' \times 2'$, $5' \times 2'$, and $4' \times 2' \times 2'$ and they jointly covered 10% of the area. In view of taking the existing spacings into consideration about 38% of the bushes had already crossed the economic age, it is thus felt that planters in this region may think of conversion of broader spacing into closer spacing by way of infilling bushes in between the rows so as to have larger concentration and consequently raise productivity. It is, therefore, suggested that planters may obtain assistance from T.R.A. and adopt a programme of intensive infilling with closer spacing (1.26)

23. .....average number of existing bushes per hectare of planted area for all estates was found to be 6370. Assuming the maximum number of bushes per hectare based on different spacing (7473), the extent of vacancy has been worked out to 14.76%. Size-group wise vacancy has been fluctuating.....average number of plants infilled during 1976-80 was 1178 per hectare accounting for 18.5% of the total number of existing bushes. The proportion of plants infilled to total bush population per hectare was maximum at 26.1% in the size-group of 100-200 hectares and minimum at 7.5% in estates below 100 hectares.

Although the vacancy was high in the size-group of 8.09-50 hectares, the percentage of plants infilled per hectare to total bush population was very low. This simply indicated that tea estates in lower size-group were unable to undertake infilling operation suitably in view of high cost.

(1.27)

24. Ownership wise, the vacancy ratio was equal in the estates under the management of Partnership firms, Private Limited companies and Public Limited companies. However, the progress of infilling was more satisfactory in the case of estates managed by Private Limited companies as compared to Partnership firms and Public Limited companies.

(1.28)

CHAPTER—II

Cultural Practices :

25. The average annual rainfall was found to be more in the northern part of Terai, i.e. in the foothills of Himalayas than the southern part of Terai which is plain.
Drought condition before the onset of plucking had become a feature for the estates in Terai which was more acute in the southern part..... Although many large estates had pumps and sprinklers for irrigation, majority of small estates had to depend on manual labour for carrying water. To obviate the difficulties created by drought it is suggested that the State Government may consider the feasibility of construction of feeder canals under the Teesta/Mahananda Barrage Scheme so as to bring this area under irrigation. For estates situated at the foot hills, construction of reservoirs at strategic points for utilasation during December to May may be considered by the State Government in consultation with the Tea Producers' Associations. (2.1)

26. Water logging during rainy season inundating thereby the tea areas at the foot hills of Himalayas was reported to be a common problem. The roads, bridges etc within the estates used to get damaged. Piling up of boulders on

the beds of rivuelets often reduces the carrying capacity of rivulets on the one side and on the other the outlets of the surplus water were found to have been obstructed by narrow culverts on highway/railway lines. It is, therefore, suggested that the State Government in consultation with the railway authorities may take corrective measures so that the beds of the rivulets are cleared and suitable outlets for water are provided. Landslides at rainy season when the rivers are in spate affect also the estates located on the banks of the river. To prevent landslides, attention of the State Government should be focussed at providing strong embankments for such estates. Dredging of the Balasun river and also harnessing its water for utilisation in the estates need to be given due attention. (2.2)

27. Pruning cycles of 4 years. 5 years and 3 years were found to have been practised normally by the estates in Terai. Extended pruning cycle was tried by 5 estates and these estates were reported to have had better crop. (2.3)

28. Almost all the estates in Terai were found to be affected mainly by weeds like Mikania and Bagracot along with Thatch, Sungrass, Baspata, Creeper and Fern. Sickling 3 to 4 rounds a year and chilling 2 to 3 rounds a year were found to be a common measure adopted by them. Use of chemical weedicides like Gramaxone, Dalapone, Paraquat and Fernoxone was also prevalent. (2.4)

29. As many as 19 estates reported some incidences of plant diseases like Red rust, Black rot, Blister Blight and in a few cases Poria. To control plant diseases chemical like Blitox was found to have been applied. (2.5)

30. The incidence of pest attack particularly that of Red spider, Thrips, Caterpiller and white ant (Termites) were very common. Scarlet Mites, Mosquitoes and Purple Mites also affect the crop. Chemical pesticides like Thiodan, Tedion, Ethion, Kelthane, Cythion etc., were used by the estates. It is suggested that T.R.A. may consider the

feasibility of rendering free advice to the estates particularly those belonging to the smaller size-groups. The Agricultural Department of the State Government may also consider the posibility of rendering extension service to the tea estates in this regard. (2.6 & 2.7)

31. Out of the 28 surveyed estates 24 estates obtained Chemical fertilisers through local distributors of the Fertiliser Corporation of India under tie-up arrangement. The remaining 4 estates obtained it from open market. Delayed supply of fertilisers by the dealers and lack of fund for the estates to lift the allotment were common difficulties faced by the estates. It is suggested that F.C.I. may take necessary steps to ensure that the allotment of fertiliser is made at the proper time and see that sufficient stocks are available with the dealers for catering the estates, quota of supplies at the right time. (2.8)

32. The most common fertilisers applied were Urea, S.O.A., M.O.P. and Super Phosphate (S.P.). In 1979 average applications of Urea, S.O.A., M.O.P and S.P. were 105 Kgs., 43 Kgs., 35 Kgs. and 16 Kgs. respectively per hectare. No noticeable variation between the different size-groups as to the pattern of usage of fertilisers was observed except in the size-group of above 100 to 200 hectares where contrary to other groups S.O.A. was applied at a higher doses than Urea. In other size-groups application of Urea was significantly higher than any other types of fertiliser. Estates below 100 hectares were not found to apply S.O.A. (2.9)

33. On inquiry regarding selection of types of fertiliser and determination of doses, it was observed that a good number of estates did not obtain suggestions from TRA regarding the application of fertilisers and had to depend mainly on their own assessment of the situation. The main difficulty standing in the way of obtaining advice from TRA was reported to be the cost factor. It is, therefore, suggested that in order to ensure judicious application

of fertilisers by the estates in Terai, the TRA may consider the feasibility of rendering free advice to the estates particularly those belonging to the smaller size-groups. (2.10)

34. Since adoption of a particular plucking round has an impact on the health of the bushes as well as quality of the green leaf plucked, it is desirable that TRA may provide necessary guidance to the tea estates for selection of suitable plucking rounds for different periods. (2.11)

35. Finer plucking - two leaves and a bud - was prevalent amongst Terai tea estates to the extent of 34.2%. The percentage of plucking three leaves and a bud was found to be 48.0% while it was 17.8% for other types of plucking. The proportion of finer plucking had been fluctuating over the size-groups and it raised from 25% to 41%. The proportion of plucking three leaves & a bud, however, showed a negative correlation with the increase in the size-group-higher the size-group lower the proportion of plucking three leaves and a bud.

36. Average yield of green leaf per bush in the size-groups of above 50-100 hectares, 100-200 hectares and above 400 hectares was fourd more or less same with only slight variations from 0.90 kgs. to 0.93 kgs. Overall average yield of green leaf per bush worked out to 0.94 kg. Yield of made tea also was found to increase from 542 kgs. per hectare in the lowest size-group to 1500 kgs. per hectare in the highest size-group. Overall average yield of made tea was found to be 1404 kgs. per hectare. (2.13) (2.14)

CHAPTER—III

Factory Operation :

37. 70.6% of the total production of made tea of the surveyed estates was manufactured by C.T.C. method, 18.6% by Orthodox and 10.8% green tea. Orthodox manufacturing of tea was more i.e. 56% of the total production for estates in the lower size group of above 50-100 hectares, which gradually reduced to 5% for estates in the highest size group of above 400 hectares. C.T.C. manufacture of tea for estates in the lower size group accounted for 36%, which rose to 95% in the highest size group of above 400 hectares. Production of green tea was maximum at 32% of the total production of the estates in the size group of above 100-200 hectares, followed by 11% for the next higher group of above 200-400 hectares. (3.2)

38. A sizeable amount of tea was sent out in the form of ungraded teas from the factories of those estates falling within the size of upto 200 hectares. The proportion of ungraded tea was 64% of the total manufacture of the estates in the size group of above 50-100 hectares and 54% in the size-group of above 100-200 hectares. Overall percentage of such teas to total was 15%. Ungraded teas is sent to Siliguri where there are units for undertaking grading. This impairs quality and producers get deprived of the benefit which would otherwise have accrued to them had the process of grading also been undertaken by them. (3.3)

39. Arrangements for withering have been found to be unsatisfactory in most of the factories, 14 factories did not have withering troughs. In the case of estates below 200 hectares as much as 80% of the green leaf was withered on floor or on racks. (3.4)

40. 5 of the factories had fermenting troughs. Shortage of space and unsatisfactory fermenting arrangement were found to be common features of the factories in Terai. (3.5)

41. Most of the factories required repair as well as replacement of the existing machinery, the requirement of additional machinery was also reported by many of the factories. It is, therefore, felt that the tea estates in Terai should come forward to avail the facilities offered under the Tea Board's scheme of Tea Machinery Hire Purchase. (3.6)

42. The estates in Terai were found to have been affected by shortage of power. Even in the case of 9 estates which had grid supply, they had to make their own arrangement for generators to supplement their requirement and also to meet the frequent power failures. Most of the tea estates, therefore, depended on generators for their requirement of power. It is, therefore, suggested that the State Electricity Board may initiate suitable steps for the supply of power to the tea estates and quicken processing of applications for electric supply. (3.7)

43. Due to inadequate availability of rakes, the estates had to get their coal requirements transported by road which was expensive. It was reported that the coal dump at Matigara was unable to provide satisfactory services in so far as the supply of quality and quantity of coal is concered. It is, therefore, suggested that Coal India Ltd., in consultation with Railway Authorities and the Tea Board and tea industry would evolve suitable steps to

supply quality coal to the estates in Terai in sufficient quantities without putting any extra burden on the estates. The availability of coal should also be ensured at the right time. (3.8)

44. In view of the unsatisfactory processing facilities in Terai and also in view of financial constraints to avail of the H. P. Scheme of the Board, the survey team felt the need for a proposal to set up a centralised processing unit under Co-operative management at a suitable place somewhere in Bagdogra. This would enable the smaller sized units to get their green leaf properly processed and graded. This would enable them to fetch reasonable price for their graded product. It is, therefore, suggested that due consideration should be given to the proposal for the setting up of a centralised processing unit in Terai by the State Government and Producers Associations. Tea Board may provide necessary assistance, if necessary. (3.9)

CHAPTER—IV

Labour :

45. Average number of daily labour employed in Terai including West Dinajpur during 1979 was estimated at 21,861 of which 19,640 were in field and 2,221 in factory. The average labour per hectare employed in Terai was estimated at 1.91. Output per labour worked out to 665 Kg. (4.1)

46. Overall average labour per hectare on roll as on 1-4-81 for the sample estates was estimated at 2.17...large sized estates employed more lobour. It increased from 1.58 in the lowest size-group to 2.24 per hectare in the highest size-group of above 400 hectares. Similarly, output per labour has also increased from 635 Kg. for the estates of 50-100 hectares to 670 Kg. for above 400 hectares. (4.2)

47. Permanent labour per hectare was found to increase with the increase in size-group, (4.3)

48. Taking both permanent and casual labour into account, female worker per hectare was slightly higher (1.06) than male worker (0.99). The proportion of children worker was, however, very insignificant. (4.4)

49. Proportion of mandays spent on plucking increased from 36% in the lowest size-group of above 8.09-50 hectares to 53% in the highest size-group of above 400 hectares. In respect of other field operations, the proportion of mandays spent showed a negative correlation with the increase in size-group. (4.5)

50. Rolling as a single item of factory operation consumed the highest percentage of total mandays, (20.6%) followed by 16.7% for withering Drying accounted for 12.7% of the total mandays while it was 8.3% for fermenting and 4.5% for packing. In respect of other operations for which detailed information was not available, it was 37.3% (4.6)

51. The ratio of overall distribution of mandays spent for various operations between the field and factory worked out to 86:14. It was also noticed that of the total mandays spent by male workers, 74% was for the field and 26% for the factory. Female and children workers mostly were employed in the field. (4.7)

52. Wages and D.A. accounted for nearly 68% of the total wages bill for the surveyed estates. Value of food concession and bonus constituted about 14% and 8%. The balance of 10% was in the form of "other amenities" like recreation facilities, medical expenses, housing etc. (4.9)

53. About half of the total labour had kutcha quarters, while less than half had pucca quarters. As regards staff about 80% had pucca quarters and 18% had semi-pucca quarters. Conversion of kutcha quarters into pucca quarters particularly for the labour according to the specification laid down in the Plantation labour Act was reportedly very slow in view of the high cost involved in building up of pucca quarters. Moreover, various building materials like cement, bricks etc., were also not available as per the required amount. The State Government may, therefore, look into this aspect and render necessary assistance to the estates for providing quarters to plantation labour. (4.10)

CHAPTER—V

Marketing :

54. On an average a little below three - fourth's of total production of the sample estates was sold ex-garden during 1976-80 and the balance through public auctions in India. A negligible quantity was sent to London auctions for sale. The share of disposal of teas of the surveyed estates through Siliguri auctions during the period under reference averaged 17% followed by 10% at Calcutta and 2% at Gauhati auctions. Tea sold exfactory and private had increased from 61.1% in 1977 to 69.5% in 1980. The establishment of an auction centre at Siliguri, therefore, did not have a positive impact on the marketing of Terai teas in view of the fact that sales at this auction had declined from 24.6% in 1977 to 20.4% in 1980. The reason for decline in the quantum of tea sold at auctions could be attributed to certain inherent disadvantages of auction sales like loss in sampling, brokerage charges, extra charges for transportation and warehousing. Moreover, auction sales involved considerable time lag for realisation of sale proceeds. (5.1)

55. The overall average price of both ex-factory and auction sales during 1976-80 worked out to Rs. 10.46. Price fetched from ex-factory and private sales during the period averaged Rs. 10.29 per kg which was lower by 0.65 paisa than the average price at all auctions. Over the years average price realised through ex-factory and private sales were lower than prices at all auctions except in 1980 in which year ex factory and private sale was higher at Rs. 10.87 as against Rs. 10.29 through all auctions. This was due to sharp fall in price realisation at Siliguri auction in 1980 compared to 1979. While in 1979 average price fetched at Siliguri auction worked out to Rs. 11.56 per kg, it was Rs. 9.64 per kg. during 1980. (5.2)

56. The proportion of sale through ex-factory during the period from 1976-80 was not less than 67% of the total disposal. The proportion was higher at 90% for estates in the lowest size-group of above 50-100 hectares but lower at 67% for estates in the highest size-group of above 400 hectares. Correspondingly, auction sales for the estates in the larger size-groups were higher than the estates in the smaller size-group. (5.3)

57. Overall average price realised through ex-factory and auction sale was higher in the size-group of 100-200 hectares than any other size-groups. Average price fetched by ex-factory and private sale was lower than prices at both Calcutta and Siliguri auctions in all the size-groups. At Siliguri auctions price realised by estates above 200 hectares was, however, lower than Calcutta auction, (5.4)

CHAPTER—VI

Cost of Production :

58. Cost of production gradually increased over a period of 3 years from 1978 to 1980. It was Rs. 9.14 in 1978 which rose to Rs. 11.47 in 1979 and Rs. 12.20 in 1980..... expenditure was found to be the highest in cultivation followed by labour welfare, manufacturing and plucking. (6.1)

59. The overall costs for the period averaged Rs. 10.86 per kg. The estates in the size group of 50-100 hectares incurred a total cost of Rs. 10.46 per kg., which increased to Rs. 11.66 per kg. for estates in the size group of 100-200 hectares. Cost of production was same at Rs. 10.60 per kg. for estates in both the size groups of 200-400 hectares and above 400 hectares.....estates falling in the size group of 50-100 hectares incurred highest cost on plucking as compared to estates in other size groups. Cost involved per kg. on items like cultivation, manufacturing, labour welfare, maintenance and repair of factory, buildings etc. and H.O. & selling expenses were relatively higher in the estates of above 100-200 hectares than that of estates in other size groups. (6.2)

60. Expenditure incurred on establishment at garden to total cost of production was maximum at 11.3% for estates in the size group of above 200-400 hectares while it was minimum at 6.2% for estates in the size group of above 400 hectares. Cost on item like cultivation was same

(16%), for estates in the size-groups of 100-200 hectares and above 400 hectares, while it was relatively low in other size-groups. Plucking constituted 15.5% in the size group of above 50-100 hectares followed by 13.8% each in the size groups of above 200-400 hectares and above 400 hectares and 12.1% in the size group of above 100-200 hectares. Cost on manufacturing was very low for estates in the size group of above 200-400 hectares. The tea estates in lower size group incurred higher percentage of total cost on labour welfare and maintenance and repair of factory and buildings etc. Duties and taxes accounted for high percentage in the estates of relatively higher size groups. The proportion of expenditure on H.O. & selling expenses was on high side for estates above 100 hectares.

(6.4)

61. ..... sale price per kg. was lower for estates in the size groups of above 50-100 hectares and above 100-200 hectares than the cost, resulting in losses of Rs. 0.78 per kg. and Rs. 1.18 per kg., respectively. Estates in the size groups of 200-400 hectares and above 400 hectares made a profit of Rs.0.16 per kg. and Rs.0.83 per kg. respectively.....that the tea estates below 400 hectares were not in good shape. The steps necessarily have to be taken to reduce the per kg. cost of production by adopting suitable cultural practices in field and improving manufacturing at factory points. It is also necessary to improve the quality of tea for obtaining better prices. The proper management of the estates, fruitful utilisation of available finance small or big - and motivation are needed to make improvement in the condition of the tea estates. (6.5)

CHAPTER—VII

Profitability ratio :

62. Gross profit as percentage to net sales showed a progressively downward trend during the three year period from 1977 to 1979. It was 19.9% in 1977 which declined to 14.3% in 1978 and further to 13.4% in 1979. On the other hand, there has been a progressive increase in the tax provision during the period under reference. Tax provision as percentage of profit before tax worked out to 44.7% in 1977 which rose to 47.7% in 1978 and 51.1% in 1979. Profit retained as percentage of profit after tax declined from 52.4% in 1977 to 23.4% in 1979. It was, however, 43.4% in 1978. (7.2)

63. Gross profit as percentage of net worth which explains the productivity of investment showed a declining trend over the years in question. It was 30.4% in 1977 which declined to 19.7% in 1978 and 17.4% in 1979. It is, therefore, apparant from the above analysis that the economic viability of Terai Tea Industry has been deteriorating over the years. There is, therefore, an urgent need for making all round efforts to keep the industry healthy. For this various agencies like State Government, Tea Industry, Central Government and Financial Institutions should work in cohesion. There is a need for working out a comprehensive plan for revitalisation of the tea estates in Terai. (7.3)