

CHAPTER THREE

THE PRESENT STUDY

The present study intends to look into the problem of the declining trend in productivity in Darjeeling tea industry and the factors responsible for it. It suggests some necessary technological measures which may help arrest the decline. It is assumed that the decline in productivity may have some impact on labour employment. The present study therefore seeks to examine the implications of the declining productivity on the socio-economic life of the plantation labourers in terms of their employment situation and other related matters like casualisation, welfare etc. It also aims to find out the impact of the possible remedial measures (to arrest productivity stagnation) on the life of the tea plantation workers in Darjeeling hills.

To provide the study a logical structure, we made an attempt

1. To examine the nature and extent of stagnation or decline in productivity in Darjeeling Tea Industry and its underlying causes.
2. To investigate further whether that trend has any effect or not on the life of the plantation labourers in terms of their employment conditions and benefits they receive from the industry.

After examining the extent of productivity stagnation and its impact on the labourers, we should try to find out the possible ways by which the prevailing stagnating situation can be overcome and the adopted measures could be more conducive in favour of the labourers.

It has been observed in the first chapter that as compared to the other tea producing regions in the country, Darjeeling is characterised by a low land productivity (kg/ha). A good number of factors have contributed to such a low production situation.¹ They are: (a) Change in climatological condition, (b) Old age of the bushes, (c) Vacancy, (d) The low producing planting material, (e) Soil erosion, (f) Land Slide, (g) More infestation of pests, diseases and weeds etc.

The changes in climatological condition are not as drastic as in the fall in the productivity. Moreover, it is very difficult to quantify the variations in the climate-related parameters to ascertain the impact of such changes in productivity. Similarly, we do not have much evidence about the possible changes in

distribution and intensity of pest population in and around Darjeeling tea gardens over time. Thus it may not be possible to understand the impact of pests and diseases vis-a-vis the declining trend in productivity. Interactions with the planters revealed that there has been no significant change in the aforesaid distribution pattern and intensity to induce such visible decline in the yield of tea. Soil erosion, land slide as well as the low yielding planting material may in a number of ways be responsible for the same.

The factors which are found directly responsible in furthering stagnation have been studied in detail subject to the availability of information on them. For easy comprehension, the factors have been categorised as below :

Old age of the bushes

A plant body consists of both productive and unproductive tissues. "Productive tissues in a plant are those that add to the growth of the plant viz. the green leaves and stems and the fine absorbing roots, while all brown tissues are unproductive and merely serve as channels for conducting water, organic and inorganic chemicals from one part of the plant body to another. As unproductive load increases, more and more energy converted by the green tissues and the chemicals absorbed by the fine roots are diverted towards supporting this load and less and less comes into the plucking basket as crop. As we were not growing tea bushes for fire wood, it is a dead loss".² This unproductive load increases with the age of the bushes. Since Darjeeling is having more of old bushes, it is possible that due to this factor, yield is coming down gradually.

Vacancy

Vacancy means unoccupied places caused due to mortality of bushes because of pest and diseases, faulty or no drainage system, old age etc. About 90% of the sections in Darjeeling tea plantations are having such vacancy ranging from 2% to to 30%.³ If we take an average of 15% as vacancy and deduct the same from the present total area of 18932 hectare (the area under tea as in 1995) the actual effective area under tea will be 16092.2 hectare. This loss in effective area under tea may be accounted for lowering productivity.

The average vacancy in the total tea area of Darjeeling gardens was 15% between 1991-95. On the basis of that, the following would be the notional yield in different years and which shows the actual potential of the land and the bushes, provided there would not have been any vacancy.

Table 3.1 : Actual and notinal yield of Darjeeling tea in different years

Year	Vacancy	Actual yield in kg/ha	Notional yield in kg/ha
1991	15%	693.65	816.06
1992	15%	639.86	752.77
1993	15%	674.08	792.04
1994	15%	575.31	676.84
1995	15%	544.77	640.08

Source: Author's estimate from data available from Tea Statistics, different years, by Tea Board, India, and Tea Digest, 1997.

Notional yield : Production / Actual effective area under tea bushes .

Change in plucking pattern for the demand of better quality

The productivity in Darjeeling tea industry peaked during 1982-83 to reach an yield of 725 kg made tea per hectare and from there onwards the decline started. Incidentally this period coincided with heavy demand from Russia, Iran and Iraq who preferred tea produced from coarse leaves as they were not much bothered about quality. With demand pattern having changed in favour of finer quality for which very fine leaves have to be plucked in shorter rounds there is an evident loss in shoot weight. Because, coarser plucking means plucking a shoot which consists of 3 leaves and a bud, whereas in case of finer plucking only the shoots containing 2 leaves and a bud and one leaf and a bud are plucked. The difference in weight in these type of shoots are as under :

100 No. of 3 leaves + bud = 142.35 gms

100 No. of 2 leaves + bud = 73.19 gms

100 No. of 1 leaf + bud = 26.32 gms

Therefore the loss of weight due to finer plucking may be another probable reason behind decline in productivity.

Consciousness about pesticidal residue

Incidentally the countries like Japan, Germany who are the main buyers of Darjeeling tea⁴ now-a-days, have become conscious about pesticidal residues since 1994 as the residue which remains in the made tea due to application of chemicals are considered harmful for human health⁵. Formerly the buyers had no objection to the existence of pesticidal residue. Consequently controlling pests and diseases by application of conventional chemical pesticides was easier. But now the maximum residue limit set is so low⁶ that these chemicals can not

be used to control the pests and diseases and the planters are having no other option than to depend on Neem and sulphur based products which are allowed by the major exporting countries. Since these products are not as efficient as the conventional chemical pesticides, at least in the short run, controlling pests and diseases has become a problem, and good amount of crop is being lost due to this.⁷ Keeping in view the export factor, some gardens are not applying any chemical weedicide to control weeds which competes with the tea bushes for nutrition and moisture. They are controlling weeds manually by sickling, uprooting etc. which are not only less effective but also more costly. This weed control technology is perhaps also affecting the productivity.

Planting material

Another possible cause for decline in productivity may be the planting materials. According to Sarkar, "More than fifty per cent of the tea is china or china hybrid type, whose shoots are very small. About 12500 shoots of two leaves and a bud from these bushes make one kilograms of tea whereas a broadleaf Assam jat can produce the equivalent quantity of tea with less than half of the shoots."⁸ So compared to broad leaf Assam jat, these bushes are low yielding and as more than 50% of the bushes are of this type only, it is contributing to the low yield of the district as a whole.

All the above stated factors are possibly responsible for the stagnation in productivity. It would have been ideal if all those factors could have been studied in detail to pinpoint the role of each one in lowering the productivity. But in the context of present study it was not possible to deal with all the aforesaid factors separately or independently because of several constraints like availability of relevant information, time etc. Therefore, we shall confine our observations only to the problem of old age and vacancy.

The specific objectives of the study are :

- (1) To find out the extent of stagnation/decline in Darjeeling tea industry over the years and the contribution of old age and vacancy to such decline.
- (2) To study the impact of this stagnation on the labourers in terms of their employment and overall welfare.
- (3) To find out the possible technological remedial measures and to ascertain how each of these measures will improve the productivity of Darjeeling tea.

- (4) To find out the possible impact of these suggested technological measures on the life of the labourers in terms of employment status, casualisation, wages, amenities and welfare that are expected to be taken up by the management from time to time in view of the favourable changes in productivity.

Location of the study area

The district of Darjeeling lies between 26°31' and 27°13' north latitude and between 87°59' and 88°53' east longitude in a subtropical belt. It is located in the extreme north of the state of West Bengal and in the foot hills of Himalayas. It is a frontier district with Nepal on one side and Bhutan on another side. It stretches from the plains of West Bengal on the south to the state of Sikkim on the North.

Historically speaking, the whole of the Dajeeling district was owned by the Raja of Sikkim. It came to the notice of the British Government when General Liyod and Mr. J.W.Grant visited the old Gorkha station called Darjeeling in February, 1829 and spent six days there. That is the period when the idea of establishing a sanatorium in Darjeeling was developed. So both the gentlemen recommended about the same to the then Governor General Lord Willium Bentinck giving a stress not only for its suitability for establishing a sanatorium but for military purpose also as an entrance into Nepal Territory. The advantageous position of the place as a centre of trade was also emphasized. The Governor General promptly acted and being satisfied after a survey, directed General Liyod to approach the Raja of Sikkim for Darjeeling in liue of land or money. The Raja was benovolent enough to present the said land to East India Company on 1st February, 1835 as a gift. Though initially it was presented as a gift without asking any favour in cash or kind, in 1841 the Government granted an allowance of Rs. 3000/- per annum²as compensation which was raised to Rs. 6000/- in 1846.

After the Hill tract was ceded in 1835, General Liyod and Dr. Chapman was sent for exploring the capability of the place for establishing a sanatorium in 1836. Depending on their positive report, decision of establishing a sanatorium was taken and in 1837 Dr. A Campbell, a member of the Indian Medical Service, was deputed as Superintendent. He is the man who played the most important role in the formation of Darjeeling district. At the time of cession in 1835, Darjeeling was having an area of 138 sq miles with population of not more than 100. In 1839 also, the population did not exceed. But as a result of the sincere effort

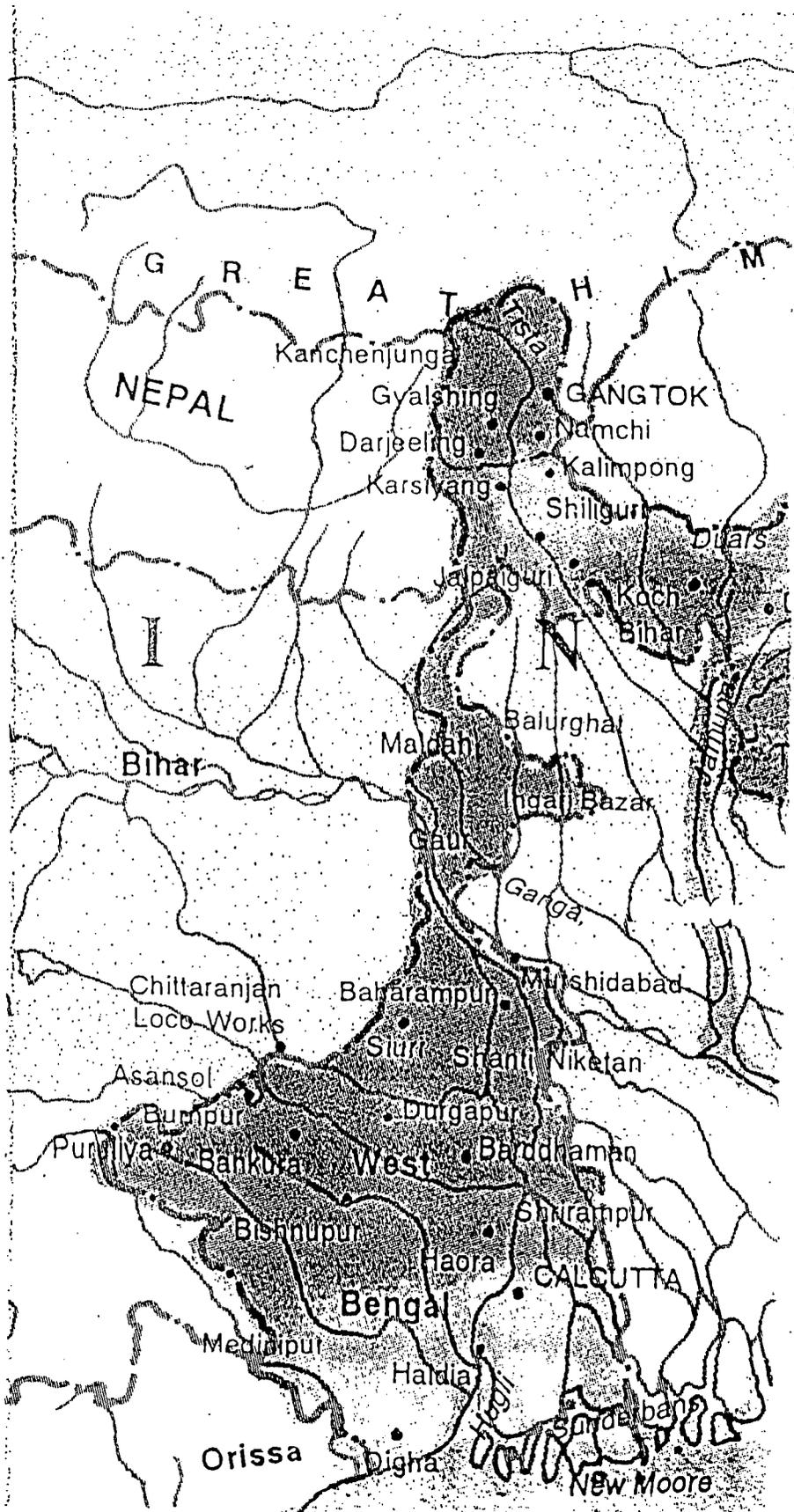
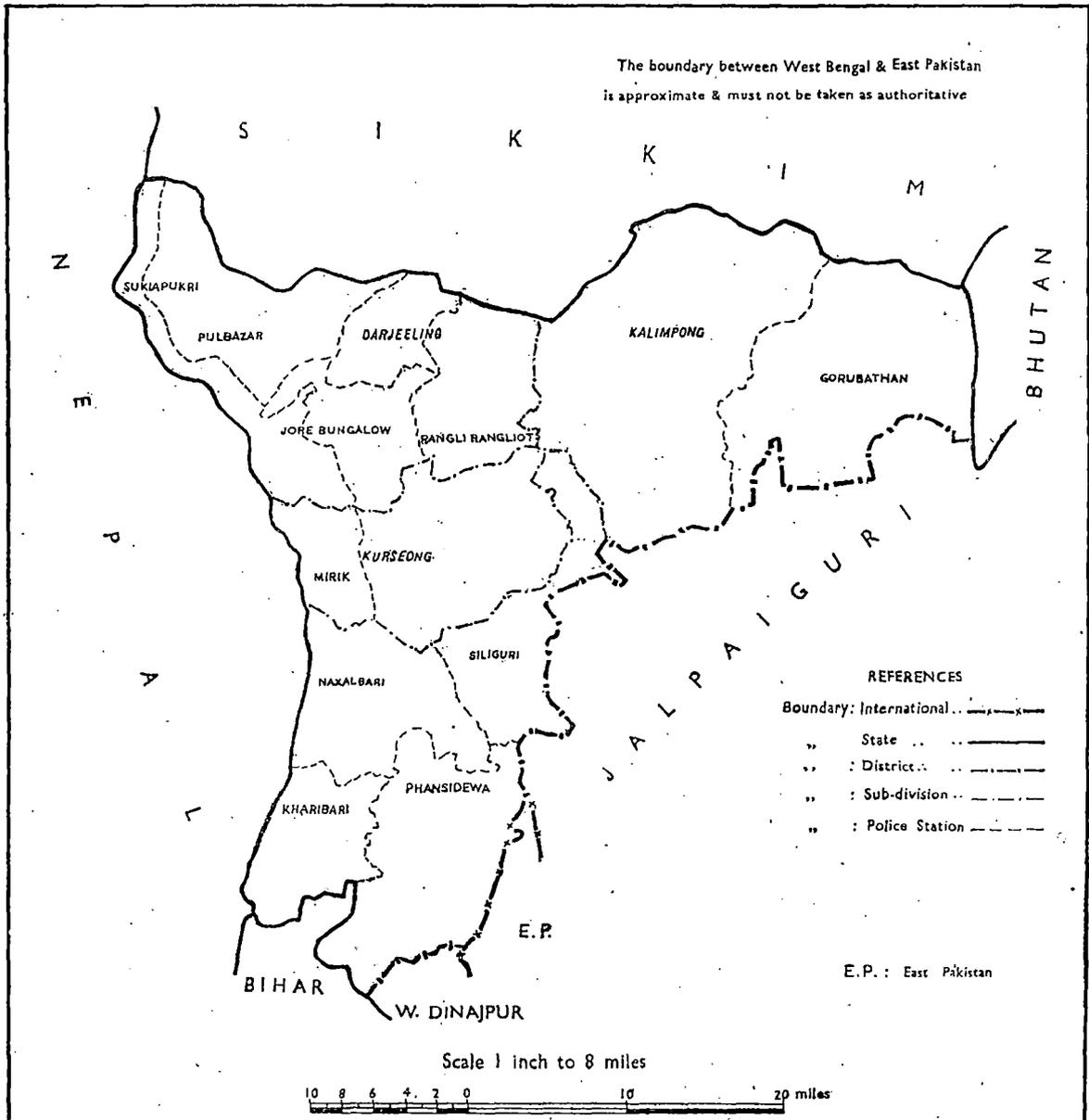


FIG. 3.1 MAP SHOWING THE LOCATION OF DARJEELING DISTRICT WITHIN THE STATE OF WEST BENGAL

DISTRICT DARJEELING



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FIG. 3.2. MAP OF DARJEELING DISTRICT

made by Dr. Campbell to make Darjeeling habitable in all respects possible, this figure rose to 10,000 in 1849 within a span of 10 years. These people mainly came from Nepal, Sikkim and Bhutan where slavery and oppression was prevalent at that time. The area which started from not more than a hundred soul and with 198 sq. miles is now comprises of 138 sq. miles with a population of more than 5 lakhs. The whole district is having four subdivisions namely Darjeeling, Kalimpong, Kurseong and Siliguri of which Siliguri is situated in the plains and rest are in the hills.

Methodology

So far the tea areas are concerned there are two tea growing regions in the district of Darjeeling. One is Terai which covers the tea gardens located in the plains of the district. The other region comprises the gardens of the hills. Our study confines only to the tea gardens of Darjeeling hills. These tea gardens are situated in varying elevations ranging from 150 meters to 1950 meters in different type of terrains ranging from gentle to steep slope and in varying climatological conditions. Considering this variation, the primary data were collected from some purposely selected gardens representing different elevations, topography and climatological conditions.

To examine the sway of age and vacancy as contributing factor towards stagnation of Darjeeling tea industry, eight gardens were selected from where primary data were collected. The executives as well as the labourers of these gardens were extensively interviewed to identify the social implications of productivity stagnation. While interviewing the labourers, the experienced people of slightly older age were given preference. To comprehend the extent of productivity stagnation, its various dimension and impact on plantation labourers along with the primary data, informations from secondary sources like FAO, Tea Board have been used. The data collected by the Darjeeling Planters Association on different aspects of plantation labourers in Darjeeling have also been utilized in relevant contexts.

In order to identify the possible measures in combating the problem of old age and vacancy, and to test the suitability of certain recommended measures in Darjeeling milieu, the gardens who have already introduced the required programmes were selected and the necessary informations were collected from them. For examining the impact of such programmes on the economic as well

as social life of the labourers, not only the common labourers but also the labour leaders, the proprietors and the managers were interviewed.

✓ Collection of required information from Darjeeling hills was not smooth because (1) most of the gardens were found not maintaining proper records, 2) a few gardens who were having records, were unable to supply the full information as during the GNLFF agitation period (1986-89) those were burnt or misplaced, 3) due to frequent changes of ownership of gardens and garden managers as well, records in systematic form are not available in many gardens. Interestingly it is the general practice on the part of the garden owners or managers to take away all informations and records while leaving the garden. This apart, as the data relating to production and productivity reasonably reflect the loss or profit position of a garden, some of the gardens were somewhat reluctant to provide the same. However, at last, they took me in confidence after getting assurance that I am not going to disclose their confidentiality in any way. I am therefore deliberately keeping in secret the actual identities of the gardens covered. Throughout the study they are referred as A, B, C, D, E etc. Some salient features of the gardens in this study are given below.

Profile of the sample gardens

Amongst the ten selected gardens, Garden A is situated in Teesta Valley. It belongs to a 'progressive' group which is having six gardens in Darjeeling and a good number of gardens in Upper Assam. It contains sections right from the elevation of 2000 ft. to 5700 ft. Most of the sections are facing North, East and North-East. The garden gets moderately high price for 1st and 2nd flush production in auction and private sale too. Here labourers are good natured though occasional labour unrest is not uncommon. Being located in a good rainfall zone this garden hardly suffers from drought.

Garden B is also located in Teesta Valley zone but in the opposite direction of Garden A. It belongs to a proprietary group having only one garden in Darjeeling Hills, one in the plains area of the district i.e. Terai, and a good number of gardens in Assam. It is a mid-elevation garden having sections from 1500 ft. to 4100 ft. The sections are facing mainly south, East and West. Qualitatively, the tea of this garden fetches high prices particularly from private sale to German or Japanese buyers. For 1st flush production it fetched a price ranging from Rs. 1500 to 2000 per kg in a number of occasions over the last few years. The incidence of labour unrest is bare minimum. An idea about the good nature of

the labourers and their support to the management can be had from an incident stated below.

In one occasion the author was rather critical to the manager for committing some silly mistakes in the matter of production and thereby lagging behind in output. The labourers (mostly labour sirders) who were present there assured the author that in the next visit he would see that all mistakes are rectified and thereby the loss occurred in crop will be recouped. To the surprise of the author, in his next visit he found all mistakes were actually rectified and loss of crop thus recouped.

Garden C belongs to a group having four gardens in Darjeeling and number of gardens in Assam and Cachar. It is a garden of a progressive group and involved in doing developmental work like new extension, uprooting and replanting in the recent years. It is a big garden situated in Darjeeling having sections from 1518 ft. to 6250 ft in all different aspects. This garden produces tea of high quality in Darjeeling standard and on a few occasions it has obtained very remunerative price in the last few years. The garden is situated in Darjeeling East sub-district.

Garden D is situated in Teesta Valley. It belongs to a reputed agency house having two good gardens in Darjeeling and good number of gardens in Terai and Dooars. It is one of the very few compact gardens of Darjeeling having a record higher yield. Qualitatively it can be categorised as medium quality garden. Labour unrest is minimum. The garden has sections from elevation of 3333 ft to 5000 ft. facing mainly North and East.

Garden E belongs to the same group of garden A. Its sections are different from garden A and those are mostly facing South and West which is just opposite to Garden A. Its sections are situated from low elevation of 1800 ft. to high elevation of 5900 ft. It produces tea which fetches price of high range. The garden is situated in Darjeeling West sub-area.

Garden F belongs to a very big and reputed agency house having four gardens in Darjeeling and number of gardens in Assam and Dooars. The sections of the garden are situated from the elevation of 2592 ft to 4561 ft. facing South, East and North. Qualitatively it is a medium quality garden. This garden belongs to Rungbong sub-area.

Garden G belongs to the same group of garden C but situated in Darjeeling West sub-district. It is also a progressive garden and doing developmental works

like rejuvenation pruning and infilling, uprooting and replanting. The labourers of this particular garden were unfortunately involved in frequent strikes and unrest, as a result the production suffered a lot. But in last few years, the situation has changed drastically in favourable direction. The garden is having sections from the elevation of 1518 ft. to 6250 ft. The garden is reputed for its high quality of tea.

Garden H belongs to same agency house of Garden F and qualitatively best among the group. It is situated in Darjeeling East sub-district. The sections of garden are situated from the elevation of 3200 ft. to 6100 ft. In this garden, labour unrest is quite frequent.

Garden I is owned by a reputed agency house having good number of gardens both in Darjeeling and Dooars. It is situated in Darjeeling West sub-district. Mainly the sections are facing West and are situated from 1000 ft. 5400 ft. height from the mean sea level. Qualitatively it falls in the lower side of medium grade. Here labour unrest is not uncommon.

Amongst the gardens considered as Hill gardens, garden J produces the highest quantity of tea. It has considerable area in lower elevation and sections ranging from the elevation of 1300 ft. to 3550 ft. It is a quite progressive garden and regularly conducts developmental work like rejuvenation pruning, uprooting and replanting. However in terms of quality of tea it falls in the lowest cadre. The garden is situated in Kurseong South sub-district. Labour unrest is very rare in this garden.

Table 3.2 : Some characteristic features of the sample gardens.

Garden	A	B	C	D	E	F	G	H	I	J
Year of establishment	1864	NA	NA	NA	NA	NA	1852	NA	NA	NA
Area under tea (in ha)	271.34	470.99	253.42	183.22	252.71	285.66	436.72	141.6	321.05	500.32
Management pattern	Agency house	Proprietary	Agency house	Agency house	Agency house	Agency house	Agency house	Agency house	Agency house	Proprietary
Elevation min.-max.in fit.	2000-5700 ft.	1500-4100 ft.	1518-6250 ft.	3333-5000 ft.	1800-5900 ft.	2592-4561 ft.	1518-6250 ft.	3200-6100 ft.	1000-5400 ft.	1300-3550 ft.
Aspect (main)	North & North East	South, East & West	East North-West	North & East	South & South West	South-East & North	East-West	North East	West	East
Valley or sub-dist.	Teesta Valley	Teesta Valley	Darjeeling East	Teesta Valley	Darjeeling West	Rungbong West	Darjeeling East	Darjeeling West	Darjeeling South	Kurseong
Rainfall in cm (1997)	422.37	126.84	213.59	259.07	193.62	167.78	258.64	256.15	163.45	436.62
Price* fetched	H	H	H	M	H	M	H	H	M	L
Annual production (1997) in kg	182293	232240	162335	157738	144994	202713	239285	83191	231435	535601
Change in ownership in last 10 years	1	-	-	-	1	-	-	-	-	-
Change in managerial Cadre (10 yrs)	3	2	2	4	3	3	3	4	3	5
Incidence* of lockout in last 10 yrs.	1	-	-	-	-	-	-	1	-	-
Incidence of labour unrest.	L	-	M	L	M	L	L	H	H	-

Garden	A	B	C	D	E	F	G	H	I	J
Drinking* problem	L	L	M	L	M	H	L	M	M	-
Illiteracy %	46.39	65.07	51.22	60.63	49.66	46.14	65.86	49.14	52.15	63.59
Bonus paid	18.75%	19.50%	19.50%	19.50%	18.75%	19.50%	18.75%	19.50%	19.50%	19.50%
Child labour	Nil									
Labour employed	750	1387	975	490	948	910	1597	477	1300	1176
Labour land ratio	2.76	2.94	3.84	2.67	3.75	3.18	3.65	3.36	4.04	2.35
Land productivity (in kg / ha)	671.13	493.09	640.58	860.92	573.76	709.63	547.91	587.38	720.87	1070.52
Labour productivity (in kg / labour)	243.06	167.44	166.49	321.91	152.95	222.76	149.83	174.40	178.02	455.44
Rejuvenation done in last 5 years in ha (1991-95)	25.78	19.07	42.67	24.04	-	-	61.75	-	34.58	51.76
%of the total area	9.50	4.05	16.84	13.12	-	-	14.14	-	10.77	10.35
Uprooting/Repanting done in last 5 yr. in ha (1991-95)	-	6.73	-	-	6.49	-	54.53	3.69	-	21.19
% of the Total area	-	1.43	-	-	2.57	-	12.49	2.61	-	4.24

*High = H

Low = L

Medium = M

NA = Not available.

Source : Data obtained from different gardens.

For the information relating to the wages and other benefits given to the labourers, extra leaf price etc., both the executives of Darjeeling Planters Association and the gardens were contacted. Their furnished informations were cross checked with the actual recipients of those wages and benefits i.e. the laborourers and their leaders.

In course of this study an attempt had been also made to identify the reasons behind general aversion of Darjeeling planters towards certain developmental programmes which have been appeared successful in some other areas. And for getting required informations both the executives and their proprietors/ directors were consulted.

For analysing the trend of yield with the increase in age, instead of taking data on yield by year the average yield of a pruning cycle has been calculated as the yield in tea varies according to pruning. Similarly as vacancy does not remain the same in all the years, vacancy counted in 1995 was only taken into consideration for calculation. Again for computation and analysis of yield before and after rejuvenation; and uprooting and replanting the yield of pruning cycle was taken into account. For finding out the maximum yielding age group 4231 observations were made in five different gardens where the required informations for the analysis like year of planting (which is very difficult to get in Darjeeling gardens), yield progression with the advancement of age etc. were available. For calculating the pay back period, average cost of production of made tea per kg and actual average annual price realised per kg of made tea was collected from different gardens. Since a good portion of tea of Darjeeling gardens is sold directly to the buyers specially foreign buyers and not in auction - the auction price was not given importance for calculating the pay back period.

Notes

1. The factors responsible for stagnation, their possible impact on the tea bushes and thereby yield, whether these factors can be studied in details or not and if not the reasons for the same may be clear from the following chart :

Factors	Possible impact	Whether difficult to stud	Why
I. Change of climatological condition			
(a) Drought	Moisture stress in the soil	Yes	Lack of data
(b) Excessive rainfall	Drainage problem	Yes	-do-
(c) Very foggy misty weather	More incidence of blister blight	Yes	-do-
d) Hail storm	Defoliation of bushes, breaking of the branches	Yes	-do-
ii) Old age	Weak and diseased bush frame, less yield	No	
iii) Vacancy	Less yield of the section due to less number of bushes	No	
iv) Low producing planting material	Less yield as compared to high yielding clones	Yes	Lack of data
v) Soil erosion	Loss of rich top soil which ultimately affects yield by poor supply of nutrients to the bushes	Yes	-do-

2. Barua, D.N. (1971), p 32.

3. De, S.K. (1996), p.2

4. Discussion with several planters like Mr. B.C.Tiwari, The Director, M/s Darjeeling Consolidated (India) Ltd., Mr. H Chowdhury, the Manager, Namring T.E., Mr. Brijmohan, the Director, Samebiong T.E., Mr. R Dutta, the Secretary, Darjeeling Planters Association revealed the fact that Japan and Germany are the main buyers of Darjeeling tea now-a-days.

5. From 1994, the buyers of Darjeeling tea became serious about the pesticidal residue though the ill-effect of pesticides was first pointed out by Rachel Carson (1962) followed by Wilson committee report (1969). Because of this, Darjeeling Planters Association organised a conference to discuss about the effect of pesticidal residue on the consumers of tea and the possible ways and means to eliminate or minimise the use of hazardous pesticides.

6. Maximum Residue Limit (MRL) is the limit, set by different organisations such as Environmental Protection Agency (EPA) of USA, Codex Alimentarius Commission, FAO and WHO, which are permissible in made tea. It is expressed in terms of mg per kg of made tea. For example, the MRL of Endosulfan allowed by CODEX is 30. It means that if one kg of made tea contains 30 miligram of endosulfan, that is allowed. If it is more than that the tea can not be consumed and therefore can not be sold as well. Different countries and different agencies have set different MRLs. Given below are the MRL fixed by different countries and agencies for the pesticides commonly used in tea.

Maximum Residue limit (MRL) set by different agencies/countries for the different chemicals used in tea in mg/ka.

	FAO/WHO	EPA	Codex	G.L.	Japan	E.C.	Russia
Dicofol	5	45	8	2	-	(d)	-
Ethion	7	10	5	2	-	2	-
Endosulfan	30	24	30	30	-	30	-
Phosalone	-	8	-	-	-	-	-
Deltamethrin	10	-	10	-	10	5	-
Cypermethrin	20	20	-	-	20	(d)	-
Glyphosate	-	-	-	-	0.5	0.1*	-
Chlorpyrifos	0.1	-	-	-	3	0.1*	-
Dimethoate	-	-	-	-	-	0.2	-
Anthio	-	-	-	-	-	-	0.2
Dalapon	-	-	-	-	-	NP	-
2,4-D Amine salt	-	-	-	-	-	-	0.5
Fenitrothion	0.5	-	-	-	-	(d)	-
Simazine	-	-	-	-	-	-	0.5
Copper	-	-	-	-	-	-	100

	FAO/WHO	EPA	Codex	G.L.	Japan	E.C.	Russia
Acephate	-	-	-	-	-	0.1*	-
Fenvelerate	-	-	-	-	-	(d)	-
Paraquat	-	-	-	-	-	0.1	-
Malathion	-	-	-	-	-	(d)	-
Monocrotophos-	-	-	-	-	-	(d)	-
Quinalphos	-	-	-	-	-	(d)	-
Diflubenzuron	-	-	-	-	20	-	-
Cartap	20	-	-	-	-	20	-

*Indicates lower limit of analytical determination

NP - Not Permissible

(d) should levels be not adopted by 1.1.98, the maximum level (0.1)* shall apply.

Source : Barbora, B C (1994), P.12

7. The fact that if pests and diseases are not controlled it inflict crop-loss is a matter of common sence and well established fact too. According to Chakrabarty and Singh (1994)* the crop loss due to incidence of thrips, jassids, mies, helopeltis and blister blight would be around 15%.

Interview with the several planters about their practical experience relating to the neem and sulphur based products revealed that these products are not as efficient as the conventional pesticides. Moreover, this fact has been proved by a scientifically laid out trial also. When Monocrotophos and Quinalphos was tried against thrips along with Neembased products like Bioneem, Nimgreen, Rakshak and Fortune Aza, the percenage reduction of thrips by conventional pesticides was between 89.2% to 94.6% and the same by the Neembased products was between 57.2 to 64.3%. This trial was conducted by the Plant Protection Department of Tocklai Experimental Station, Jorhat at Maheema T.E. of Assam.

8. Sarkar, S K (1989) , p.2.