Tea plantation

1. Introduction

Tea plantation in India has been contributing significantly towards the socio economic development of the people of the tea growing regions of the country. Tea industry contributes substantially towards the national and state economy by way of enriching the foreign exchange reservoir and State exchequer besides employment. Today the major tea growing states are Assam, West Bengal, Tripura, Tamil Nadu, Kerala and Karnataka. Himachal Pradesh and Uttaranchal are also traditional tea growing states, albeit to a less significant extent. Besides, tea plantation has come up recently in states like Arunachal Pradesh, Manipur, Sikkim, Nagaland, Meghalaya, Bihar, Orissa, etc. Mizoram also has the potential for development of commercial tea plantation.

2. Indian scenario

India is one of the major tea growing country in the world, producing about 30% of the world tea production annually. The other leading producers are China, Kenya, Sri Lanka, Turkey and Vietnam.By building on a proud legacy of enterprise that spanned nearly two and a half centuries, India has acquired an exalted status on the global tea map. In India, it is grown in an area of approximately six lakh hectare. The country is the second largest tea producer in the world with production of 1,197.18 million kg in 2014-15. Interestingly, India is also the world's largest consumer of black tea with the domestic market consuming 911 million kg of tea during 2013-14. India is ranked fourth in terms of tea exports, which reached 197.81 million kg during 2014-15 and were valued at US$ 619.96 million. The area and production under tea cultivation in major tea producing areas of the country is given in Table 1

Table 1

Area and production under tea plantation area in major tea producing states of the country- 2013-14

State / Districts	**Area under tea (in '000 ha)**	**% of total area**	**Production (Million kg)**	**% of total Production**
Assam Valley	270.92	48.04%	581.03	48.07%
Cachar	33.48	5.94%	48.02	3.97%
Total Assam	**304.40**	53.97%	**629.05**	52.04%
Darjeeling	17.82	3.16%	8.91	0.74%
Dooars	72.92	12.93%	177.85	14.71%
Terai	49.70	8.81%	125.34	10.37%
Total West Bengal	**140.44**	**24.90%**	**312.10**	**25.82%**
Other States(Includes Tripura, Uttarakhand, Bihar, Manipur,Sikkim, Arunachal Pradesh, Himachal Pradesh,Nagaland, Meghalaya, Mizoram and Orissa)	12.29	2.18%	23.92	1.98%
Sub Total	**457.13**	**81.05%**	**965.07**	**79.84%**
Tamil Nadu	69.62	12.34%	174.71	14.45%
Kerala	35.01	6.21%	63.48	5.25%
Karnataka	2.22	0.39%	5.52	0.46%
Sub Total	**106.85**	**18.95%**	**243.71**	**20.16%**
ALL INDIA TOTAL	**563.98**	**100.00%**	**1208.78**	**100.00%**

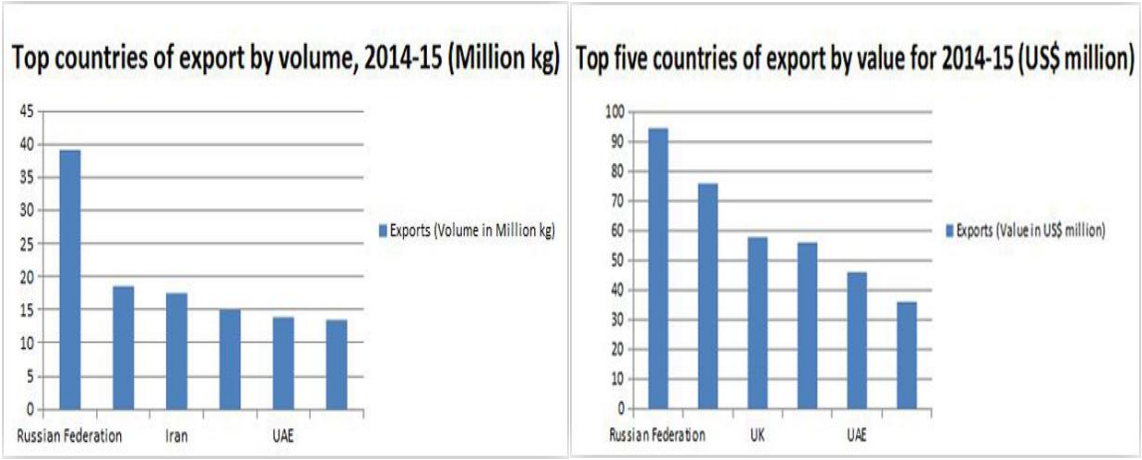
(Source: Tea Board of India)

It may be observed that about 81% of the country's total area under tea plantation is located in North India. Out of the total, 54% is existing in Assam and 23% in West Bengal.

In general, the productivity in North is less than in South. It is primarily due to the comparatively coarser standard of plucking resorted to in South India. It is reflected in the quality and price realization factors also. The overall productivity has remained almost static during the last three years.

3. Tea Export

The top export markets in volume terms for 2014-15 were Russian Federation (39.14 million kg), UK (18.58 million kg) and Iran (17.53 million kg). In terms of value, the top export markets were Russian Federation (US$ 94.43 million), Iran (US$ 75.73 million) and UK (US$ 57.74 million). All varieties of tea are produced by India. While,'Crush,Tear and Curl(CTC) accounts for around 89 per cent of the production, orthodox/green and instant tea account for the remaining 11 per cent.



4. Kangra Tea – History

Kangra tea is famous worldwide for its rich aroma, colour and taste**.** It's a tea like no other. Kangra tea is frequently compared to Darjeeling tea to get a frame of reference. But, it's different, and Kangra fully deserves to be recognized as a distinct origin. Uniquely, it's probably the only tea region in India that comprises exclusively China, or China-hybrid, tea bushes. There was a time when tea from this part of Himachal Pradesh ranked among the best in the world. In 1883, the *Gazetteer of the Kangra District* noted that tea produced in the region was "probably superior to that produced in any other part of India".

History of Kangra Tea in Himachal Pradesh traces back to nineteenth century after Dr William Jameson, the then Superintendent of the Botanical Gardens in Peshawar in the North West Provinces, on a visit in 1849, declared that Kangra district was right for tea cultivation. He was the man who brought the tea plant to Kangra. In 1849, he planted Chinese hybrid shrubs at three places in the valley: Kangra town (altitude 750m); Nagrota (870m) and Bhawarna (960m). Kangra town was too warm and dry, but the plants did well at the other two places. This was all the encouragement the local administration needed. Three years later saplings were brought in from China and the first commercial tea plantation as a tea estate was set upat Holta near Palampur, at an altitude of 1,260 m.In the next seven years, a number of private planters, both locals and Europeans, got into the business. They set up 19 tea

estates in the region, covering a total of 2,635 acres. In another 15 years, the area under tea had increased to 7,994 acres, and by the end of the 19thcentury, it stood at 10,000 acres and produced almost 1,000 tonnes of tea annually. At least 80% of these plantations were around Palampur, which had a congenial climate and abundant water. In the span of half a century, Kangra had entrenched itself on the world's tea map. Its black and green teas were travelling to Afghanistan, Russia and Central Asia via Amritsar. On the other side, it could hold its own among teas from Assam and Darjeeling in the Kolkata market, from where they were shipped to Europe and America.

The second half of the 19thcentury saw a small, but thriving tea industry take shape in Kangra. In it's hey day, Kangra tea was of the choice in Afghanistan and Central Asia, and even reached Europe and USA.In the 1890s, almost 10,000 acres in the Kangra valley was covered by tea plantations. In 1892, the Kangra Valley Tea Company Ltd sold more than 20,000kg of tea in London. Between 1886 and 1895, Kangra's tea won gold and silver medals for quality in London and Amsterdam respectively.

Kangra tea fell off the tea map of India after the devastating earthquake in 1905 when European planters left the region, handing over their estates to their workers or local traders. The locals who took over the abandoned estates were unable to meet the same standards of quality and productivity, and Kangra's tea started losing ground. In 1980, Kangra's estates produced only 132kg of tea per hectare, the lowest in the country, and well below the 284kg that the European planters averaged in 1892.Today, most of the tea growers have small land holdings.Nearly half of the area under tea plantation has been neglected or abandoned due to low productivity and low prices of tea.

But, with the efforts of all the stakeholders especially State Government, Centre Government and Tea Board of India, the past one decade resulted in increase of acreage, production and improvement in quality of tea, thus coupled with higher margins for tea growers. The estates are now a sight to behold.

In 2006, Kangra also won recognition as a "geographic indicator" for tea (like Champagne is for wine and Chanderi is for cloth) and has its own unique brand image of Kangra Tea "Two leaves and a bud". Why significant? Because two leaves and a bud are ideal for plucking. When two leaves exist along with a bud, they are small, tender and pale green and emanate rich flavour and are ideal for rolling. So, now it is known that all tea leaves are not equal and the pluckers are after a certain kind of leaf combination. Flavour is the unique selling proposition of Kangra tea. The Chinese hybrid variety grown here produces a very pale liquor, which is the reason why Kangra does not produce any CTC (crushed, turned, curled) tea—the staple tea of India.

5. Present Status of Tea Cultivation and Production in Himachal Pradesh

As per a report of Tea Board, the total area under tea cultivation in HP, majority of which is concentrated in Kangra district is 2312 ha. Out of this only 1150 ha area is active and remaining area has been abandoned for various reasons and there is no commercial tea production from this area. As on31 March 2015, there were a total of 5,870 tea growers registered with Tea Board of India. Out of these, 19 were big growers who have more than 10 hectare of land under tea plantation whereas rest of the growers fall under the category of small tea planters.

6. Kangra Tea Processing &Production

As per the data from Tea Board as on 31.03.2015, there are 67 tea processing factories registered with the Tea Board. However, there are only 39 factories which exist now, but processing is being done in very few factories. The most important ones among these include Mann Tea Estate Factory, Wah Tea estate factory, Mansimbal Tea Estate Factory, Khalet Tea Estate factory,etc. Out of these, 4 tea factories are in cooperative fold viz. Palampur Cooperative Tea factory, Sidhbari Cooperative Tea Factory, Beed Cooperative Tea Factory and Baijnath Cooperative Tea Factory. Cooperative Societies were expected to perform better but it could not happen that way and now 3 of these cooperatives factories except Palampur Cooperative Tea factory have been leased out to the private sector. Tea production over last two decades in the State is given in Table – 2.

Table – 2
Tea Production over last two Decades (1994-95 to 2004-05)

Year	Tea Production (lakh kg)	Year	Tea Production(lakh kg)
1994-95	13.14	2005-06	8.57
1995-96	13.56	2006-07	8.62
1996-97	14.23	2007-08	8.03
1997-98	14.42	2008-09	8.50
1998-99	17.11	2009-10	8.49
1999-00	12.22	2010-11	8.84
2000-01	14.63	2011-12	9.80
2001-02	10.22	2012-13	8.31
2002-03	7.18	2013-14	8.95
2003-04	7.02	2014-15	9.50
2004-05	6.50		

Source : - Tea Board of India

7. Tea Board's Initiatives to Promote Kangra Tea

The Tea Board of India is contemplating to increase area under tea plantation and raise its production to 10 million kg in next 10 years from current nearly 1 million kg. It aims to bring more non-conventional area under tea, rejuvenate abandoned and neglected tea gardens besides formulating various schemes to encourage tea growers to promote Kangra tea.

The Tea Board has initiated certain steps for restoring Kangra Tea's lost glory after analysing the reasons for downturn in the Kangra tea industry. It has prepared a plan to rejuvenate the Kangra tea industry by promoting tea planters in the area. To implement its plans, the Tea Board has strengthened its office at Palampur with four new posts, including deputy director, factory advisor, and two development officers. The Centre had sanctioned a project of Rs. 15 lakh for the state agriculture department to conduct a baseline survey of the abandoned area under tea cultivation and another research project for revival of the Kangra tea and its organic farming to the CSK Himachal Pradesh Krishi Vishavidyalya, Palampur. The survey identified nearly 4500 hectare of non-conventional tea producing area that has potential for tea production. Tea Board is preparing plans keeping in view this area in addition to nearly 1000 hectare of organized tea gardens and nearly half of 2312 hectare ill maintained and abandoned tea gardens in Himachal. Thus, Tea Board project envisages enhancement in production up to ten times from the current production figures of nearly 1 million Kgs per year to 10 million kgs over the next decade in a phased manner. It will collaborate with Institute of Himalayan Bio resources and Technology, Palampur and CSK Himachal Pradesh Krishi

Vishavidyalya, Palampur for technical expertise to explore and implement new schemes for tea planters.

7.2 Focus on Small Tea Planters

Tea Board is focusing to promote small tea producers by formulating new schemes for them. Data reveal that Himachal has a total of 5,870 tea growers including 19 big growers who have more than 10 hectare of land under tea plantation whereas rest of the growers fall under the category of small tea planters. Tea Board is focusing on small tea growers as they constitute 99% of the total tea growers.

7.3 Promoting Self Help Groups

Tea Board intends to promote small tea growers by constituting self help groups. As per the plan, 20 tea growers having collective area of 20 or more hectare under tea plantation can work together in a group. While working in a group, tea growers will be eligible for many benefits as the Tea Board will provide subsidy of 25% to 40% and even more on many schemes. According to information, it has taken up the matter of providing loan facility for purchase of new machinery, construction of godowns and sheds besides subsidy on fertilizers with the government. It has constituted four self help groups of tea growers in the first phase of the scheme. Tea growers of Bir, Chauntra, Tanda and Jhikar in Dharamshala have come under one umbrella to form these groups thus becoming eligible for benefits to accrue.

7.4 Status and Extent of Small growers

The Tea Board of India defines the Tea Growers into Large Tea Growers (LTGs) and Small Tea Growers. The Growers with a plantation area of up to 10ha are classified as Small Tea Growers(STGs) and all growers having tea plantation of more than 10 ha are known as LargeTea Growers. Majority of the tea Growers in Kangra district fall in the category of STGs.

In Indian scenario, the contribution of STGs in the production of tea has been on an increasing trend from 11% in 1994 to 30 % in 2013. Their numbers have swelled from less than a lakh in 1995 to 1.7 lakh in 2013. Even as their numbers swell, scattered nature, lack of organizing and bargaining capacity, non-availability of working capital for maintenance & management of tea gardens, non-availability of nearby market, their dependence on exploitative trade channels, low levels of technical knowledge and business skills, lack of awareness about government support and abysmal representation at local and national level become serious impediments in their healthy growth. Unfair price of green adds to their vulnerability and affects their access to health, education and other essential services.

7.5 Tea Board's - Tea Development & Promotion Scheme

In order to promote tea sector, Tea Board is implementing a comprehensive scheme in the country. However, there is no Himachal Pradesh or state specific scheme or components under this scheme. The benefits are available equally for all beneficiaries across the country. The scheme has seven major components covering broad areas of Tea Board's operation: Component-1: Plantation Development; Component-2: Quality Up gradation and Product Diversification including Orthodox Production; Component -3: Market Promotion – Domestic and International; Component -4: Research and

Development; Component -5: Human Resource development; Component -6: Development of Small Growers and Component -7: National Programme for Tea Regulation.

The above components primarily comprises extending subsidy/ financial incentives/ grant in aid for various activities carried out by different stakeholders for improving the Production, Productivity and Quality of Tea in India and Promotion of Indian Tea in the international market and Research and Development. Out of these, for plantation sector is Component- 1: Plantation Development is the most significant for tea growers. There are 5 sub-components under this component viz. Replantation, Replacement planting; Rejuvenation of old tea bushes; New Planting; Organic Tea; Irrigation facilities and Field Mechanization. The rate of subsidy varies from 25 % in case of new planting to 30 % in replanting and rejuvenation of old plantations. Tea growers may visit www.teaboard.gov.in for more details on these schemes.

8. Problems / constraints in Promoting KangraTea:

The improvement in quality in addition to reduction in cost of production and increasing production and productivity are the important issues concerning the Kangra tea industry today due to the following impediments:

- **Low productivity &low yields:** Majority of the tea gardens in Kangra are old plantations ranging from 50- 100 years and yield is diminishing year after year
- **Fragmented land holdings**: Earlier the Tea Estates which were big in size have reduced to small-2 units because of division of family units over the years
- **Acute Labour Shortage:** All the problems & issues/ challenges being faced by Kangra tea are mainly manifestations of acute shortage of labour. Tea basically being labour intensive activity, it requires regular permanent labour throughout the year. In HP especially Kangra district, rural folk are abandoning agriculture due to various reason and local labour is not available even during lean period. In order to address this problem, efforts are required on the part of tea planters to mechanize various operations especially pruning and plucking. Some of the tea growers have tried this and results are encouraging. The planters need to be incentivized for taking up mechanization in tea gardens.
- **Non-availability of bank finance**: Since tea plantations are long term investment, institutional finance both for capital investment as well as for seasonal intercultural operations or maintenance of the tea gardens is crucial for the tea planters. As of now the bank finance is not available for capital investment in tea gardens because of the security related issues. As per land revenue rule of the Himachal State Government, the land under tea gardens can't be sold as such so banks do not have the benefit of mortgaging these lands for the bank credit they provide to the tea planters. Thus, appropriate policy interventions/ guidelines are required at State Government level in this regard to facilitate bank finance for this sector.
- **Low accessibility to the market, lower prices:** Since the share of Kangra tea in the entire kitty of the tea in India is almost negligible, there is no local market in this area. The auction market is only in Kolkata for orthodox black tea and Amritsar for green tea. Thus, tea growers don't have any say in the market and are totally dependent on agents in these markets and as such they get lower price for the tea sold.
- **Low sale price for Green leaves:**As the tea processing units are getting lower price for their produce, they in turn procure the green leaves from the growers at lower rate leading to the low income to the tea growers making the whole activity a loss making proposition.
- **Low takers for expansion or establishment of new tea gardens:** Due to the above factors, there are very few individuals rather no individuals who are venturing into this activity. Even

the existing tea growers have abandoned their tea gardens. That is why, out of 2312 ha that is under tea, only 1150 ha area is active and remaining area has been abandoned and there is no commercial tea production from this area.

9. Technical Parameters for Tea Cultivation

9.1*Agro-climatic conditions*

Well distributed rainfall ranging around 2000 mm to 5000 mm is considered suitable for successful tea plantation. The monthly average maximum temperature ranging between 28^0Cand 32^0C during April to September, with occasional rise upto 36^0C -37^0 C is good for the plantation.The Kangra valley, blessed by the twin advantages of a temperature range of 13^0C-35°C during the cropping season of March-October and an annual precipitation of 2300–2500mm of well distributed rainfall, is ideal for tea cultivation tea. These unique topographical and climatic conditions must, obviously, have been the deciding factors way back in the 1850s when the Kangra Valley was opened up to tea planting. As tea plants generally prefers flat and slightly undulating lands, Kangra valley with undulating topography and slightly acidic soils is suited for commercial tea plantation.

9.2 Soil Conditions

Generally, sandy loam to silty loam type of soil with pH range of 4.5 - 5.5 is ideal for growing tea. Soil should possess a minimum 1% of organic carbon, 1-2% of organic matter, 35ppm of P_2O_5 and 80 ppm of K_2O for successful establishment of tea. Tea plantation being a long term investment it is advisable that before going for new plantations, soils may be tested in soil testing laboratory of the State Agriculture Department at Palampur. As per Tea Board norms, soil testing is mandatory for the planters to avail subsidy from Tea Board. Due care must be taken to collect the soil samples most methodically to represent the section properly. Before collecting the soil samples, necessary advice may be obtained from the soil testing laboratory in this regard. Based on the soil testing results, the necessary prescriptions by soil expert for improving the soil conditions, if any, may be followed to ensure the success of tea plantation.

9.3 Choice of planting materials:

Good number of clones have been released from various sources for using as the planting materials by the industry. Clones proven to be successful in a particular locality and recommended by Technical Institutions only should be chosen by the growers. In Kangra valley, the choice of planting material is limited to Kangra local (China Hybrid) based on the original China seed stock introduced by **the then European planters** and is still one of the favorite choices of the growers. The then European planters in their wisdom used a cold-resistant Chinese cultivar as the only planting stock. This same high quality tea stock, having been propagated for the last century and a half, is till today the only raw material for all teas produced in the valley. Besides this the clonalsaplings of Kangra- Asha, Kangra Jawala, Happy Valley-9, AV-2,UPASI-9 , TR-1, SA-06 etc are also being propagated by the Tea Wing of Agriculture Department,Technical officer Tea (ToT) and IHBTPalampur.

For better yield and quality tea production, seed and clonal saplings should be used in 80:20 ratio. In order to have a proper mix of better yield and quality, the standard clones and high yielding and quality clones should be used in the ratio of 70:30.

9.4 Source of planting materials

The sources of planting material must be very reliable. The quality of the planting material will primarily decide the health of the plants and to a great extent the style of bush formation. The beneficiary may develop his own nursery or he may obtain the materials either from Tea nursery of Tea Wing of HP Agriculture Department, Palampur or approach Tea Board, Palampur.

9.5 Planting seasons

Planting of tea is done either in spring (June-July) after the first few showers of rain or in autumn (October-November) while the soil is still moist and the area has irrigation facilities.

9.6 Land planning and Site Preparation

Topographical planning for laying out drains and bunds, culvert and plucking access would generally help in soil water management, easier supervision, cheaper maintenance and better utilisation of mandays for weeding & soil workings, pruning, spraying, plucking, etc. As the entire Kangra valley is undulating, planting in hilly areas should be done along the contour.After clearing the area / site of bushes, the land need to be levelled or terraced in case of undulating topography. If site conditions permit subsoiling, ploughing and harrowing will improve the soil surface for proper root growth and subsoil drainage.

9.7 Drainage

For laying out drains, bunds, culverts, etc., topographical planning is helpful. The drain design, i.e. depth, width, spacing, etc. would be governed by the topography, soil type, soil structure, etc. Waterlogging reduces the crop besides causing root diseases. Existing drains should be renovated as a routine practice to keep them functional. Regular cleaning and desilting of drains to 90cm depth is desirable. Protection of drain-edges with vegetation is more important than batter or depth.

9.8 Layout, Method of Planting and Spacing

Tea Board is recommending either single hedge row or double hedge row system/ method of the planning in the field. Various spacing norms are followed by the industry. The advisable norms are 105cm X 65cm, 105cm X 75cm, 105cm X 60cm X 60cm, 105cm X 75cm X 60cm, etc for valley plantation. However, for planting along contour and for small growers, double hedge method of planting with a spacing of 105 cm X 70 cm is being recommended for Kangra tea planters. Recently, there has been a shift from manual operations to mechanical filed operations due to labour constraints; a spacing of 120 x 60cm X 60 cm has been adopted for this model scheme so as to accommodate mechanical operations. This will facilitates the convenience in field works, mechanized field operations combined with higher plant population.

9.9 Pit digging and Refilling of Pits

After site clearance and layout, pits of 45 cm diameter and 45cm depth are to be dug at the designated spacing as elaborated above. Stones/ boulders, old roots, etc. are to be removed from the pits. The soil excavated from the pits should be allowed to weather for some period before refilling. The soil should be mixed with 40 gm of Murate of Potash (MoP) alongwith 2 to 3 kg of bulky organic matter or well decomposed FYM per pit.

9.10 Planting

Only well grown robust plants of 45 to 60 cm height with basal stem diameter of 0.5 – 0.8 cm and 8-10 leaves should be planted in the main field. Results from the use of planting materials raised in sleeves are always better than those raised in beds.The polybags should be removed from saplings and it should be planted in such a manner that collar of the saplings should be above the ground level. The soil around the sapling should be pressed hard. It needs to be ensured that no depressions are left around the plants. Mulching should be done immediately after planting to avoid mortalities.

9.11 Planting of shade Trees

As shade is very important in tea plantation, shade trees need to be planted alongwith planting of tea saplings. In the initial years shade can be provided through planting of suitable nurse crops. A leguminous crop is very much suitable in the first three years of planting. Green crops like Crotolaria are useful in young tea areas and their seeds should be sown simultaneously with tea in lines. A spacing of 3.6m X 3.6m is suggested for the temporary shade trees. When the permanent shade trees establish well, the temporary shade trees need to be removed.As a routine, the poorly shaded areas should be renovated by planting new shade trees.Alongwith this, permanent shade should also be planted. The most suitable shade trees in Kangra valley are *Albizzia lebbeck, Albizzia procera*, *Jacarandamimosifolia*, etc.). The shade trees species should be planted at a spacing of about 6 m x 6 m in site exposed to southern aspect and 10 m X 10 m in sites exposed to northern aspects. Later on depending upon the canopy development, these shade trees may be thinned depending on the canopy size at maturity.

9.12 Mulching

Following planting, the area is thoroughly mulched preferably with grass, water hyacinth, citronella grass, etc. If paddy straw is used, 20 kg N/ha in the form of urea is to be sprayed. Mulching materials may be collected from nearby forests also. Mulching helps conservation of soil moisture, prevents erosion, reduces weed growth and adds organic matter to the soil.

9.13 Initial operations for training Bush after planting

Frame forming in the initial stages is very important to build up the bush to give higher productivity. The following operations are recommended for bringing up of young tea, depending upon the season of planting as indicated :

Year#	Operation
1st year (June-May)	June-July- Plant tea.
2nd year (June-December)	October- Finger prune/Decentre at 20cm from the ground & tip at 55-60cm.
3rd year	Keep UP Pluck over one leaf in the beginning.
4th year	Cut across between 35-40cm and open up the centre selectively. tip over 25cm. (It is called the Frame Forming Pruning)
5th year	Keep UP (1st UP year)
6th year	Deep skiff / Medium skiff
7th year	Keep UP

8th year	Light Prune 5-6cm above last cut across mark and tip over 25cm.

Note- # Year of planting is considered as first year in this model scheme (in some cases year of planting is considered as 0 year)

Thereafter, 4 to 5 year pruning cycle may be followed depending on the requirements and growth pattern. Considering the factors such as the growth and region of growing tea and climatic conditions of the region, the sequence and type of different pruning operations stated above can be modified.

9.14 Tea Bush development- Operations/ Practices

Some practices stated below can be followed for encouraging the proper formation of the tea bush. Breaking the stem using thumb and forefinger 25cm above ground in such a way that at least ¼th of the stem is remained intact. The dried broken branches can be removed just below the broken portion by clean pruning using 7.5cm (3") pruning knife.

Decentre select between 15-20cm.

Debudding by nipping/removing all the growing buds from the main stem/growing shoots above 25cm from the ground. Once the branches below this height are developed, the top debudded portion is removed by clean pruning using a 7.5cm (3") pruning knife.

9.15 Pruning

In general in Kangra region4 to 5 year pruning cycle is followed. A 4-year cycle for vigorous tea and 5-year cycle for average tea may be followed. While forming a sound pruning programme, various factors need to be analyzed. These include: stage of growth of tea crop, crop distribution / canopy density, annual fluctuations, incidence of pests and diseases, frame height, availability of labour, type of tea to be manufactured, availability of water for irrigation andShade tree status.

Various Types of Tipping and Plucking

Type of prune	Tipping heights
Medium Pruned (MP)	25-35cm from MP mark which generally comes between 50-65cm from ground.
Light Pruned (LP)	On the average height of 5 leaves or 25cm whichever is lower.
Deep Skiff (DS)	Average height of 2 leaves between 7-10cm.
Medium Skiff (MS)	Over 1 leaf, between 3.5-5.0cm
Light Skiff (LS), Level Off Skiff (LOS) and Unpruned (UP)	Over janam*, raising the plucking table by a leaf on certain occasions

* *janam = When shoots on a bush start growing after a period of dormancy, small leaflets (cataphylls or bud scales) are first unfolded before the true leaves appear. These bud scales are called janam (birth scales).*

Normally, a 4-year pruning cycle of LP-UP-DS/ MS-LS-UP may be adopted in this area. The suitable time for light prune and deep skiff is between December and mid-January and that of medium skiff between January and early February.The plucking interval should be maintained between 7-8 days for quality.

9.16 Manuring

(a) Young tea manuring: (Manure YTD 2:1:3 mixture)

Year of planting/ 1st year	5g YTD / plants, 3-4 times at 6-8 weeks intervals
2nd year	10g YTD/plant, 3-4 times at 6-8 weeks intervals
3rd year onwards	20g YTD/plant, 3-5 times at 6-8 weeks intervals
4th year	YTD Broad cast @130-150 kg N/ha

b) Mature tea manuring:

Nitrogen	130-165 kg/ha depending on the yield potential of an individual section (average yield of the pruning cycle)
Phosphate	40-50 kg P_2O_5 /ha
Potash	On the basis of soil analysis report where the soil potash level should be minimum 100 ppm.

In addition to the normal, NPK fertilization, micronutrients like Zn, Mg, B etc., may also be applied as foliar spray for correcting the deficiencies, if any observed in the field.

9.17 Weed control

In Kangra Valley various obnoxious weeds are found in tea gardens and adjoining areas. These include Parthenium, congress grass, lantana, Saccharum grass,etc. Thus, for high productivity, effective control of weeds is very essential. Till the plants are about 1 year old, the young tea should be kept under manual weeding. Thereafter, very careful use of herbicides like simazine, 2, 4-D, oxyflurofan, paraquat, etc. can help in keeping the young tea (2 years and above) free from weed competition.For mature tea, herbicides like 2, 4-D, parquet, dalapon, glyphosate, simazine, etc., are useful for effective control of weeds.

9.18 Pests and diseases control

Intensive management of pests and diseases is required particularly during the formative years for early establishment. The common pests like thrips, greenflies and mites, caterpillar pests, crickets, cockchafer grubs and termites normally create problem during the early years. In mature tea also pests like red spider, pink, purple and scarlet mites, thrips, helopeltis, caterpillars, termites, etc., cause a great deal of crop loss. Among the diseases, red rust is a common one in young tea areas. In mature tea, besides this red rust, black rot, brown root rot, charcoal stump rot, blister blight, etc. are very common. It is, therefore, absolutely necessary to control the pests and diseases by spraying appropriate insecticides and fungicides regularly.

9.19 Irrigation

Since Kangra valley where tea plantations are being recommended receives adequate rainfall both in monsoon and winter seasons, not much irrigation is required. However, in the initial year of plantation, 2-3 critical irrigation, if required in rain shadow area or rain deficit period, may be provided.

9.20 Fencing

Fencing of tea plantation is must to protect the tea plants from stray and wild animals especially in the initial years. Depending on the perimeter of the plot of land, the length of fencing required would vary. In order to reduce the cost, fencing with barbed wire with locally available wooden posts, preferably live, may be erected.

10. Extension & Advisory Services

The small tea growers may avail necessary technical guidance from institutes like Tea Board IHBT, CSKHPKVV, ToT, Tea Wing, Department of Agriculture, all having offices at Palampur, The beneficiaries may also get necessary technical assistance from the owners of the bigger tea estates located nearby. The planters who purchase the plucked leaf from the beneficiaries are also expected to provide necessary technical guidance.

10.2 Sale of Green Leaves

The tea plantations produce green leaves which need to be further processed to convert to a consumable item. Small tea growers can't go for processing. As such, the growers have to sell green leaves to an established tea processing factory owned either by a corporate body or individuals. In and around, Palampur, there are tea processing both in corporate and cooperative sectors which buy green leaves for further processing. These include Mann Tea Estate Factory, Wah Tea estate factory, Mansimbal Tea Estate Factory, Khalet Tea Estate factory,etc. The tea factories in cooperative are Palampur Cooperative Tea factory, Sidhbari Cooperative Tea Factory. These are procuring green leaves from the tea growers. Some of the big tree growers are also having individual processing facilities which are limited to either green tea or hand- made tea or organic tea. An agreement or understanding between the factory owner and the tea grower may help the latter in selling his leaf.

11. Unit Cost for New Tea Plantations

The unit cost for a new plantation covering one hectare area has been arrived at Rs. 4,70023/- which included capital cost for the first year and working capital for the next 3 years. The loan can be repaid in 12-13 years depending on the yield and the price of the tea leaves and would provide a net saving ranging from Rs 40,000-Rs 60,000 per hectare/ year for the entire loan period. The detail worksheet is provided in Annexure I. since the initial investment is high, the subsidy component from Tea Board is essential for making this investment financially viable for the small tea growers in the prevailing cost and price regimes of the Indian tea industry.

12. Conclusion :-

Keeping in view the study findings and our feedback from tea growers, the model scheme for 1 ha. Of Tea plantation has been prepared. Further, the following issues / suggestions which need to be addressed with a view to provide opportunity to extend credit support to tea growers by banks one hand and create avenues for tea growers for new planting, rejuvenation and replanting of old plantations. Thus the concerted efforts of all stakeholders will give impetus to the tea industry in Himachal Pradesh :-

A. Issues :-

a. The whole economics or financial viability of tea plantations depends on sale of green leaves. The assured agreements with processors is the pivotal point in the tea plantation activity.
b. Lack of uniformity in quality of leaves among Small Tea Growers (STGs) owing to fragmented land.

c. Lack of good agricultural practices due to non-availability of adequate land.
d. Lack of availability of bank finance.

B. Suggestions :-

a. To chalk out rehabilitation plan for Kangra Tea in coordination with Tea Board and all stakeholders.
b. To form Tea Farmers' Producers Organisations (FPOs) and to provide credit support to these entities.
c. To enhance quality and uniformity of tea quality among Small Tea Growers to get good price in the market.

Annexure-1

A) Unit cost of 1 ha of Tea Plantation

Area (ha)	1.0		
Spacing (m x m)	1.2 X0.6 X0.6	**Wage rate/Manday(MD)**	**200**
No of tree bushes/Ha	15556	**Mortality replacement**	**10%**
Survival @ 90 %	14000		

Sl. No	**Particulars of works**	**Unit**	**Rate**	**Cost(Rs.) per Year**				
				1	**2**	**3**	**4**	**Total**
1	Site Clearance	Manday(MD)	30	6000				**6000**
2	Removal of Boulders, sub soiling ,Land Levelling & terracing	LS(Rs)	20000	20000				**20000**
3	Alignment, & Layout	MD	10	2000				**2000**
4	Digging of pits(45 cm3) @ 20 pits/MD and refilling of pits after mixing FYM, Fertilizers &insecticides @ 100 pits/day	MD	933	186672	18672			**205344**
5	Cost of FYM@3 Kg/Pit	Rs/ ton	0.8	37334				**37334**
6	Cost of Fertilizer@40 gms of SSP per plant for refilling of pits	Rs / kg	8	4976	-	-		**4976**
7	Cost of plants$ including transport(15556,1556)	Rs /Plant	1.5	23334	2334			**25668**
8	Planting @100 plants per day	MD	156	31112	-			**31112**
9	Replanting @100 plants per day	MD	16	-	3112			**3112**
12	Weeding & hoeing/ Soil working(3,2, 2)	MD/weeding	20	12000	8000	8000	-	**28000**
13	Mulching / green Manuring	MD	15	3000	3000	3000	-	**9000**
14	Irrigation @ 5 times /year for three years only	RS/ irrigation	600	3000	3000	3000	-	**9000**
15	Fertilizer &Manure application(AS, SSP& MoP)	Rs	LS	-	8000	10000	10000	**28000**
16	Tipping/ FFP & pruning	Rs	LS	-	3000	5000	10000	**18000**
17	Labour for Plucking(@20 MDs per cycle for 20 Cycles)*	MD	400	-	-	-	20000	**20000**
18	Sub total	Rs		331428	49118	29000	40000	**449546**
19	Contingency 5%	Rs	0.05	16571	2456	1450	0	**20477**
	Grand Total	**Rs**		**347999**	**51574**	**30450**	**40000**	**470023**

Note: * One fourth of the plucking cost for 4th & 5th year and thereafter full cost

$ The Tea Wing of State Agriculture department provide tea saplings @ Rs. 1/- per plant to the planters and even this cost of saplings is reimbursed to the SC beneficiaries. Thus cost of sapling including transportation is considers as Rs. 1.50.

Unit cost (uto 4 year)	**470023**
Subsidy from Tea Board	**218504**
Margin Money	**70503**
Net Bank Loan	**181016**

As tea Board is releasing subsidy(Rs 2,18,504 per ha) in 2 installments based on progress of planting,entire amount of unit cost net of margin money is to be provided by the bank as loan and later on adjusted on receipt of subsidy from the Tea Board

B) YIELD AND INCOME FROM ONE HACTARE OF TEA PLANTATION Years

			1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Quantity of leaf (kgs)#	**0**	**0**	**0**	**0**	**2200**	**3700**	**5900**	**8900**	**11100**	**13300**	**14800**	**14800**	**14800**	**14800**	**14800**
	Price/kg of green leaf	**15**														
	Income from sale		**0**	**0**	**0**	**33000**	**55500**	**88500**	**133500**	**166500**	**199500**	**222000**	**222000**	**222000**	**222000**	**222000**
	Subsidy from Tea Board		131102	87402												
	Total Income		131102	87401.6	0	33000	55500	88500	133500	166500	199500	222000	222000	222000	222000	222000
	Total Expenditure		347999	51574	30450	40000	40000	80000	80000	80000	80000	80000	80000	80000	80000	80000
	Income		-216897	35828	-30450	-7000	15500	8500	53500	86500	119500	142000	142000	142000	142000	142000

Note: # The method /system of planting recommended by Tea Board & IHBT and adopted in this model scheme is Double hedge row which accommodate around 18518 tea plants per ha. This is around 17 % more than the normal planting method i.e. Single hedge row being adopted in other parts especially west Bengal and North East. Thus, green leaf yield is considered accordingly.

NPV **43512**

B:C **1.07**

IRR **17.74%**

C	**Cash flows**		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Loan /Loan os		295799	200194	180653	228215	281601	305061	336001	340655	323867	283065	222367	154385	78245	0
	New loan for the year		0	43838	25883	26000										
	Total Loan O/s		295799	244031	206536	254215	281601	305061	336001	340655	323867	283065	222367	154385	78245	0
	Interest (TL@ 12%,)		35496	24023	21678	27386	33792	36607	40320	40879	38864	33968	26684	18526	9389	0
	Total outstanding net of subsidy received		200194	180653	228215	281601	315394	341668	376322	381534	362732	317034	249052	172912	87635	0
	Net Income		-216897	35828	-30450	-7000	15500	8500	53500	86500	119500	142000	142000	142000	142000	142000
	Repayment		0	0	0	0	10333	5667	35667	57667	79667	94667	94667	94667	87635	0
	Saving for the households		0	0	0	0	5167	2833	17833	28833	39833	47333	47333	47333	54365	142000