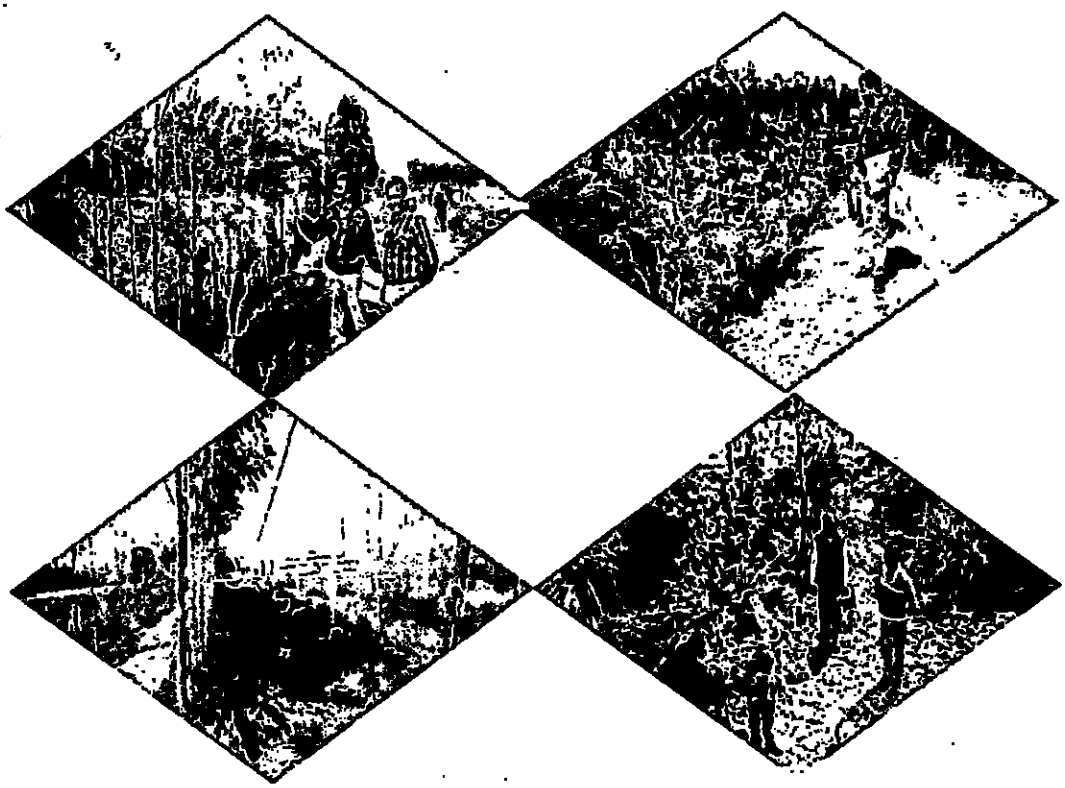
Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Ambala District (Haryana) under State CAMPA Scheme



Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Monitoring & Evaluation of CAMPA Works District Ambala (Haryana)

(Plantation Year 2012-13 & 2013-14)

Submitted to :

The Principal Chief Conservator of Forests
Department of Forest, Govt. of Haryana
Van Bhawan, Sector-6
Panchkula, Haryana

P. Kaushal
Joginder Tomar
Jagdish Thakur

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried " ***Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Ambala District (Haryana)"****. This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.*

The Centre express thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Ambala and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P.Kaushal
Joginder Tomer
Jagdish Thakur

TABLE OF CONTENTS

CHAPTER-I

1.1 Background of District Ambala, Haryana

All forest areas situated in Ambala Civil District constitute the Ambala Forest Division with headquarter at Ambala. Ambala Forest Division covers block and strip forests raised along railway lines, roads, canals, bunds, land escapes, drains, abandoned canals, etc. and other lands appended to these strips under the management of the Forest Department.

The area of Ambala Forest Division lies between 30^0N to 30^0 30' N latitude and between 76°30' E to 77° E longitude. The tract is bounded by the main Shivalik foothills in the North, Yamuna Nagar district in the East, Kurukshetra district in the South and Patiala district of Punjab in the West. The civil district of Ambala has three sub divisions i.e. Ambala, Naraingarh and Barara and there are three forest ranges – Ambala, Naraingarh and Saha.

Out of the total forest area of this division, 57.61 per cent of the forest area lies along roads and 15.30 per cent along railway lines. Reserved and protected block forests consist about 12.60 per cent of the total area. Per capita forest areas in Ambala district is about 0.004 ha which is much below the national average and much less than what is required for maintaining an ecological balance.

The species are scattered over the entire area in the district. Khair is found in block forests in Naraingarh range. The existing government forests situated along roads, canals drains, bunds, railway tracks, etc., do not bear natural forests. The strip were planted in past with different species such as *Eucalyptus, Acacia nilotica, Dalbergia sissoo, Terminalia arjuna, Azadirachta indica, Albizia lebbek, Cassia siamea, Syzygium cumini* etc. No effort was made to plant other natural species. As a result of the artificial plantation, the vegetation on the strip forests does not correspond to natural vegetation of the area. The forest has turned into a composition of mixed species and the age gradation is also not normal. In the past, extraction of timber was done on an ad-hoc basis which turned these forests into

irregular mixed forests. However, pure rows of *Eucalyptus*, kikar and shisham trees in some of the areas are present.

The species planted artificially are *Dalbergia sissoo, Acacia nilotica,* Eucalyptus hybrid, *Azadirachta indica, Albizia procera, Delonix regia, Cassia siamea, Melia azadirach, Terminalia arjuna, etc. The distribution, however, depends upon edaphic factors.*

1.2 Geographical Location

The total geographical area of Ambala district is **156885 ha** and its population as per 2011 census is 1136784. Thus, population density is about 725 persons per square km which is much above the national average.

The board distribution of population is as follows:

Category	Male	Female	Total
Rural	334564	297679	632243
Urban	269480	235061	504541
Total	**604044**	**532740**	**1136784**

In Ambala district 55.62 per cent population lives in villages and for every 1000 males there are only 882 females. The number of females in rural areas (890) is more than in urban areas (872).

The tract is a part of fertile northern alluvial plains. Various streams emanating from the Shivaliks pass through the area and bring with them conglomerates, sand and silt. The areas near the Shivalik foothills in Naraingarh Range consists of loosely aggregated conglomerates and soft earth beds of clay underlain by a barely coherent sandrock layer lying upon on otherwise very similar sand stone.

1.3 Geology, Rock and soil

The area is occupied by Indo-Gangetic alluvium. There are no surface features worth mentioning, except that the area is traversed and drained by seasonal streams namely Tangri, Beghna and Markanda. Physiographically the area is a flat terrain. However, a little part in the extreme North-Eastern area of the district is occupied by Shivalik Hills and falls in the zone of "Dissected Rolling Plains". The general elevation in the district varies between 245 m to 300m above MSL. In most of the areas soils are sandy, sandy loam, loamy sand and silt loam. Soils are generally dry due to excessive surface run off. The soils are deficient in humus contents. However, they are fairly fertile and suitable for raising of forest crops in the entire area. The pH value varies from 7 to 9 indicating a tendency towards alkalinity. The organic carbon content varies from 0.07% to 1.00%. In some Kallar areas, organic carbon is deficient and gypsum application is required alongwith farm yard manure to improve the soil.

1.4 Climate

The climate of the tract is sub-tropical. Frost occurs sometimes during January and February. Occassional winter rains are caused by Westerly disturbances. The summer is fairly severe with high temperature during the day, characterized occasionally by high velocity hot winds in May and June.

The monsoon rains usually start by the end of June or beginning of July and last up to the middle of September. The rainfall is erratic and characterized by frequent thunderstorms. The average number of wet days in the year is 40 to 50.

From March, the temperature increases rapidly. May and June are generally the hottest months in the year with the mean daily minimum temperature at about 25^0C to 27^0C. The heat in the summer season is intense. The decrease in temperature is rapid from November. January is generally the coldest month with the mean daily maximum temperature at about 21^0C and the mean daily minimum at 5^0C. During the winter season, cold waves sweep the district in the wake of passing western disturbances and the minimum temperature drops down occasionally to

about a degree below the freezing point of water, leading to frost formation. **The mortality due to excessive transpiration among young plants is maximum during April, May and June.**

The average annual rainfall at Ambala is 717 mm and varies from 474 mm to 1038 mm whereas at Naraingarh it varies from 1037mm to 1038mm. Most of the rainfall occurs during July and lasts up to middle of September. Winter rains are experienced during January and February. Drought is fairly prolonged both during winter and summer. Such prolonged dry spells during summer and winter cause high rate of mortality in young plantations where irrigation facility is not available.

Frost occurs during winter months and its severity is felt more due to the long dry spell. Frost causes extensive damage to young seedlings of kikar, neem, siris, teak etc. which are sometimes killed outright. Repeated occurrence of frost inhibits the growth of frost tender species. Severe frost damages young trees up to a height of 3 meters.

During summers, dry and hot winds cause drought like conditions. Dust storms also occur during hot weather. Uprooting of trees and breaking of branches of large trees takes place if strong winds follow the rains. **During the winters the northerly winds cause cold spell and damage to plants.**

The relative humidity is maximum during the monsoon and minimum during the dry months of April, May and June.

The plantations are mostly dependent upon rains and hand watering. The rains during winter are uncertain and negligible. Young plantations on suitable sites can also be irrigated from canals, tube-wells and wells. The water table in the districts is high in certain areas but in Barara block it is very low making pump sets uneconomical.

2.1 List of Activities undertaken under CAMPA for 2012-13

Annual Plan of Operation under the state CAMPA for the year 2012-13

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	No
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	Yes
IV	Plantation of Tall Plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Saraswati Forest	No
VII	Land reclaimation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services), 19/250 tall plants per tree groves/RKM	Yes
IX	Building for Frontline Staff	No
X	Training of Front Line and Ministerial Staff	No
XI	Capacity Building and Strengthening of Village Level Forestry Institutions	No
XII	Urban Forestry Plantation of Tall Plants in Urban Areas	No
XIII	Silt retention dam at Khol-hi-raittan	No
XIV	Crate wire structure at Bir Shaikargah	No
XV	Digging of ponds in Saraswati conservation reserve forests	No
XVI	Deepening of ponds in Bhor Shaidan Crocodile Breeding Centre	No
XVII	Silt retention structure in Amwali Khol of Kalesar wildlife sanctuary	No
XVIII	Crate wire structure Bir Sikargh WLS Behind CC	No
XIX	Protection centre in Nahar Wildlife Sanctury	No
XX	Pasture development in Nahar Wildlife Sanctury	No
XXI	Construction of WHS in M.garh and Rewari	No
	Sukhna Catchment	
XXII	Afforestation	No
XXIII	Land treatment silt retention dam	No
XXIV	Wire crate structure	No

2.2 List of Activities undertaken under CAMPA for 2013-14

Annual Plan of Operation under the state CAMPA for the year 2013-14

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	Yes
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	No
IV	Plantation of Tall Plantation in linear forests 250 per RKM	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	No
VI	Plantation of Native Species in Kurukshetra Forests and Duloth Forest	No
VII	Land reclamation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services)	No
IX	Building for Frontline Staff	No
X	Plantation of Native Species in Jind Bir	No
XI	Plantation of Chaal and Jhingen in Shiwalic Hills	No
	Sukhna Catchment	
XII	Afforestation	No
XIII	Plantation of Bhabar grass	No
XIV	Land treatment by check dams	No
	Construction of crate wire structures	No

2.3 Agencies undertaking plantations and other CAMPA works in the District

Haryana Community Forest Project (HCFP) division Ambala and Territorial Forest Division, Ambala are the nodal agencies to undertake the plantation work in the district. The Afforestation works were carried out in three ranges of two divisions and in nine blocks.

Ranges/blocks/beats of Ambala Forest Division

Sr.No.	Division	Range	Block	Beat
1	HCFP, Ambala	CFP, Ambala	---	---
2	Territorial Forest Division Ambala	Ambala	Ambala East	1. Mohra 2. Shahpur 3. Khuda 4. Panjokhera
			Ambala West	1. Ambala 2. Nasirpur 3. Balana 4. Badola
			Jansui	1. Jansui 2. Naggal 3. Naneola 4. Jaitpur 5. Malaur
		Naraingarh	Naraingarh	1. Naraingarh 2. Chechi Majra 3. Hamidpur 4. Bhurewala
			Shahzadpur	1. Shahzadpur 2. Karasan 3. Patwi 4. Bari Bassi
			Kurali	1. Kurali 2. Jharsala 3. Barsu Majra 4. Akbarpur
		Saha	Barara	1. Barara 2. Ugala 3. Adhoya 4. Tandwal
			Mulana	1. Mulana 2. Dheen 3. Dhanaura
			Saha	1. Kesri 2. Nagla 3. Kalpi 4. Gaganheri

3.1 Inventory of the plantations

The plantations raised by various agencies during 2012-13 and 2013-14 in Ambala district are as follows :

3.1.1 : List of plantations during 2012-13 undertaken by Community Forest Project, Ambala

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Ambala	Non Forest Land	Bio-drainage	Ghelri	35	0	7000
			Tandwal	4	0	800
			Dhurala	35	0	7000
			Banh Pur	5	0	1000
			Jagoili	3	0	600
			Jalbehra	2	0	400
			Kalrehri	16	0	3200
			Barola	9	0	1800
			Bhano Kheri	36	0	7200
			Sakron	5	0	1000
		Linear Tree Groves (LTG)	Tandwal Bandh 0 to 7 RD	0	5	1250
			Grand Total	**150**	**5**	**31250**

3.1.2 : List of plantations during 2013-14 undertaken by Community Forest Project, Ambala

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Ambala	Non Forest Land	Bio-drainage	Bhari	13	0	2600
			Niharsi	2	0	400
			Bamba	3	0	600
			Panjola	3	0	600
			Nadiyali	22	0	4400
			Dhurala	48	0	9600
			Boh	19	0	3800
			Ghelri	29	0	5800
			Naraingarh Majra	5.5	0	1100
			Nagla	5.5	0	1100
			Ramgarh Majra	3	0	600
			Barola	2	0	400
		Linear Tree Groves (LTG)	Ambala to Barola Road 9 to 14 L&R Side	0	5	1250
			Tangri Margin Bundh R Side Majri Mardan Sahib Bundh R Side	0	8	2000
			Grand Total	**155**	**13**	**34250**

3.1.3 : List of plantations during 2012-13 undertaken by Territorial Forest Division, Ambala

Agency Range/Beat/ Block	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Naraingarh/ Naraingarh/ Hamidpur	Forest Land	Ridge Plantation	Sangrani Sec. 5	0	15	7500
			Kherki Manakpur Sec. 5	0	10	5000
			Sub Total	**0**	**25**	**12500**
Ambala/ Jansui/Jansui	Forest Land	Ridge Plantation	Gorsain Sec. 4-5	0	35	17500
Ambala/ Ambala/ East/ Mohra	Forest Land	Ridge Plantation	GT Road KM 194-95	0	2	1000
Ambala/ Ambala/ West/ Ambala	Forest Land	Ridge Plantation	GT Road KM 200-212	0	7.68	3840
Ambala/ Ambala/ East/ Mohra	Forest Land	Ridge Plantation	GT Road KM 190-200	0	4	2000
			GT Road KM 211-12	0	6	3000
			GT Road KM 194-95	0	4	2000
		ANR (Mixed)	GT Road KM 190-91 L/R	5	0	1000
Ambala/ Ambala/ West/ Ambala	Forest Land	ANR (Mixed)	GT Road KM 211-12 L/R	5	0	1000
Ambala/ Ambala/ East/ Mohra	Forest Land	Tall Plantation	GT Road KM 191-200 L/R	0	15	3750
Ambala/ Ambala/ West/ Ambala	Forest Land	Tall Plantation	GT Road KM 211-212 L/R	0	15	3750
			Sub Total	**10**	**88.68**	**38840**
Forest Range Saha	Non Forest Land	Ridge Plantation	Samlehri to Pilkhani Road Pvt. Land	0	5	2500
Saha/Saha/ Kesri	Non Forest Land	Ridge Plantation	Samlehri to Pilkhani Road Pvt. Land	0	8	4000
Saha/Saha/ Nagla	Forest Land	ANR (Mixed)	State Highway KM 52-58 L	10	0	2000
Saha/Mulana/ Dhanoura	Forest Land	Tall Plantation	Shahbad Sadhoura Road KM 20 to 33 L&R	0	30	7500
Saha/Barara/ Ugara	Forest Land	Tall Plantation	Shahbad Sadhoura Road KM 20 to 33 LS	0	10	2500
			Sub Total	**10**	**53**	**18500**
			Grand Total	**20**	**166.68**	**69840**

3.1.4 : List of plantations during 2013-14 undertaken by Territorial Forest Division, Ambala

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Ambala/East/ Khudda	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	Khudda Dhukeri Road KM 0-6 L&R	0	6	1500
Ambala/East/ Khudda	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	Brahman Majra to Sambhalkha Road KM 0-2 L&R	0	4	1000
Ambala/ West/Ballana	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	Bhanokheri to Mohri Road KM 0 to tail L&R	0	2.4	600
			Mohri to Teja Road KM 0 to tail L&R	0	1.4	350
Ambala/ West/Badula	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	Mohri to Lakhanaur Sahib Road KM 0 to tail L&R	0	3.4	850
			Mohri to Lalana Road KM 0 to Tail L&R	0	1.6	400
Ambala/ West/ Nasirpur	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	Ambala Baroula Road KM 0 t tail L&R	0	1.2	300
			Sub Total	**0**	**20**	**5000**
Saha/Saha/ Nagla	Forest Land	CAMPA Deposit Work NPV (Tall Plantation)	State Highway Road KM 58-71.5 L&R	0	20	5000
			Sub Total	**0**	**20**	**5000**
			Grand Total	**0**	**40**	**10000**

3.2 Species and number of seedlings planted

Total number of plants planted during 2012-13 and 2013-14 under CAMPA in Ambala district are 145340. The species are *Eucalyptus* spp., *Dalbergia sissoo, Terminalia arjuna, Holoptelia integrifolia, Emblica officinalis, Sizygium cumni,* etc.

3.2.1 : Number of plants of different species planted in district Ambala during 2012-13

Sr.No.	Name of plant	Botanical Name	Division		Total number of Plants
			HCFP	Territorial	
1.	Safeda	*Eucalyptus* spp.	30000	48340	78340
2.	Shisham	*Dalbergia sissoo*	550	13200	13750
3.	Arjun	*Terminalia arjuna*	300	2900	3200
4.	Jamun	*Syzygium cumini*	0	3350	3350
5.	Papri	*Holoptelia integrifolia*	200	2000	2200
6.	Hathiphal	*Kegilia pinnata*	200	0	200
7.	Amla	*Emblica officinalis*	0	50	50
	Total		**31250**	**69840**	**101090**

3.2.2 : Number of plants of different species planted in district Ambala during 2013-14

Sr.No.	Name of plant	Botanical Name	Division		Total number of Plants
			HCFP	Territorial	
1.	Safeda	*Eucalyptus* spp.	31000	0	31000
2.	Jamun	*Syzygium cumini*	70	1500	1570
3.	Kadam	*Anthocephalus indica*	805	300	1105
4.	Shisham	*Dalbergia sissoo*	2314	5200	7514
5.	Silver Oak	*Grevillea robusta*	61	0	61
6.	Papri	*Holoptelia integrifolia*	0	1500	1500
7.	Arjun	*Terminalia arjuna*	0	800	800
8.	Chakrasia	*Chakrasia* spp.	0	160	160
9.	Pilkhan	*Pilkhan* spp.	0	40	40
10.	Amla	*Emblica officinalis*	0	500	500
	Total		**34250**	**10000**	**44250**

CHAPTER-IV

4.1 Information about the Scheme/Project

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected

areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

4.2 Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

4.3 Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia procera, Delonix regia, Cassia siames, Melia azadirach, Terminalia arjuna* etc. However, the distribution depends upon the edaphic factor, although other species

are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas. Poor people earn their livelihood by selling products of domestic animals, like milk, meat and wool. They keep large herds of cattle. It has resulted in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing, therefore, grazing by cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon weather conditions and incidence of grazing and browsing. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire. Generally, it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practiced under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages to seek people participation at all level of project activities. The project which include Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

4.4 Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations has an adverse affect on the environment. Now a days it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i) To conserve and extend the existing forest and vegetative cover in the district of Ambala for soil and moisture conservation and to preserve the natural biodiversity.

ii) To improve the growing stock by protection, regeneration and planning of local indigenous species.

iii) To conserve the forest habitats critical to biodiversity and protection of ecosystem.

iv) To protect the wildlife by providing them shelter and food.

v) To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.

vi) To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.

vii) To provide employment opportunities to the rural people living in the vicinity of these forests.

viii) To encourage the plantation and sustainable harvesting of NTFPs.

ix) To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

Assessment of Survival Rate








5.1 Sampling Methodology

Ten per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantation areas were available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants wee separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

Name of Division	Agency (Forest Range)	Land Category	Scheme/ Component	Site Detail		Site selected for sampling			
				No. of sites	Plants Planted	No. of sites	Plants therein	No. of Samples taken	Plants sampled
Community Forest Project (HCFP), Ambala	HCFP Range Ambala	Forest Land/Non Forest Land	Bio-drainage Plantation	22	61000	6	22400	99	2240
	-do-	-do-	Linear Tree Groves Plantation (LTG)	3	4500	2	3250	10	325
Territorial Forest Division, Ambala	Ambala	Forest Land	Ridge Plantation	6	29340	3	8840	17	884
	-do-	-do-	Tall Plantation	2	7500	1	3750	15	375
	-do-	-do-	Deposit Work (NPV) Tall Plantation	7	5000	2	2500	10	250
	Naraingarh	Forest Land	Ridge Plantation	2	12500	1	5000	10	500
		Forest Land	ANR (Mixed)	1	2000	1	2000	10	200
			Tall Plantation	2	10000	1	7500	30	750
			Deposit Work (NPV) Tall Plantation	1	5000	1	5000	20	500
Total					**136840**		**60240**	**221**	**6024**

Assessment of Survival Rate

CHAPTER-VI

6.0 Results (Plantation 2012-13)

The results showing the survival percentage of plantation carried out in Ambala district during the year 2012-13 are given below :

6.1.0 Bio-drainage Plantation Community Forests

6.1.1 Number of sampling units and survival percentage in HCF Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Ghelri	Bio-drainage Plantation of clonal Ridge Plantation	Areas = 35 ha No of plants = 7000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35	85.5 87.6 89.2 78.3 75.8 82.2 84.1 83.2 88.8 82.5 77.2 76.5 80.4 80.6 72.2 70.2 74.5 76.2 68.4 66.2 82.8 66.8 80.2 84.4 74.2 76.8 72.8 72.6 78.4 78.2 80.5 80.2 84.5 74.5 76.2	78.36

6.1.2 Number of sampling units and survival percentage in HCF Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Tandwal	Bio-drainage Plantation of clonal Ridge Plantation	Areas = 4 ha No of plants = 800 Species = Eucalyptus	1 2 3 4	88.8 94.2 92.8 86.6	90.6

6.1.3 Number of sampling units and survival percentage in HCF Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Barola	Bio-drainage Plantation of clonal Ridge Plantation	Areas = 9 ha No of plants = 1800 Species = Eucalyptus	1 2 3 4 5 6 7 8 9	90.4 88.2 82.5 84.6 85.8 80.4 78.2 82.8 72.2	82.78

6.2.0 Linear Tree Groves, Haryana Community Forest

6.2.1 Number of sampling units and survival percentage in HCF Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Tandwal Bandh	Linear Tree Groves	Areas = 5 RKM No of plants = 1250 Species = Shisham, Arjun, Papri, Kegilia	1 2 3 4 5	78.2 78.2 76.8 80.6 80.5	78.86

6.3.0 Ridge Plantation Territorial Forests (2012-13)

6.3.1 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
GT Road KM 200-212	Ridge Plantation	Areas = 7.68 RKM No of plants = 3840 Species = Eucalyptus	1 2 3 4 5 6 7	74.2 72.8 62.2 62.6 68.2 70.8 72.2	69.0

6.3.2 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
GT Road KM 190-200	Ridge Plantation	Areas = 4 RKM No of plants = 2000 Species = Eucalyptus	1 2 3 4	92.8 90.2 88.8 87.8	89.9

6.3.3 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
GT Road KM 211-212	Ridge Plantation	Areas = 6 RKM No of plants = 3000 Species = Eucalyptus	1 2 3 4 5 6	68.2 72.4 66.8 74.2 70.8 70.2	70.43

6.4.0 Tall Plantation Territorial Forests (2012-13)

6.4.1 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
GT Road KM 191-200 L&R	Tall Plantation	Areas = 15 RKM No of plants = 3750 Species = Shisham, Arjun, Jamun, Amla, Papri	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	80.4 82.2 78.4 72.2 80.6 80.8 79.2 78.6 76.8 86.6 80.2 78.2 79.8 82.2 80.6	79.77

6.4.2 Number of sampling units and survival percentage in Territorial Forest Range Naraingarh during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Kherki Manakpur Sec. 5	CAMPA State Ridge Plantation	Areas = 10 RKM No of plants = 5000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10	94.8 92.2 90.4 89.2 86.5 92.2 90.2 91.5 88.8 88.2	90.4

6.4.3 Number of sampling units and survival percentage in Territorial Forest Range Saha during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
State Highway KM 52-58 R	Added Natural Regeneration (ANR) Mixed	Areas = 10 ha No of plants = 2000 Species = Shisham, Arjun, Jamun	1 2 3 4 5 6 7 8 9 10	72.2 70.2 66.4 64.2 68.4 74.8 74.2 68.8 66.2 68.5	69.39

6.4.4 Number of sampling units and survival percentage in Territorial Forest Range Saha during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Shahabad Sadhoura Road KM 20 to 33 L&R	State CAMPA Tall Plantation	Areas = 30 RKM No of plants = 7500 Species = Shisham, Arjun, Jamun, Papri	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	74.8 72.2 70.2 64.8 72.8 66.2 66.8 68.6 70.8 72.2 69.8 66.5 64.2 74.8 76.2 68.8 68.2 66.4 68.8 70.8 70.2 74.2 70.5 68.5 72.2 70.2 64.2 72.8 72.6 70.2	69.98

Successful Plantations

CHAPTER-VII

7.0 Results (Plantation 2013-14)

The results showing the survival percentage of plantation carried out in Ambala district during the year 2013-14 are given below :

7.1.0 Bio-drainage Plantation

7.1.1 Number of sampling units and survival percentage in HCF Range Ambala during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Nadiyali	Bio-drainage Plantation of clonal Eucalyptus in water logged areas (Farm Land Plantation)	Areas = 22 ha No of plants = 4400 Species = Eucalyptus	1	92.2	
			2	94.6	
			3	86.8	
			4	88.5	
			5	84.4	
			6	94.6	
			7	96.6	
			8	92.4	
			9	90.4	
			10	90.8	
			11	88.6	90.62
			12	86.8	
			13	92.6	
			14	92.2	
			15	92.8	
			16	88.5	
			17	86.6	
			18	90.5	
			19	92.8	
			20	90.8	
			21	88.6	
			22	91.8	

7.1.2 Number of sampling units and survival percentage in HCF Range Ambala during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Ghelri	Bio-drainage Plantation of clonal Eucalyptus in water logged areas (Farm Land Plantation)	Areas = 29 ha No of plants = 5800 Species = Eucalyptus	1	76.6	
			2	78.4	
			3	72.2	
			4	82.2	
			5	84.6	
			6	88.2	
			7	76.4	
			8	72.5	
			9	78.6	
			10	72.4	
			11	77.2	
			12	84.5	
			13	86.6	
			14	81.6	
			15	81.8	77.62
			16	77.8	
			17	72.8	
			18	68.8	
			19	82.8	
			20	64.6	
			21	72.8	
			22	71.5	
			23	78.6	
			24	75.5	
			25	72.8	
			26	84.5	
			27	78.8	
			28	76.4	
			29	79.6	

7.2.0 Linear Tree Groves (2013-14)

7.2.1 Number of sampling units and survival percentage in HCF Range Ambala during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Ambala to Barola Road 9-14 L&R side	Linear Tree Groves (LTG)	Areas = 5 RKM No of plants = 1250 Species = Jamun, Kadam, shisham, silver oak	1	92.2	
			2	84.6	
			3	86.6	87.36
			4	88.2	
			5	85.2	

7.3.0 Ridge Plantation Territorial Forests (2013-14)

7.3.1 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Khudda Dhukeri Road	CAMPA Deposit Work (NPV) Tall Plantation	Areas = 6 RKM No of plants = 1500 Species = Teak, Shisham, Papri	1 2 3 4 5 6	62.2 64.2 66.8 68.2 60.6 66.5	64.75

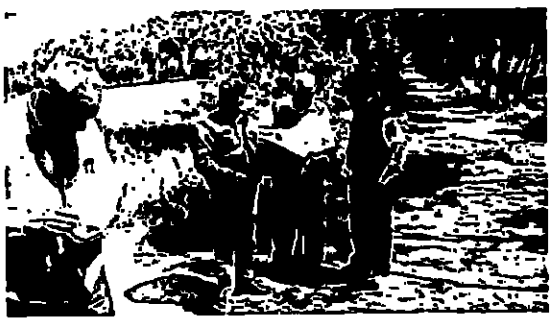
7.3.2 Number of sampling units and survival percentage in Territorial Forest Range Ambala during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Brahman Majra to Sambhalkha Road KM 0 to 2 L&R	CAMPA Deposit Work (NPV) Tall Plantation	Areas = 4 RKM No of plants = 1000 Species = Shisham, Papri	1 2 3 4	68.2 74.2 70.0 66.8	69.8

7.3.3 Number of sampling units and survival percentage in Territorial Forest Range Saha during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
State Highway Road KM 58 to 71.5 L&R	CAMPA Deposit Work (NPV) Tall Plantation	Areas = 20 RKM No of plants = 5000 Species = Papri, Jamun, Shisham, Arjun, Chakrisya, Pilkhan, Amla	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	68.2 64.8 62.8 74.8 74.2 74.4 76.5 70.2 70.4 70.6 68.2 66.4 66.2 62.4 62.2 66.8 68.8 68.8 70.2 70.2	68.85

Assessment of Survival Rate



CHAPTER-VIII

8.0 Analysis of Results

The overall survival rate of tree plantation in Ambala district of Haryana during 2012-13 and 2013-14 are tabulated below :

8.0.1 : Survival rate of plantation in forest land and community land

Land category	Agency	Scheme	No. of sample taken	Average survival
Community Land	Community Forest Range (CFP), Ambala	Bio-drainage + Linear Tree Groves (LTG)	109	83.74
Forest Land	Territorial Forest Range, Ambala	Ridge Plantation + Tall Plantation and Deposit Work NPV (TP)	42	73.94
	Territorial Forest Range, Naraingarh	Ridge Plantation	10	90.4
	Territorial Forest Range, Shaha	ANR	60	69.40

8.0.2 : Survival rate of plantation in community land (2012-13)

Land category	Agency	Scheme	No. of sample taken	Average survival	Overall
Community Land	Community Forest Range, Ambala	Bio-drainage	48	83.91	81.38
	Community Forest Range, Ambala	LTG	5	78.86	

8.0.3 : Survival rate of plantation in community land (2013-14)

Land category	Agency	Scheme	No. of sample taken	Average survival	Overall
Community Land	Community Forest Range, Ambala	Bio-drainage	51	85.40	86.38
	Community Forest Range, Ambala	LTG	5	87.36	

8.0.4 : Survival rate of plantation in forest land (2012-13)

Land category	Agency	Scheme	No. of sample taken	Average survival	Overall
Forest Land	Territorial Forest Range, Ambala	Ridge Plantation	17	79.93	76.91
	Territorial Forest Range, Ambala	Tall Plantation	15	74.87	
	Territorial Forest Range, Ambala	ANR (Mixed)	10	69.39	
	Territorial Forest Range, Saha	Tall Plantation	30	69.98	
	Territorial Forest Range, Naraingarh	Ridge Plantation	10	90.40	

8.0.5 : Survival rate of plantation in forest land (2013-14)

Land category	Agency	Scheme	No. of sample taken	Average survival	Overall
Forest Land	Territorial Forest Range, Saha	Deposit Work and NPV Tall Plantation	20	67.80	66.45
	Territorial Forest Range, Ambala	Tall Plantation	10	61.10	

8.1 Survival of the Result

8.1.1 Table showing survival under different administrative systems irrespective of land use (2012-13)

Sr.No.	Administrative System		Overall Survival (%)
1	**Territorial Forest**		
	a) Ambala Forest Range	77.4	79
	b) Naraingarh Forest Range	90.4	
	c) Saha Forest Range	69.6	
2	**Community Forest**		
	a) Ambala Community Forestry Range	81.3	81

8.1.2 Table showing survival under different topographic/land use/planting system situations (2012-13)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Bio-drainage	a) Ghelri	78.3	
		b) Tanwal	90.0	84
		c) Barala	82.7	
2	Linear Tree Groves (LTG)	Tandwal Bandh	79.0	79
3	Ridge Plantation	a) GT Road KM 200-212	69.0	
		b) GT Road KM 190-200	89.9	80
		c) GT Road KM 211-212	70.4	
		d) Kharki Manakpur Sec. 5	90.4	
4	Tall Plantation	a) GT Road KM 191-200 L&R	79.7	75
		b) Shahbad Sadhoura Road KM 20-33 L&R	70.0	
5	ANR (Mixed)	a) State Highway KM 52-58 R	69.4	69

8.1.3 Table showing survival under different Administrative systems irrespective of land use 2013-14

Sr.No.	Administrative System		Overall Survival (%)
1	**Territorial Forest**		
	a) Ambala Forest Range b) Saha Forest Range	65.1 67.8	66
2	**Community Forest**	86.3	86

8.1.4 Table showing survival under different topographic/land use/planting system situations (2013-14)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Bio-Drainage	Nadyali Ghelri	90.6 77.6	84
2	Linear Tree Groves (LTG)	Ambala to Barola Road 9-14 L&R sides	87.3	87
3	CAMPA Deposit Work Tall Plantation	a) Khudda Dhukeri Road b) Brahman Majra to Sambhalkha Road KM 0 to 2 L&R c) State Highway Road KM 58 to 71.5 L&R	64.7 69.8 68.8	67

Afforestation Awareness Programme
(through Nukkar Sabha)

CHAPTER-IX

9.0 Conclusion and Suggestions

9.1 Comment on survival rates

Performance of the plantation is variable, depending upon various factors such as soil depth, texture and structure; climate and edaphic factors; the quality of planting stock and the maintenance of plantations.

Overall survival percentage with respect to different ranges are 90.4 per cent, 83.74 per cent, 73.94 per cent and 69.40 per cent for Territorial Forest Range, Naraingarh, Community Forest Project, Ambala, Territorial Forest Range Ambala and Territorial Forest Range Shaha respectively. Territorial Forest Range Narayangarh has highest survival percentage of 90.40 per cent whereas, survival was observed lowest (69.40%) for Territorial Forest Range Shaha. The survival percentage was found to be satisfactory in plantations raised in reserved forests irrespective of the different schemes. However, the maximum (90.62%) survival percentage was observed in Nadiyali site of CFP Range, Ambala under Bio-drainage scheme of CAMPA, whereas, minimum of 64.75 per cent survival percentage was recorded in the CAMPA Deposit Work NPV (TP) Forest Range, Ambala.

Plantation along road side and railway side in ridges and tall plantation were also having good survival percentage. Most of the plantation in ridge were done in Territorial Forest Range, Ambala where survival varied from 89.90 to 69.00 per cent. Where as in case of Tall Plantation most of the plantations were done in Ambala Forest Range where survival varies from 79.77 to 64.75 per cent.

In Ambala district 206.68 RKM and 20 Ha area was planted with 145340 number of seedlings of various species during 2012-13 and 2013-14. The survival percentage was good in Community Forestry Project as compared to reserve forest

and protected forest where there is less biotic interference. The plantations have been well established where the area is covered out. The survival rate was observed lower in areas where proper maintenance could not be done. The areas along road side and railway side are water logged and is prone to grazing and browsing which has resulted in lower survival percentage. The fire incidence at all the forest ranges has resulted in less survival percentage. Flood hazards have also shown impact on survival percentage in some sites. Weed growth, in few sites has also suppressed the growth of the seedlings. The overall survival rate is good in Ambala district.

9.2 People's Participation

Peoples are actively involved in Afforestation programme. Local peoples are engaged for Afforestation activity and for watch and ward. People get grass from the forest in reward to maintenance and care of the plantation area. They are avoiding grazing in the forest area. This participation has helped in establishment and survival of plant species. Social fencing and people's participation in combating the fire has enhanced sense of belonging of forest resource.

9.3 Choice of species and condition of planting stock

Considering the edaphic, climatic and ecological conditions of the plantation areas, the choice of species is good which suit to the conditions. However the condition of planting stock at planting can not be judged at this stage.

9.4 Maintenance of records

The plantation register have been well maintained with all plantations.

9.5 Project constraints

It was observed that there was regular flow of funds in CAMPA schemes. Low wages norms are also the constraints of the project.

9.6 Suggestions for improvement and recommendations

To increase the economic gain from low volume high value cash crop i.e. Medicinal and Aromatic plants. In order to improve the performance of the plantation the following suggestions are made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in ridge and tall plantations along road side and railway sides
- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.
- To increase the forest cover through afforestation activities, involve the local communities.
- The concept of social forestry and strip plantation should be increased in the project area.
- Most of the protected forests in the region are in the form of strip along roads, railway lines, canals and watercourses which are subjected to heavy biotic pressure. Proper fencing is needed to ensure plantation survival in these forest areas. Social fencing may be key factor for plantation success.
- Special projects like agro-forestry, farm forestry must be formulated for rural areas to reduce the pressure on natural forests to meet the requirement of local people for fuel, fodder, small timber and other forest produces.
- Tree improvement for commercially important species must be started to increase the forest productivity.
- Extension activities must be geared up to boost awareness generation among the people to sensitize them towards forestry related activities.

9.7 Technological points

- Vigorous seedlings should be planted. Poor planting stock should be discouraged.
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Tending operations should be done timely.
- Root trainers technology to raise the nursery stock can be adopted.
- Temporary nursery under CAMPA scheme near plantation site should be established.

9.8 Administrative points

- Maintenance of plantations should be done for more than three years, if possible.
- Adequate women representation should be there in the village forest committees.
- Villagers should be provided incentives for maintenance of the plantations.
- Administrative decisions should be taken timely for seed procurement, nursery raising, plantation and other operations at concerned levels.
- As most of the project area falls under rainfed conditions, trench planting techniques should be adopted for better survival of plantations.
- Suitable species should be planted in water logged areas for better survival as most of the project area falls under water logged conditions.

Annexure-I : CAMPA Expenditure 2012-13 (Ambala District) under Community Forestry Project

Sr. No.	Component	Unit	Target Fixed		Target Achieved	
			Physical	Financial	Physical	Financial
1	Biodrainage 2012-13	Ha	150	2370000	150	2370000
2	Biodrainage 2011-12 (Maint)	Ha	165	594000	165	594000
3	CAMPA TG	No	70	114755	70	114755
4	Maint of LTG 2013-14	RKM	5	137200	5	137200

Annexure-II : CAMPA Expenditure 2013-14 (Ambala District) under Community Forestry Project

Sr. No.	Component	Unit	Target Fixed		Target Achieved	
			Physical	Financial	Physical	Financial
1	Biodrainage 2013-14	Ha	155	2015000	155	2015000
2	Biodrainage 2012-13 (Maint)	Ha	150	300000	150	300000
3	Maint of LTG 2013-14	RKM	13	500500	13	500500
4	Maint of LTG 2012-13	RKM	5	47525	5	47525

Annexure-III : CAMPA Expenditure 2012-13 (Ambala District) under Territorial Forest Division, Ambala

Sr. No.	Range (Range/Block/Beat)	Name of Reach	Work Compo-nent	Financial Target (Rs.)	Physical Target	
					Ha	RKM
1	Naraingarh/Naraingarh/ Hamidpur	Sangrani Sec.-5	Ridge 75 RKM @ 500/-	483795	0	15
2	Naraingarh/Shahzadpur/ Barri Bassi	Kherki Manakpur Sec. 5		322530	0	10
3	Saha/Saha/Kesri	Samlehri to Pilkhani Road Pvt. Land		161265	0	5.00
4	Saha/Saha/Kesri	Samlehri to Pilkhani Road Pvt. Land		258024	0	8.00
5	Ambala/Jansui/Jansui	Gorsian Sec. 4-5		1128855	0	35
6	Ambala/Ambala East/Mohra	GT Road KM 194-95		64506	0	2
		Total State CAMPA Ridge		**2418975**	**0**	**75**
1	Ambala/Ambala West/Ambala	GT Road KM 200-212		247352	0	7.68
2	Ambala/Ambala East/Mohra	GT Road KM 190-200		128829	0	4
3	Ambala/Ambala East/Mohra	GT Road KM 211-212		193243	0	6
4	Ambala/Ambala East/Mohra	GT Road KM 194-195		128829	0	4
		Total State CAMPA Ridge Last Year		**698253**	**0**	**21.68**
		G. Total State CAMPA Ridge		**3117228**	**0**	**96.68**
1	Ambala/A/East/Mohra	GT Road KM 190-191 L/R	ANR 20 Ha @ 200/-	72500	5	0
2	Ambala/A/West/Ambala	GT Road KM 211-212 L/R		72500	5	0
3	Saha/Saha/Nagla	State Highway KM 52-58 R		145000	10	0
		Total State ANR Scheme		**290000**	**20**	**0**
1	Ambala/A/East/Mohra	GT Road KM 191-200 L/R	Tall Plant 70 RKM @ 250/-	556110	0	15
2	Ambala/A/West/Ambala	GT Road KM 211-212 L/R		556110	0	15
3	Saha/Mullana/Dhanoura	Shahabad Sadhoura Road KM 20 to 33 L&R		1112220	0	30
4	Saha/Barara/Ugara	Shahabad Sadhoura Road KM 20 to 33 LS		370740	0	10
		Total State ANR Scheme		**2595180**	**0**	**70**
		Total CAMPA Scheme		**6002408**	**20**	**166.68**

Annexure-IV : CAMPA Expenditure 2013-14 (Ambala District) under Territorial Forest Division, Ambala

Sr. No.	Range (Range/Block/Beat)	Name of Reach	Work Compo-nent	Financial Target (Rs.)	Physical Target	
					Ha	RKM
1	Ambala	Khudda Dhukeri Road KM 0-6 L&R	Tall Plants - 40 RKM @ 250/-	173250	0	6
2	Ambala	Brahman Majra to Sambhalkha Road KM 0-2 L&R		115500	0	4
3	Ambala	Bhanokheri to Mohri Road KM 0 to tail L&R		69300	0	2.4
4	Ambala	Mohri to Teja Road KM 0 to tail L&R		40425	0	1.4
5	Ambala	Mohri to Lakhnaur Sahib Road KM 0 to tail L&R		98175	0	3.4
6	Ambala	Mohri to Lalana Road KM 0 to tail L&R		46200	0	1.6
7	Ambala	Ambala Baroula Road KM 0 to tail L&R		34650	0	1.2
8	Saha	State Highway Road KM 58-71.5 L&R		577500	0	20
		Total State CAMPA Ridge		**1155000**	**0**	**40**

Annexure-V : Final APO for the year 2012-13 under CAMPA Scheme HCFP Range Ambala

Sr. No.	Range (Range/Block/Beat)	Site	GIS Coordinates				Nature of Soil	Nature of Plantation	Kind of Plantation	Target Achieved			Species	Total No. of Plants Planted	Spacing
				Degree	Minutes	Seconds				Ha/HH/Plants	Nos.	RKM			
1	Ambala/Barara/Saha	Ghelri	N	30	14	6.96	Sandy Loam	Ridge Plantation	New Plantation	35			Eucalyptus	7000	1.5 Mtr
			E	76	59	52.8									
			N	30	14	6.74									
			E	76	59	6.66									
2	Ambala/Barara/Saha	Tandwal	N	30	14	17.1	Sandy Loam	Ridge Plantation	New Plantation	4			Eucalyptus	800	1.5 Mtr
			E	76	58	29.2									
			N	30	13	40.2									
			E	76	58	7.45									
3	Ambala/Saha/Saha	Dhurala	N	30	16	6.70	Sandy Loam	Ridge Plantation	New Plantation	35			Eucalyptus	7000	1.5 Mtr
			E	76	55	2.2									
			N	30	16	52.5									
			E	76	55	6.35									
4	Ambala/Ambala/ Ambala	Banh Pur	N	30	15	6	Sandy Loam	Ridge Plantation	New Plantation	5			Eucalyptus	1000	1.5 Mtr
			E	76	37	39									
			N	30	15	9									
			E	76	38	21									
5.	Ambala/Ambala/ Ambala	Jagoili	N	30	12	8.84	Sandy Loam	Ridge Plantation	New Plantation	3			Eucalyptus	600	1.5 Mtr
			E	76	37	26.2									
			N	30	12	57.6									
			E	76	37	8.91									
6	Ambala/Ambala/ Ambala	Jalbehra	N	30	19	42.7	Sandy Loam	Ridge Plantation	New Plantation	2			Eucalyptus	400	1.5 Mtr
			E	76	45	9.37									
			N	30	19	18.1									
			E	76	47	52									

7	Ambala/Ambala/ Ambala	Kalrehri	N	30	23	55.2	Sandy Loam	Ridge Plantation	New Plantation	16			Eucalyptus	3200	1.5 Mtr
			E	76	51	18.7									
			N	30	24	45.9									
			E	76	52	34.5									
8	Ambala/Ambala/ Ambala	Barola	N	30	12	15.5	Sandy Loam	Ridge Plantation	New Plantation	9			Eucalyptus	1800	1.5 Mtr
			E	76	45	3.3									
			N	30	12	52.9									
			E	76	44	33.4									
9	Ambala/Ambala/ Ambala	Bhano Kheri	N	30	16	9.20	Sandy Loam	Ridge Plantation	New Plantation	36			Eucalyptus	7200	1.5 Mtr
			E	76	44	7.58									
			N	30	16	8.24									
			E	76	44	40.5									
10.	Ambala/Ambala/ Ambala	Sakron	N	30	15	29.3	Sandy Loam	Ridge Plantation	New Plantation	5			Eucalyptus	1000	1.5 Mtr
			E	76	43	34.7									
			N	30	15	38.1									
			E	76	43	36.4									
	Total Ambala									150				30000	
	Plantation of LTG (250 plants each) in villages under State CAMPA Scheme														
1.	Ambala/Barara/ Saha	Tandwal Bandh	N	30	14	17.1	Sandy Loam	Normal Pit Planting	New Plantation	2			Shisham Arjun Papri Keglia	550 300 200 200	4x4 Mtr
			E	76	58	29.2									
			N	30	13	40.2									
			E	76	58	7.45									
													Total	1250	

Annexure-VI : Final APO for the year 2013-14 under CAMPA Scheme HCFP Range Ambala

Sr. No.	Type of Land	Name of Scheme/ Component	Name of Range/ Block/ Beat	Name of Site	Target Achieved		Spacing (Mtr)	Species	Total No. of Plants Planted	GPS Coordinates					
	Forest Land/ Non Forest Land				Ha.	Nos/ RKM				Latitude			Longitude		
1	Non Forest Land	Biodrainage	Ambala	Bhari	13		1.5	Eucalyptus	2600	30	18	14	76	42	0.6
2	Non Forest Land	Biodrainage	Ambala	Niharsi	2		1.5	Eucalyptus	400	30	12	68.7	76	38	34
3	Non Forest Land	Biodrainage	Ambala	Bamba	3		1.5	Eucalyptus	600	30	14	22	76	40	00
4	Non Forest Land	Biodrainage	Ambala	Panjola	3		1.5	Eucalyptus	600	30	16	15	76	36	51
5	Non Forest Land	Biodrainage	Saha	Nadiyali	22		1.5	Eucalyptus	4400	30	15	58	76	42	10
6	Non Forest Land	Biodrainage	Ambala	Dhurala	48		1.5	Eucalyptus	9600	76	55	2.2	30	16	67
7	Non Forest Land	Biodrainage	Ambala	Boh	19		1.5	Eucalyptus	3800	30	22	53.48	76	53	14.1
8	Non Forest Land	Biodrainage	Barara	Ghelri	29		1.5	Eucalyptus	5800	30	14	69.6	76	59	52.8
9	Non Forest Land	Biodrainage	Saha	Naraingarh Majra	5.5		1.5	Eucalyptus	1100	30	14	9.2	76	56	5.4
10	Non Forest Land	Biodrainage	Saha	Nagla	5.5		1.5	Eucalyptus	1100	30	14	7.9	76	56	6.95
11	Non Forest Land	Biodrainage	Ambala	Ramgarh Majra	3		1.5	Eucalyptus	600	30	21	54.8	76	53	16.66
12	Non Forest Land	Biodrainage	Ambala	Barola	2		1.5	Eucalyptus	400	30	12	15.5	76	45	3.33
				Total Ambala	**155**				**31000**						
	Plantation of LTG (250 plants each) in villages under State CAMPA Scheme														
1	Forest Land	LTG CAMPA	Ambala	Ambala to Barola Road		5	4x4	Jamun Kadamb Shisham Silver Oak	70 805 314 61						
2	Forest Land	LTG CAMPA	Ambala	Tangri Margin Bundh R Side Majri Mardan Sahib Bundh		8	4x4	Shisham	2000						
				Total					**2000**						
				G. Total		**13**			**3250**						

Annexure-VII : APO of Territorial Forest Division, Ambala for the year 2012-13

Sr. No.	Name of Range/ Block/ Beat	Name of Scheme	Compo-nent	Target	Name of Reach	Target to be achieved			Name of Species	Latitude	Longitude
						Ha	RKM	Nos. of Plants			
1	Naraingarh/Naraingarh/ Hamidpur	CAMPA State	Ridge	75 RKM @ 500/-	Sangrani Sec.-5	0	15	7500	Eucalyptus	30.4916153°	76.165881°
2	Naraingarh/Shahzadpur/Barri Bassi				Kherki Manakpur Sec. 5	0	10	5000	Eucalyptus	30.493432°	77.079114°
3	Saha/Saha/Kesri				Samlehri to Pilkhani Road Pvt. Land	0	5.00	2500	Eucalyptus	30.4916153°	30.491615°
4	Saha/Saha/Kesri				Samlehri to Pilkhani Road Pvt. Land	0	8.00	4000	Eucalyptus	30.493432°	30.493432°
5	Ambala/Jansui/Jansui				Gorsain Sec. 4-5	0	35	17500	Eucalyptus	30.228576°	76.676012°
6	Ambala/Ambala East/Mohra				GT Road KM 194-195	0	2	1000	Eucalyptus	30.255041° 30.296036°	76.852765° 76.845693°
					Total State CAMPA Ridge	**0**	**75**	**37500**			
1	Ambala/Ambala West/Ambala				GT Road KM 200-212	0	7.68	3840	Eucalyptus	30.359841° 30.380245°	76.801125° 76.790583°
2	Ambala/Ambala East/Mohra				GT Road KM 190-212	0	4	2000	Eucalyptus	30.25497° 30.316626°	76.852823° 76.839298°
3	Ambala/Ambala East/Mohra				GT Road KM 211-212	0	6	3000	Eucalyptus	30.255041° 30.296036°	76.852765° 76.845693°
4	Ambala/Ambala East/Mohra				GT Road KM 194-195	0	4	2000	Eucalyptus	30.255041° 30.296036°	76.852765° 76.845693°
					Total State CAMPA Ridge Last Year	**0**	**21.68**	**10840**			
					G. Total State CAMPA Ridge	**0**	**96.68**	**48340**			

1	Ambala/A/East/Mohra		ANR	20 Ha @ 200/-	GT Road KM 190-191 L/R	5	0	1000	Shisham Arjun, Jamun	30.255041° 30.296036°	76.852765° 76.845693°
2	Ambala/AWest/Ambala				GT Road KM 211-212 L/R	5	0	1000	Shisham Arjun, Jamun	30.255041° 30.296036°	76.852765° 76.845693°
3	Saha/Saha/Nagla				State Highway KM 52 to 58 R	10	0	2000	Shisham Arjun, Jamun	30.25497° 30.316626°	76.852823° 76.839298°
					Total State ANR Scheme	**20**	**0**	**4000**	Shisham Arjun, Jamun	30.25497° 30.316626°	76.852823° 76.839298°
1	Ambala/A/East/Mohra		Tall Plant	70 RKM @ 250/-	GT Road KM 191-200 L/R	0	15	3750	Shisham Arjun, Jamun	30.359841° 30.380245°	76.801125° 76.790583°
2	Ambala/A/West/Ambala				GT Road KM 211-212 L/R	0	15	3750	Shisham Arjun, Jamun	30.359841° 30.380245°	76.801125° 76.790583°
3	Saha/Mullana/Dhanoura				Shahbad Sadhoura Road KM 20 to 33 L&R	0	30	7500	Shisham Arjun, Jamun	30.259093° 30.335404°	77.076843° 77.178873°
4	Saha/Barara/Ugara				Shahbad Sadhoura Road KM 20 to 33 LS	0	10	2500	Shisham Arjun, Jamun	30.259093° 30.335404°	77.076843° 77.178873°
					Total State ANR Scheme	**0**	**70**	**17500**			
					G Total	**20**	**166.68**	**69840**			

Annexure-VIII : Detailed APO of Territorial Forest Division, Ambala for the year 2013-14 under CAMPA NPV

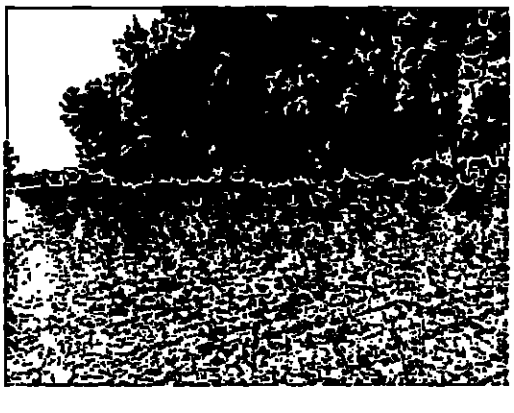
Sr. No.	Name of Range/ Block/ Beat	Name of Scheme	Component	Target	Name of Reach	Target to be achieved			Name of Species
						Ha	RKM	Nos. of Plants	
1	Ambala/Ambala East/Khudda	CAMPA Deposit Work (NPV)	Tall Plants	40 RKM @ 250/-	Khudda Dhukeri Road KM 0-6 L&R	0	6	1200 300	Shisham Papri
2	Ambala/Ambala East/Khudda				Brahman Majra to Sambhalkha Road KM 0-2 L&R	0	4	300 700	Shisham Papri
3	Ambala/Ambala West/Ballana				Bhanokheri to Mohri Road KM 0 to Tail L&R	0	2.4	600	Shisham
4	Ambala/Ambala West/Ballana				Mohri to Teja Road KM 0 to tail L&R	0	1.4	350	Shisham
5	Ambala/Ambala West/Badoula				Mohri to Lakhanaur Sahib Road KM 0 to tail L&R	0	3.4	850	Shisham
6	Ambala/Ambala West/Badoula				Mohri to Lalana Road KM 0 to tail L&R	0	1.6	400	Shisham
7	Ambala/Ambala West/Nasirpur				Ambala Baroula Road KM 0 to tail L&R	0	1.2	300	Kadam
8	Saha/Saha/Nagla				State Highway Road KM 58-71.5 L&R	0	20	500 1500 1500 800 160 40 500	Papri Jamun Shisham Arjun Shakrisya Pilkhan Anwala
					Total CAMPA Deposit Work (NPV)	**0**	**40**	**10000**	

Annexure-IX : List of species/plants used in plantation programme 2012-13 and 2013-14

Sr.No.	Name of plant	Botanical Name
1.	Safeda	*Eucalyptus* spp.
2.	Shisham	*Dalbergia sissoo*
3.	Arjun	*Terminalia arjuna*
4.	Jamun	*Syzygium cumini*
5.	Papri	*Holoptelia integrifolia*
6.	Hathiphal	*Kegilia pinnata*
7.	Amla	*Emblica officinalis*
8.	Jamun	*Syzygium cumini*
9.	Kadam	*Anthocephalus indica*
10.	Silver Oak	*Grevillea robusta*
11.	Papri	*Holoptelia integrifolia*
12.	Chakrasia	*Chakrasia* spp.
13.	Pilkhan	*Pilkhan* spp.

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Kaithal District (Haryana) under State CAMPA Scheme


RD



Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Kaithal District (Haryana) under State CAMPA Scheme

P. Kaushal
Sunil Kumar
Pawan Thakur

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

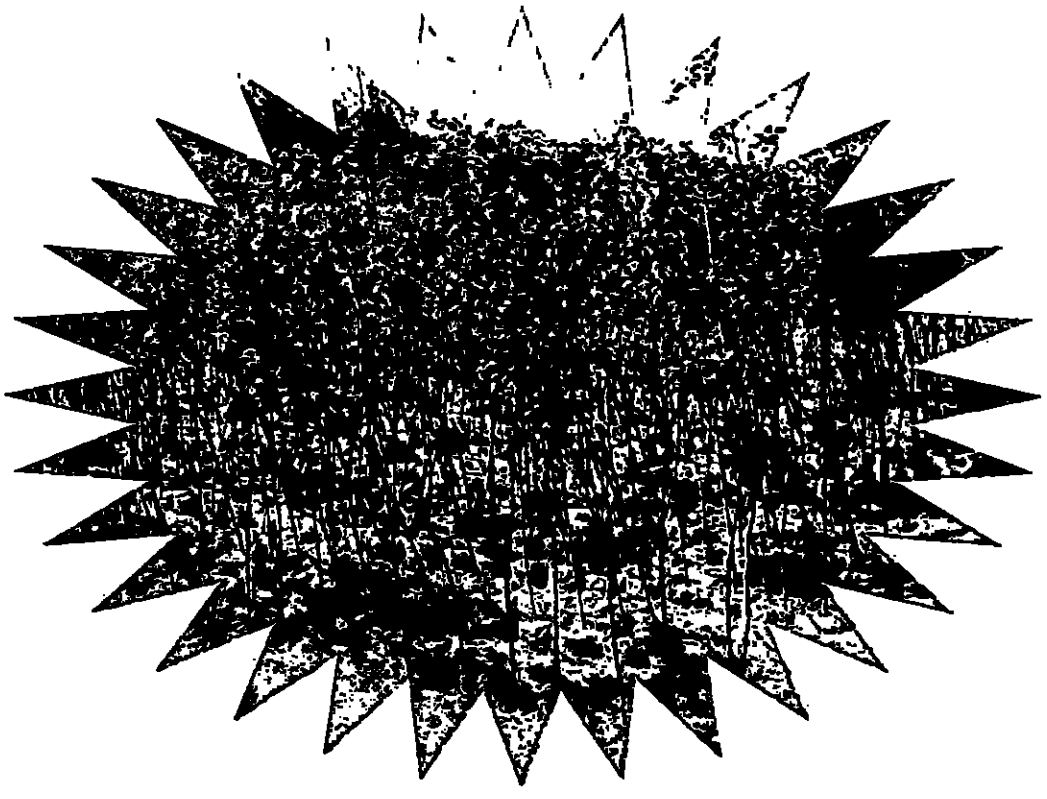
Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried out the ***Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Kaithal District (Haryana) under State CAMPA Scheme*** *in Kaithal district (Haryana). This report is the outcome of the sincere efforts of members of the research team who are associated with the preparation of this report.*

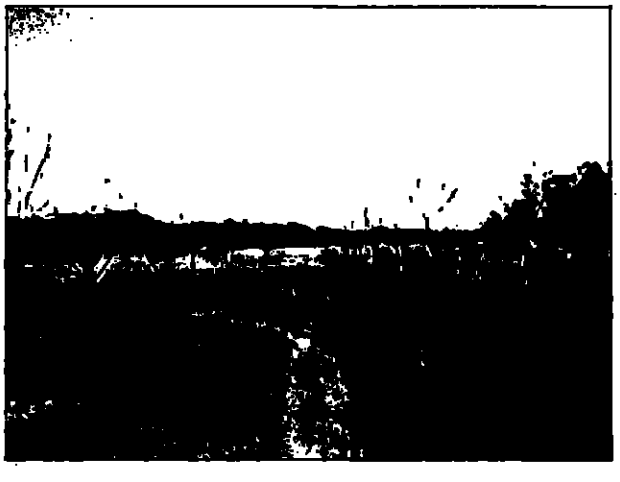
We are thankful to the Haryana State Forest Department, Divisional Forest Officer, Kaithal and Community Forestry Project, Range Officer Kaithal for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P. Kaushal
Sunil Kumarr
Pawan Thakur

TABLE OF CONTENTS





1.0 Background Kaithal District (Haryana)

The state of Haryana has an area of 42212 sq. km. 82 per cent of which is under cultivation. Recorded forest area is about 1685 sq. km. which is about 3.8 per cent of the total area of the state, where as per capita forest cover is only 0.013 ha.

Kaithal district came into being as results of bifurcation of Kurukshetra district on 4th November 1989 vide Haryana Government Notification No. S.O 148/P.A.17/1887/S.5/89 dated 16th October 1989. The said notification alters the limits of areas of Kurukshetra and Jind districts so as to form a new district to be called Kaithal comprising Kaithal and Guhla sub divisions of Kurukshetra district, Kalayat sub Tehsil and six revenue estates of Jind district. It lies between 29^0 34'15"& $30^0$15'15" North latitude and $76^0$30'15" and $77^0$45'10" East longitude. The geographical area of this district is 2799 sq. km. Kaithal district is bounded by Punjab in North and North-West by Jind in the South-West by the district of Panipat and Karnal in the South-West and by Kurukshetra in North-East. Ghaggar is the main river which passes through the district. Kaithal forest division has three ranges namely Kaithal, Saraswati and Pundri.

The area of the district is flat alluvial plain forming a part of vast Indo-Gangetic Alluvial Plain. There is no conspicuous feature in the district. Generally, slope of the district is from North-East to South-West, in which direction most of the river/nalas flow down.

i) **The Khadar :** It is a low lying riverian tract extending upto the broad sandy bed of the river with light soils and water close to the surface. It is formed by the river Ghaggar along its course. After rainy season the receding floods deposit a lot of fine silt which is easy to cultivate and remains wet for most part of the year. Hence the soils of the tract seidom suffer from moisture stress. The Khadar is generally about 20 ft lower than upland plain. In this area the altitude gradually decreases to the South and average fall is upto 2 ft

per mile. The vegetation consists mainly of grass and scrub with trees here and there.

ii) **The upland plain :** This plain is not uniformly level area. It is inclined to South and South-West. There is a sort of hump in the configuration of surface. Within this zone the land is relatively flat. This area is irrigated by Tube-wells and canals and is a prosperous agricultural area.

iii) **The low-lying areas :** These areas are flood plain having clayey loam soil in dry season. This type of soil is hard and cracked whereas in rainy season it is wet and sticky. It suffers from poor drainage during rainy season.

1.1 Altitude

The plain evaluation varies from 252-217 meter from mean sea level. The maimum height is of top Dhand 245.60 metre.

1.2 Geology

Quarternary sediments in this part comprise alluvial and Aeolia sediments. These are unconsolidated and flat. The older alluvium sediments occupy most of the district. Its thickness is about 300 m in Southern part and increases six cycles of sediments within 300 m depth from surface.

1.3 Rocks

Topographically the area is a flat alluvial plain without any conspicuous topographical feature. This is no out crop in the area. Hard rock formation is not traced even in deep drill holes sunk for installation of tube-wells.

1.4 Soil

In the district soils are mostly loam (Bagar and Nardak) and silty and clay (Naili and Chhra dark). The soil is well-known for several occurrences of salt peter which is of great economic importance. The ordinary potter's clay which is a common

feature in the alluvial plains is used for the manufacture of earthenwares and bricks. The main soil groups are as follows :

i) **Tropical Arid Brown Soils :** This type of woil found in area having annual rainfall from 750 to 1000 mm and covers the parts of Guhla, Kaithal and Pundri. These soils are sandy-loam to loam and availability of potassium and phosphorus are medium and high respectively while availability of N2 is low to medium. The pH of the soil varies from 7.0 to 8.5.

ii) **Arid Brown Soils :** This group is found in parts of Guhla, Kaithal and Pundri blocks whereas the average rainfalls varies from 500 to 750 mm. This group of soils falls in hot and semi-dry bio-climatic zone. Salinity and sodicity are main problems along with monsoon floods in these areas. The pH of soil varies from 7.5 to 9.9.

1.5 Climate

The district has a sub tropical continental monsoon climate where we find seasonal rhythm, hot summer, cool winter, unreliable rainfall and great variation in temperature. It is only the rainy season comprising the months of July, August and September, that the moist air of oceanic origin penetrates in to the district and gives rain. The year may be divided into four seasons.

1.6 Rainfall

Average annual rainfall of the year in Kaithal with 11 years rainfall is 629.41 mm with maximum rainfall in July-August is approximately 166 and 151 mm. During 1999 (254.70 mm), 2000 (462.30 mm) and 2001 (658 mm) rainfall was recorded.

1.7 Temperature

The cold season starts by the end of November when the temperature starts to decrease rapidly. January is the coldest month with mean daily minimum temperature at about 7 and mean daily maximum at 20. With the passage of western

disturbances eastward, cold waves effect the whole district and the minimum temperature go down to about a degree. From mid March, the temperature begins to rise rapidly. May and June are hottest months with maximum temperature touching 40^0C. From April hot westerly winds known as "Luh" begins to blow and weather becomes intensively hot. In May and June, the temperature may go above 45^0C. With the advances of S.W. monsoon towards the end of June, there is a decline in day temperature while the night temperatures are as high as in summer. During monsoon period, the weather is stuffy and unpleasant due to increase in humidity.

1.8 Humidity

The air is generally dry during greater part of the year. During monsoon season, the humidity is between 60 to 85 per cent. Humidity decreases in the post monsoon season. April and may are usually the driest months with relative humidity being 20 per cent less in the afternoon.

1.9 Winds

Winds are generally light during the post monsoon and winter months. They strengthen a little during the summer and monsoon months. Winds are predominantly Easterly or South-Easterly in the monsoon season. They are mostly Westerly or North-Westerly during the morning and blow from direction between North and North-West during afternoons.

1.10 Water Supply

There is only one main river called as Gaggar which supply water to the district. There are two important non perennial rivers flow through the division are Saraswati and Markanda.

1.11 Distribution of Forest Area

The distribution forest area of Kaithal Forest Division is given in the following table :

Sr.No.	Type of Forest	Area (Ha)	Length (KM/RD)
1	Reserve Forest	3714.03	-
2	Protected Block Forest	86	-
3	Protected Strip Forest		
	Railway lines	274.32	60
	Roads	1556.10	933.9
	Canals	1702.83	2813.35
	Bunds	58.71	91
4	Area closed U/W 38 of IFA	4.86	-
5	Unclassed Forests		
	Roads	391.44	315.15
	Canals	224.85	291.80
	Bunds	4.46	8
	Total	**8018.60**	**4513.20**

Note : Management of Forest areas closed U/S 38 of IFA

2.0 List of Activities undertaken under CAMPA for 2012-13

Annual Plan of Operation under the state CAMPA for the year 2012-13

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	No
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	Yes
IV	Plantation of Tall Plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Saraswati Forest	Yes
VII	Land reclaimation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services), 19/250 tall plants per tree groves/RKM	Yes
IX	Building for Frontline Staff	No
X	Training of Front Line and Ministerial Staff	No
XI	Capacity Building and Strengthening of Village Level Forestry Institutions	No
XII	Urban Forestry Plantation of Tall Plants in Urban Areas	No
XIII	Silt retention dam at Khol-hi-raittan	No
XIV	Crate wire structure at Bir Shaikargah	No
XV	Digging of ponds in Saraswati conservation reserve forests	No
XVI	Deepening of ponds in Bhor Shaidan Crocodile Breeding Centre	No
XVII	Silt retention structure in Amwali Khol of Kalesar wildlife sanctuary	No
XVIII	Crate wire structure Bir Sikargh WLS Behind CC	No
XIX	Protection centre in Nahar Wildlife Sanctury	No
XX	Pasture development in Nahar Wildlife Sanctury	No
XXI	Construction of WHS in M.garh and Rewari	No
	Sukhna Catchment	
XXII	Afforestation	No
XXIII	Land treatment silt retention dam	No
XXIV	Wire crate structure	No

2.1 List of Activities undertaken under CAMPA for 2013-14

Annual Plan of Operation under the state CAMPA for the year 2013-14

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	Yes
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	Yes
IV	Plantation of Tall Plantation in linear forests 250 per RKM	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Kurukshetra Forests and Duloth Forest	No
VII	Land reclamation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services)	No
IX	Building for Frontline Staff	No
X	Plantation of Native Species in Jind Bir	No
XI	Plantation of Chaal and Jhingen in Shiwalic Hills	No
	Sukhna Catchment	
XII	Afforestation	No
XIII	Plantation of Bhabar grass	No
XIV	Land treatment by check dams	No
	Construction of crate wire structures	No

2.2 Agencies Undertaking Plantations and other CAMPA works in the District

In Kaithal district, there are two agencies namely Territorial Forestry Division, Kaithal and Community Forestry Project (CFP) Range Kaithal of Ambala Community Forestry Project Division which has undertaken the Afforestation and soil conservation activities. The Afforestation work, soil conservation and maintenance of fire lines were carried out by Kaithal Forest Division in three ranges i.e. Kaithal, Saraswati and Pundri. The Community Forestry Project Range Kaithal has carried out the soil and moisture conservation works only under state CAMPA scheme.

3.0 Inventory of the plantations

3.1 List of plantation of Territorial Forest Division Kaithal

The plantations carried out during 2012-13 and 2013-14 by the Territorial Forest Division Kaithal are as follows :

3.1.1 Final APO of State CAMPA (CA and NPV) of Territorial Forest Division, Kaithal for the year 2012-13

Range	Scheme	Component	Name of Reach	Target Achieved		Plants Planted	Species
				Ha	RKM		
Kaithal	Compensatory Afforestation	Tall Plantation	Simla Minor RD 0-17 L&R	0	12	3000	Shisham, Jamun, Draik, Jamoya
Kaithal	Compensatory Afforestation	Tall Plantation	Kamalpur-Sandeel Road KM 04 L&R	0	4	1000	Shisham, Jamun, Jamoya
Saraswati	Compensatory Afforestation	Tall Plantation	Bhuna Minor RD 0-18	0	10	2500	Shisham, Arjun
Saraswati	Compensatory Afforestation	Tall Plantation	RF Kohli Khera	0	30.144	7536	Shisham, Arjun
Saraswati	NPV CAMPA	Tall Plantation	RF Rewar Rect. No. 51, 64	10	0	5000	Suhajna, Amla, Siris, Zaal, Kikar, Pilkhan, Shisham, Toot, Bar, Beri
Saraswati	NPV CAMPA	Tall Plantation	RD Bichiyan Rect. No. 56	10	0	5000	Shisham, Jamun, Toot, Siris Black Siris White, Arjun, Pilkhan, Gullar, Amla, Emly, Neem, Dhak, Kaim, Ritha, Khairi, Bahera, Bel, Pathar, Kachnar, Bar, Pipal, Gambhari, Zaal, Simbal,
	Total			20	56.144	24036	

3.1.2 APO of Territorial Forest Division, Kaithal for the year 2013-14

Range	Scheme	Compo-nent	Name of Reach	Target allotted		Target Achieved		Plants planted	Species
				Ha	RKM	Ha	RKM		
Kaithal	State CAMPA	Ridge	RF Roherian	0.	6	0	6	3000	Eucalyptus
Saraswati	State CAMPA	Ridge	RF Kohli Khera Rect. No. 14	0	14	0	14	7000	Eucalyptus
Saraswati	State CAMPA	ANR TP	RD Kohli Khera	9	0	9	0	2250	Niim, Shisham, Lasura, Siras, Pipal, Eucalyptus
Saraswati	State CAMPA	ANR TP	RD Nauch MP Road	10	0	10	0	2500	Arjun, Lasura
Saraswati	State CAMPA	ANR TP	Saraswati Head Quarter	1	0	1	0	250	Jamun, Toon, Kadam
	Total			20	20	20	20	15000	

3.2 List of plantation of Community Forest Range Kaithal

The plantations carried out during 2012-13 and 2013-14 by the Community Forest Project Range are as follows :

3.2.1 Final APO of CAMPA Scheme for the year 2012-13 (CFP Range, Kaithal)

Range	Scheme	Component	Name of Reach	Phy Achievement		Plants Planted	Species	Financial Achievement
				Ha	RKM			
Kaithal	CAMPA	LTG	Kalayat-Balu Road KM 0-12 L&R	0	6.5	1625	Arjun, Papri, Shisham, Draik, Jamun, Siris, Kachnar	181865
Kaithal	CAMPA	LTG	Choushala-Julani Khera Road KM 0-2 L&R	0	1.5	375	Jamun, Papri, Shisham	36055
Kaithal	CAMPA	LTG	Kharak Pandwa to Ramgarh Road KM 0-2 L&R	0	2	500	Arju, Papri, Jamun, Draik.	51996
	Total			0	10	2500		269916

3.2.2 Final APO of CAMPA Scheme for the year 2013-14 (CFP Range, Kaithal)

Range	Scheme	Component	Name of Reach	Phy Achievement		Plants Planted	Species	Financial Achievement
				Ha	RKM			
Kaithal	CAMPA	LTG	Batta-Sajuma Road KM 0-3 L&R	0	1.7	420	Amla, Arjun, Shisham	48560
Kaithal	CAMPA	LTG	Batta-Brahmni Wala Road KM 0-3 L&R	0	1.3	330	Arjun, Shisham	38154
Kaithal	CAMPA	LTG	Narwal Garh Road KM 0-2 L&R	0	1	250	Shisham	28905
Kaithal	CAMPA	LTG	Diwal-Brahmani Wala Road KM 0-3 L&R	0	3	750	Shisham, Pipal	74743
Kaithal	CAMPA	Bio-Drainage	Village Kalayat	37.77	0	7554	Clonal Eucalyptus	519362
Kaithal	CAMPA	Bio-Drainage	Village Choushala	7.23	0	1446	Clonal Eucalyptus	97659
	Total			45	7	10750		807383

3.3 Species and number of seedlings planted

Total number of plants planted during 2012-13 and 2013-14 under CAMPA in Kaithal district are 52286. The year wise data of species of Territorial Forest Division and Community Forest Range, Kaithal are given in the following tables :

3.3.1 Number of plants of different species planted in district Kaithal by Territorial Forest Division, Kaithal during 2012-13

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Arjun	*Terminalia arjuna*	0	56.144	14036
2	Shisham	*Dalbergia sissoo*			
3	Draik	*Melia azedarach*			
4	Jamun	*Syzygium cumini*			
5	Jamoya	*Jamoya* spp.			

6	Suhajna	*Moringa oleifera*			
7	Amla	*Emblica officinalis*			
8	Siris black	*Albizia lebbeck*			
9	Zaal	*Saluadora oleojdes*			
10	Kikar	*Acacia nilotica*			
11	Pilkhan	*Pilkhan* spp.			
12	Toot	*Morus alba*			
13	Barh	*Ficus bengalensis*			
14	Beri	*Zizyphus mauritiana*			
15	Gullar	*Ficus glomerata*			
16	Emly	*Tamarindus indica*			
17	Neem	*Azadirachta indica*			
18	Dhak	*Butea monosperma*	20	0	10000
19	Kaim	*Kaim* spp.			
20	Ritha	*Sapindus mukooresi*			
21	Khairi	*Salvadora persica*			
22	Behera	*Terminalia belerica*			
23	Bel Pathar	*Aeglemar melos*			
24	Gambhari	*Gambhari* spp.			
25	Pipal	*Ficus religiosa*			
26	Simbal	*Bombex ciba*			
27	Siris white	*Albizia procera*			
28	Shisham	*Dalbergia sissoo*			
29	Jamun	*Syzygium cumini*			
	Total		**20**	**56.144**	**24036**

3.3.2 Number of plants of different species planted in district Kaithal by Territorial Forest Division, Kaithal during 2013-14

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Arjun	*Terminalia arjuna*			
2	Neem	*Azadirachta indica*			
3	Shisham	*Dalbergia sissoo*			
4	Lasura	*Cordia dichotoma*			
5	Siris	*Albizia* spp.			
6	Pipal	*Ficus religiasa*	20		5000
7	Safeda	*Eucalyptus hybrid*			
8	Jamun	*Syzygium cumini*			
9	Toon	*Toona ciliate*			
10	Kadam	*Mitragyna parvifolia*			
11	Safeda	*Eucalyptus hybrid*		20	10000
	Total		**20**	**20**	**15000**

3.2.3 Number of plants of different species planted in district Kaithal by Haryana Community Forestry Project Range, Kaithal during 2012-13

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Arjun	*Terminalia arjuna*	0	10	2500
2	Papri	*Holoptelia integrifolia*			
3	Shisham	*Dalbergia sissoo*			
4	Draik	*Melia azedarach*			
5	Jamun	*Syzygium cumini*			
6	Siris	*Albizia* spp.			
7	Kachnar	*Bauhinia variegate*			
	Total		0	10	2500

3.3.4 Number of plants of different species planted in district Kaithal by Haryana Community Forestry Project Range, Kaithal during 2013-14

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Amla	*Emblica officinalis*	0	7	1750
2	Arjun	*Terminalia arjuna*			
3	Shisham	*Dalbergia sissoo*			
4	Pipal	*Ficus religiosa*			
5	Safeda	*Eucalyptus hybrid*	45		9000
	Total		45	7	10750

CHAPTER-IV

4.0 Background Information about the Scheme/Project

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

4.1 Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

4.2 Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted artificially in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia lebbeck, Syzygium cumini, Ficus religiasa, Melia azadirach, Terminalia arjuna* etc.

However, the distribution depends upon the edaphic factor. Although though other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) and *Saccharam munja* are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas poor people earn their livelihood by selling products of domestic animals, like milk, meat and wood. They keep large herds of cattle. It has results in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing. Grazing by domestic cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon the weather conditions and incidence of grass growth. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire.

Generally it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practical under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages to seek

people participation at all level of project activities. The project which include Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

4.3 Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations has an adverse affect on the environment. Now a days it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i) To conserve and extend the existing forest and vegetative cover in the district of Kaithal for soil and moisture conservation and to preserve the natural biodiversity.

ii) To improve the growing stock by protection, regeneration and planning of local indigenous species.

iii) To conserve the forest habitats critical to biodiversity and protection of ecosystem.

iv) To protect the wildlife by providing them shelter and food.

v) To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.

vi) To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.

vii) To provide employment opportunities to the rural people living in the vicinity of these forests.

viii) To encourage the plantation and sustainable harvesting of NTFPs.

ix) To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

CHAPTER-V

5.0 Sampling Methodology

10 per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantations areas was available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants wee separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

Name of Division	Agency (Forest Range)	Land Category	Scheme/ Component	Site Detail		Site selected for sampling			
				No. of sites	Plants Planted	No. of sites	Plants therein	No. of Samples taken	Plants sampled
Territorial Forest Division, Kaithal	Kaithal	Forest land/non forest land	Compensatory Afforestation Tall Plantation	2	4000	1	3000	12	300
	Kaithal	-do-	Ridge Plantation	1	3000	1	3000	6	300
	Saraswati	-do-	NPV Tall Plantation and Compensatory Afforestaion Tall Plantation	4	20036	1	5000	10	500
	Saraswati	-do-	Ridge Plantation	1	7000	1	7000	14	700
	Saraswati	-do-	ANR Tall Plantation	3	5000	1	5000	9	500
Community Forest Project Division (HCFP), Ambala	CFP Range Kaithal	Non Forest Land	Linear Tree Groves Plantation LTG	7	4250	1	1625	6	162.50
	CFP Range Kaithal	-do-	Bio-drainage	2	9000	1	1446	7	144.60
Total					52286		26071	64	2607.10

CHAPTER-VI

6.0 Results (Plantation 2012-13)

The results showing the survival percentage of plantation carried out in district Kaithal during the year 2012-13 are given below :

6.1.0 Tall Plantation Territorial Forest (2012-13)

6.1.1 Number of sampling units and survival percentage in Territorial Forest Range, Kaithal during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Simla Minor RD 0-17 L&R	CAMPA Compensatory Afforestation Tall Plantation	Areas =12 RKM No of plants = 3000 Species = Shisham, Jamun, Drain, Jamoya	1 2 3 4 5 6 7 8 9 10 11 12	64.00 68.00 72.00 64.00 60.00 76.00 52.00 48.00 68.00 60.00 64.00 68.00	63.66

6.1.2 Number of sampling units and survival percentage in Territorial Forest Range, Saraswati during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
RF Rewar Rect. No. 51, 64	NPV (CAMPA) Tall Plantation	Areas =10 Ha No of plants = 5000 Species = Suhajana, Amla, Siris, Zaal, Kikar, Pilkhan, Shisham, Toot, Bar, Beri	1 2 3 4 5 6 7 8 9 10	74.00 76.00 80.00 84.00 82.00 86.00 72.00 64.00 70.00 60.00	74.80

6.2.0 Linear Tree Groves, Haryana Community Forest (2012-13)

6.2.1 Number of sampling units and survival percentage in Haryana Community Forest Project Range, Kaithal during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Kalayat-Balu Road KM 0-12 L&R	CAMPA LTG	Areas =6.5 RKM No of plants = 1625 Species = Arjun, Papri, Shisham, Draik, Jamun, Siris, Kachnar	1 2 3 4 5 6	80.00 68.00 48.00 48.00 68.00 76.00	64.66

CHAPTER-VII

7.0 Results (Plantation 2013-14)

The results showing the survival percentage of plantation carried out in district Kaithal during the year 2013-14 are given below :

7.1.0 Ridge Plantation Territorial Forest (2013-14)

7.1.1 Number of sampling units and survival percentage in Territorial Forest Range, Kaithal during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
RP Roherian	State CAMPA Ridge Plantation	Areas =6 RKM No of plants = 3000 Species = Eucalyptus	1 2 3 4 5 6	90.00 86.00 80.00 86.00 68.00 72.00	80.33

7.1.2 Number of sampling units and survival percentage in Territorial Forest Range, Sarswari during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
RF Kohli Khera Rect. No. 14	State CAMPA Ridge Plantation	Areas =14 RKM No of plants = 7000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14	86.00 70.00 72.00 90.00 96.00 86.00 86.00 92.00 76.00 68.00 66.00 76.00 82.00 90.00	81.71

7.2.0 Tall Plantation Territorial Forest (2013-14)

7.2.1 Number of sampling units and survival percentage in Territorial Forest Range, Sarswari during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
RF Kohli Khera	State CAMPA ANR Tall Plantation	Areas =9 Ha No of plants = 2250 Species = Neem, Shisham, Lasura, Siris, Pipal	1 2 3 4 5 6 7 8 9	68.00 60.00 72.00 80.00 88.00 68.00 64.00 68.00 76.00	71.55

7.3.0 Bio-drainage Plantation Community Forest Range (2013-14)

7.3.1 Number of sampling units and survival percentage in Haryana Community Forest Project Range, Kaithal during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Village Choushala	CAMPA Bio-drainage	Areas =7.23 ha No of plants = 1446 Species = Clonal Eucalyptus	1 2 3 4 5 6 7	70.00 70.00 70.00 60.00 80.00 80.00 85.00	73.56

8.0 Analysis of Results

The overall survival rate of tree plantation in Kaithal district of Haryana during 2012-13 and 2013-14 are tabulated below :

8.0.1 Table showing survival under different administrative systems irrespective of land use (2012-13)

Sr.No.	Administrative System		Overall Survival (%)
1	Territorial Forest		
	a) Kaithal Forest Range	63.66	69
	b) Saraswati Forest Range	74.80	
2	Community Forest		
	a) Kaithal Community Forestry Range	64.66	65

8.0.2 Table showing survival under different topographic/land use/planting system situations (2012-13)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Compensatory Afforestation in Tall Plantation	Simla Minor RD 0-17 L&R	63.66	64
2	NPV Tall Plantation	RD Rewar Rect No 51, 64	74.80	75
3	Linear Tree Groves (LTG)	Kalayat-Balu Road KM 0-12 L&R	64.66	65

8.0.3 Table showing survival under different Administrative systems irrespective of land use 2013-14

Sr.No.	Administrative System		Overall Survival (%)
1	Territorial Forest		
	a) Kaithal Forest Range	80.33	78
	b) Saraswati Forest Range	76.63	
2	Community Forest		74
	a) Kaithal Community Forest Range	73.56	

8.0.4 Table showing survival under different topographic/land use/planting system situations (2013-14)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Ridge Plantation	a) RP Roherian b) RF Kohli Khera Rect No. 14	80.33 81.71	81
2	ANR Tall Plantation	RF Kohli Khera	71.55	71
3	Bio-Drainage	Village Choushala	73.56	74

8.0.5 The overall survival rate of tree plantation in Kaithal district of Haryana during 2012-13

Agency	Land category	Scheme/ Component	No. of sample taken	Average survival (%)	Overall survival (%)
Territorial Forest Division, Kaithal	Forest Land/ Non Forest Land	Compensatory Afforestation Tall Plantation	12	63.66	67
Territorial Forest Division, Kaithal	Forest Land/ Non Forest Land	NPV (CAMPA) Tall Plantation	10	74.80	
Community Forestry Project Range, Kaithal	Private Land	CAMPA LTG	6	64.66	

8.0.6 The overall survival rate of tree plantation in Kaithal district of Haryana during 2013-14

Agency	Land category	Scheme/ Component	No. of sample taken	Average survival (%)	Overall survival (%)
Territorial Forest Division, Kaithal	Forest Land/ Non Forest Land	State CAMPA Ridge Plantation	6	80.33	76
Territorial Forest Division, Kaithal	Forest Land/ Non Forest Land	State CAMPA Ridge Plantation	14	81.71	
Territorial Forest Division, Kaithal	Forest Land/ Non Forest Land	State CAMPA ANR Tall Plantation	9	71.55	
Community Forest Project Range, Kaithal	Private Land	CAMPA Bio-drainage	7	73.56	

CHAPTER-IX

9.0 Conclusion and Suggestions

9.1 Comment on survival rates

Performance of the plantation is variable, depending upon various factors such as soil depth, soil texture and soil structure. Climate and edaphic factors, the quality of planting stock and the maintenance of plantations are also responsible for the survival.

The overall survival of the plantations of 2012-13 in CAMPA scheme was found to be 67.62 per cent in Kaithal district. The highest (74.80%) surivival was observed in NPV tall plantation of the site RF Rewar Rect. No. 51, 64 in Territorial Forest Range Saraswati. The lowest (63.58%) survival was observed for compensatory Afforestation tall plantation scheme in the site Simla Minor RD 0-17 L&R in Kaithal Territorial Forest Range. In the Community Forest Range Kaithal the survival rate of plantation in CAMPA LTG was observed 64.50% in site Kalayat-Balu Road KM 0-12 L&R. The soil texture, climate and adaphic factors are responsible for lowest survival rate.

The plantation raised in 2013-14 recorded overall survival rate is 76.77 per cent. This is greater from the overall survival recorded for the year 2012-13. The site RF Kohli Khera Rect. No. 14 Saraswati Range Territorial Forest Division had the highest (81.71%) survival rate followed by the site RF Roherian (80.33%) in Kaithal Forest Range and 71.83 per cent for RF Kohli Khera site in Saraswati Forest Range. Whereas the plantation raised in Haryana Community Forest Project range Kaithal 2013-14 in the village Choushala under the CAMPA Bio-Drainage recorded 73.71 per cent survival rate.

Finally it is concluded that the plantation raised in 2012-13 and 2013-14 under the different component of CAMPA scheme the survival of plantation in Territorial Forest Division, Kaithal and Community Forest Range, Kaithal found satisfactory.

9.2 People's Participation

Peoples are actively involved in Afforestation programme. Local peoples are engaged for Afforestation activity and for watch and ward. People get grass from the forest in reward to maintenance and care of the plantation area. They are avoiding grazing in the forest area. This participation has helped in establishment and survival of plant species. Social fencing and people's participation in combating the fire has enhanced sense of belonging of forest resource.

9.3 Choice of species and condition of planting stocks

Considering the edaphic, climatic and ecological conditions of the plantation areas, the choice of species is good which suit to the conditions. But, it is too late to judge the condition of planting stock.

9.4 Maintenance of records

The plantation register have been well maintained with all plantation information.

9.5 Project constraints

It was observed that there was regular flow of funds in CAMPA schemes. Low wages norms are also the constraints of the project.

9.6 Suggestions for improvement and recommendations

In order to improve the performance of the plantation the following suggestions have been made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in strip plantations along road side

- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.

9.7 Technological points

- Vigorous seedlings should be planted. Poorly grown seedlings should be culled and destroyed so that they could not be planted in any circumstances
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Tending operations should be done timely.

9.8 Administrative points

- Plantation raised should be maintained for more than three years.
- Villagers should be provided incentives for maintenance of the plantations.
- Adequate women representation should be there in the village forest committees.
- Administrative decisions should be taken timely for seed procurement, nursery raising, plantation and other operations at concerned levels.
- There should be smooth flow of funds.

9.9 Suggestions for improvement and recommendations

To increase the economic gain from low volume high value cash crop i.e. Medicinal and Aromatic plants. In order to improve the performance of the plantation the following suggestions have been made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in ridge and tall plantations along road side and railway sides

- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.
- To increase the forest cover through afforestation activities by involving the local communities.
- The concept of social forestry and strip plantation should be increased in the project area.
- Most of the protected forests in the region are in the form of strip along roads, railway lines, canals and watercourses which are subjected to heavy biotic pressure. Proper fencing is needed to ensure plantation survival in these forest areas. Social fencing may be key factor for plantation success.
- Special projects like agro-forestry, farm forestry must be formulated for rural areas to reduce the pressure on natural forests to meet the requirement of local people for fuel, fodder, small timber and other forest produces.
- Tree improvement for commercially important species must be started to increase the forest productivity.
- Extension activities must be geared up to boost awareness generation among the people to sensitize them towards forestry related activities.

Annexure I : Final APO of Territorial Forest Division Kaithal of State CAMPA (CA and NPV) with GPS Coordinates for the years 2012-13

Range	Scheme	Component	Reach	Target		Plants planted	Species	Longitude			Latitude			Financial achievement
				Ha.	RKM			D	M	S	D	M	S	
Kaithal	CA	TP	Simla minor RD 0-17 RD	0	12	3000	Shisham, Jamun, Draik, Jamoya	29	39	25	76	14	19	444000
Kaithal	CA	TP	KamalpurSandeel Road Km 04 L&R	0	4	1000	Shisham, Jamun, Jamoya	29	38	21	76	21	55	148000
Saraswati	CA	TP	Bhuna minor RD 0-18	0	10	2500	Shisham, Arjun	29	59	20	76	20	14	370000
Saraswati	CA	TP	RF Kohlikhera	0	30.144	7536	Shisham, Arjun	30	03	36	76	17	00	1115328
	Total			**0**	**56.144**	**14036**								**2077328**
Saraswati	NPV	TP	RF Rewar Rect. No. 51,64	10	0	5000	Suhajna, Amla, Siris, Zaal, A Kikar, Pilkhan, Shisham, Toot, Bar, Beri	29	59	54	76	24	04	1945714
Saraswati	NPV	TP	RF Bichiyan Rect. No. 56	10	0	5000	Shisham, Jamun, Toot, Siriss, Black, Siris White , Arjun, Pikhan, Gullar, Amla, Emly, Neem, Dhak, Kaim, Ritha, Khairi, Bahera, Bel Pathar, Kachnar, Bar, Pipal, Gambhari, Zeel, Simbal	30	00	02	76	25	25	1957111
	Total			**20**	**0**	**10000**								**3902825**
	G. total			**20**	**56.144**	**24036**								**5980153**

Annexure II : Final APO of Territorial Forest Division Kaithal for the year 2013-14

Range		Scheme	Component	Reach	Target allotted		Target achieved		Plants planted	Species	Financial achievement
					Ha	RKM	Ha	RKM			
Kaithal	Deban	CAMA	Ridge	RF Roherian	0	6	0	6	3000	Eucalyptus	198000
Kaithal		CAMA	Ridge	RFKohlikhera rect. No. 14	0	14	0	14	7000	Eucalyptus	462000
Saraswati	Kohlikhera	CAMA	ANR TP	RFkohliKhea	9	0	9	0	2250	Neem 150, Shisham 1800 Lasura 300	154800
Saraswati	Bhanpura	CAMA	ANR TP	RFNauch MP Road	10	0	10	0	2500	Arjun 1700, Lasura 800	172000
Saraswati	Nauch	CAMA	ANR TP	Saraswati Head quarter	1	0	1	0	250	Jamun 150, Toon 50, Kadam 50	172000
	Total				**20**	**20**	**20**	**20**	**15000**		**1004000**

Annexure III : Final APO of CAMPA scheme for the year 2012-13 Community Forest Produce (CFP) Range Kaithal

Range	Scheme	Component	Reach	Phy. Achievement		Plant planted	Species	Financial achievement
				Ha.	RKM			
Kaithal	CAMPA	LTG	KalayatBalu Road KM 0-12 L&R	0	6.5	1,625	Arjun, Papri, Shisham, Draik, Jamun, Siris, Kachnar	1,81,865
Kaithal	CAMPA	LTG	Choushala- JulaniKhera Road KM 0-2 L&R	0	1.5	375	Jamun, Papri, Shisham	36,055
Kaithal	CAMPA	LTG	KharakPandwa to Ramgarh Road Km 0-2 L&R	0	2.0	500	Arjun, Papri, Jamun, Draik	51,996
	Total			**0**	**10**	**2,500**		**2,69,916**

Annexure IV : Final APO of CAMPA scheme for the year 2013-14 Community Forest Produce (CFP) Range

Range	Scheme	Component	Reach	Phy. Achievement		Plants planted	Species	Financial achievement
				Ha	RKM			
Kaithal	CAMPA	LTG	BattaSajuma Road Km 0-3 L&R	0	1.7	420	Amla, Arjun, Shisham	48560
Kaithal	CAMPA	LTG	BattaBrahmniWala Road Km 0-3 L&R	0	1.3	330	Arjun, Shisham	38154
Kaithal	CAMPA	LTG	NarwalGarh Road Km 0-2 L&R	0	1.0	250	Shisham	28905
Kaithal	CAMPA	LTG	DiwalBrahmaniWala Road Km 0-3 L&R	0	3.0	750	Shisham, Pipal	74743
Kaithal	CAMPA	Bio drainage	Village Kalayat	0	0	7554	Clonal Eucalyptus	519362
Kaithal	CAMPA	Bio drainage	Village Choushala	0	0	1446	Clonal Eucalyptus	97659
	Total			**0**	**7**	**10750**		**807383**

Annexure V : List of species/plants used in plantation programme 2012-13 and 2013-14

Sr.No.	Local Name	Botanical Name
1	Arjun	*Terminalia arjuna*
2	Shisham	*Dalbergia sissoo*
3	Draik	*Melia azedarach*
4	Jamun	*Syzygium cumini*
5	Jamoya	*Jamoya* spp.
6	Suhajna	*Moringa oleifera*
7	Amla	*Emblica officinalis*
8	Siris black	*Albizia lebbeck*
9	Zaal	*Saluadora oleojdes*
10	Kikar	*Acacia nilotica*
11	Pilkhan	*Pilkhan* spp.
12	Toot	*Morus alba*
13	Barh	*Ficus bengalensis*
14	Beri	*Zizyphus mauritiana*
15	Gullar	*Ficus glomerata*
16	Emly	*Tamarindus indica*
17	Neem	*Azadirachta indica*
18	Dhak	*Butea monosperma*
19	Kaim	*Kaim* spp.
20	Ritha	*Sapindus mukooresi*
21	Khairi	*Salvadora persica*
22	Behera	*Terminalia belerica*
23	Bel Pathar	*Aeglemar melos*
24	Gambhari	*Gambhari* spp.
25	Pipal	*Ficus religiosa*
26	Simbal	*Bombex ciba*
27	Siris white	*Albizia procera*
28	Shisham	*Dalbergia sissoo*
29	Jamun	*Syzygium cumini*
30	Lasura	*Cordia dichotoma*
31	Siris	*Albizia* spp.
32	Pipal	*Ficus religiasa*
33	Safeda	*Eucalyptus hybrid*
34	Toon	*Toona ciliate*
35	Kadam	*Mitragyna parvifolia*
36	Papri	*Holoptelia integrifolia*
37	Kachnar	*Bauhinia variegate*

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Kurukshetra District (Haryana) under State CAMPA Scheme

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Monitoring & Evaluation of CAMPA Works District Kurukshetra, Haryana

(Plantation year 2012-13 & 2013-14)

Submitted to :

The Principal Chief Conservator of Forests
Department of Forest, Govt. of Haryana
Van Bhawan, Sector-6
Panchkula, Haryana

P. Kaushal
Joginder Tomer
Jagdish Thakur

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried out "Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Kurukshetra District, Haryana". This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.

The Centre express thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Kurukshetra, Haryana State Forest Department and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P. Kaushal
Joginder Tomer
Jagdish Thakur

TABLE OF CONTENTS

CHAPTER-I

1.1 Background of District Kurukshetra, Haryana

The name Kurukshetra is associated in the Puranas and the Great Epic with the legendary Kind Kuru although it appears to be more logical to trace it to the tribe of Kurus which was born as a result of merger of the various classes of the Great Bharatas who are described in the Rigveda as kindling sacrificial fires on the banks of the sacred Saraswati and Drishadvati. The Saraswati is described in the Rigveda as a perennial river par excellence, flowing from the Himalayas to the ocean, most probably it refers to the Ghaggar. The Drishadvati was the river in whose bed the Hansi-Hisar branch of the Western Yamuna Canal now flows. The Kurus were also known to the Rigveda, as the mention of a Kind named Kurushravana indicates.

Kurukshetra shot into prominence as the battle field of Mahabharta and as the birth place of the holy Gita. The great 18-day battle of Mahabharta was fought here in the ancient past between Kauravas and Pandavas for upholding the cause of dharma. It was a war between Kauravas and Pandavas for upholding the cause of dharma. It was a war between good and evil, in which the Pandavas were victorious. Bhagvad Gita, the Song Celestial, is the divine message which Lord Krishna delivered to Arjuna on the eve of the Great War when he saw the latter wavering from his duty. It epitomizes all that is the best and noblest in the Hindu Philosophy of life. Jyotisar, near Thanesar, is supposed to mark the site where it was delivered.

Kurukshetra is mentioned a great deal in ancient literature. A flourishing country of the Kurus, it was the most sacred region of the Dvapara age according to Matsya Purana and one of the sixteen Mahajanapadas of Jambudvipa. It was the region of lakes and lotus beds which can be seen even now.

1.2 Area

The district has an area of 1530 sq. kms. Constituting 3.8 per cent of the total area of the state. The net sown area of Kurukshetra district is 147000 hectare whereas the total cropped area of the district is 271000 hectare. The net area under

irrigation is 147000 hectare. This means that the percentage of net area under irrigation to net area sown in Kurukshetra district is 100 per cent.

1.3 Location

Kurukshetra district lies between latitude 29^0-52' N to 30^0-12' N and longitude 76^0-26' E to 77^0-04' E in the North Eastern part of Haryana state. The district headquarter is located at Kurukshetra town and is about 160 km north of Delhi, 39 kms North of Karnal and 40 kms South of Ambala. It is at a distance of about 6 kms from Pipli, an important road junction on the National Highway No. 1 popularly called the Grand Trunk Road. Kurukshetra Railway Station, also called the Kurukshetra Junction, is located on main Delhi-Ambala Railway line. The other important towns of the district are Pehowa, Shahbad and Ladwa. The district consists of 419 villages.

1.4 Geographical features and configuration of the ground

On the whole, the district is a plain which slopes from North East to South and South West. The plain is remarkable flat and within it, are the narrow low-lying flood plains, known as Betre Khadar of Naili. Saraswati, Markanda and Ghaggar are the important rivers of the region. A good network of canals is providing irrigational facilities. Underground water level is not relatively high. Tubewell irrigation is also common in the district. It is one of the prosperous district from agriculture point of view. The soil generally varies from sandy load to loam.

1.5 Geology, Rock and Soil

Quarternary sediments in this part comprise alluvial and Aeolian sediments. These are unconsolidated and flat. A generalised litho – morphological stratigraphy is given below :

Geological formation	Lithology	Morphological expression
Younger alluvial formation	Medium to coarse gray sand fine micaceous sand with thin cover of dark brown clay	Point bars, channel bars and over bank deposit
Aeloian formation	Grey to brownish, very fine to fine sand	Sandy flats
Older alluvium	Sand, silt clay alternation representing a poly cyclic sequence with or without bedded or nodular kankar	Older alluvial plains

The older alluvial sediments occupy most of the district. Its thickness is about 300 m in Southern part and increase steadily in Northern parts. Deep tubewell data shows that older alluvium comprises six cycles of sedimentation within 300 m depth from surface. Each cycle has a sequence of sand, silt and clay of varying thickness and concretions, the latter being predominant. Younger alluvial sediments are exposed along the channels of Ghaggar and Markanda rivers. Most of the old river now exist as drains. Old channels of Markanda have been used as excess water drainage ways at Jalberha. There is no distinct break between the older and newer sediments.

The older alluvium consists of calcareous deposits, mainly in nodule form, are widely distributed in the district. The new alluvium comprising of younger deposits are light coloured and poor in calcareous matter. These deposits of clay, sand etc are responsible for accumulation of water, mineral contents etc.

1.6 Rocks

Topographically the area is a flat alluvial plain without any conspicuous topographical feature. There is no rocky out crop in the area. Hard rock formation is not traced even in deep drill holes, sunk for installation of tube wells.

1.7 Soil

Tropical Arid Brown Soils are found in the Kurukshetra district. The detail is given below :

a) Tropical Arid Brown Soil : This type of soil occurs in areas having annual rainfall from 750 to 1000 mm and covers the blocks of Thanesar, Ladwa and Pehowa. The group includes the hot and sub humid climatic zone. The soils do not have $CaCO_3$ layer within 1 m. There are some pockets which are poorly drained. The soils are sand loam to loam. Availability of Potassium and Phosphorus are medium and high respectively while availability of Nitrogen is

low to medium in the soil. pH varies from 7.0 m to 8.5 m at several places, posing salinity and sodicity problems.

b) Arid Brown Soil : This type of soil is found in areas where the average rainfall varies from 500 to 750 mm. This soil group falls is hot and semi dry bio-climatic zone. The pH varies from 7.5 to 9.9. Soils are calcareous in nature and $CaCO_3$ nodules occur within a depth of 1.0 m. The texture of the soil varies from sandy loam to loam. Potassium availability in the soil varies from medium to high. Phosphorus availability in the soil is medium and Nitrogen availability varies from low to medium. A special feature of these soils is that the pH is more than 9 and the soil became highly alkaline and is known as Kallar. White to dull white fluty deposit from over the surface. Isolated patches of such deposits are scattered over the district.

1.8 Climate

The climate of the district is of pronounced character i.e. very hot in Summer and markedly cold in winter. It is as high as 45^0C in summer and as low as 3^0C in winter. The climate of the district is characterised by extreme dryness of the air with an intensely hot summer and extremely cold winter. It is only during 3 monsoon months – July, August and September and moist air of oceanic origin penetrates into the district.

1.9 Temperature

The cold season generally starts from about mid November when the temperature begins to decrease rapidly. January is the coldest month with mean daily minimum temperature at about 7^0 C and mean daily maximum at 20^0C. With the passage of western disturbances eastward, cold waves effect the district and the minimum temperature goes down to about a degree or so below freezing point of water. From mid March, the temperature begins to rise rapidly. May and June are hottest months with maximum temperature touching 40^0C. From April, hot westerly winds known as "*Luh*" begins to blow and the weather becomes intensively hot. In May and June, the temperature may go above 45^0C. With the advances of S.W. monsoon towards the end of June, there is a appreciable decline in day temperature

while the night temperature are as high as in summer. During monsoon period, the weather is sultry and unpleasant due to increase in day temperature but night temperature drop rapidly.

1.10 Humidity

The air is generally dry during greater part of the year. During monsoon season, the humidity is generally between 60 to 85 per cent. Humidity decreases in the post monsoon season. April and May are usually the driest months with relative humidities being 20 per cent less in the afternoon.

1.11 Distribution of area

The distribution of forest area of Kurukshetra Forest Division is as under :

Sr.No.	Particulars of the Forest Area	Area (ha)
1.	Reserve Forest	1835.44
2.	Protected Forest (Compact)	30.55
3.	Protected Forest (Strips) a) Rail b) Road c) Canals d) Bundhs	 183.49 1468.77 1323.11 228.72
4.	Unclassed Forest (Strips) a) Roads b) Canals c) Bundhs	 331.67 23.18 43.01
5.	Total Notified Forest Area (ha)	5070.08
6.	Total Unclassed Forest Area (ha)	397.86
7.	Area closed under Section 38 of the IFA	2.00
	Total	5469.94

Note : 1) The area of Strip Forests include the metalled surface of the roads, watercourse of all Canals, Minors, Distributories and Drains.

2) No management plan has been prescribed for areas closed under section 38 of Indian Forest Act, 1927.

CHAPTER-II

2.1 List of Activities undertaken under CAMPA for 2012-13

Annual Plan of Operation under the state CAMPA for the year 2012-13

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	Yes
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	No
IV	Plantation of Tall Plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Saraswati Forest	No
VII	Land reclaimation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services), 19/250 tall plants per tree groves/RKM	Yes
IX	Building for Frontline Staff	No
X	Training of Front Line and Ministerial Staff	No
XI	Capacity Building and Strengthening of Village Level Forestry Institutions	No
XII	Urban Forestry Plantation of Tall Plants in Urban Areas	Yes
XIII	Silt retention dam at Khol-hi-raittan	No
XIV	Crate wire structure at Bir Shaikargah	No
XV	Digging of ponds in Saraswati conservation reserve forests	No
XVI	Deepening of ponds in Bhor Shaidan Crocodile Breeding Centre	No
XVII	Silt retention structure in Amwali Khol of Kalesar wildlife sanctuary	No
XVIII	Crate wire structure Bir Sikargh WLS Behind CC	No
XIX	Protection centre in Nahar Wildlife Sanctury	No
XX	Pasture development in Nahar Wildlife Sanctury	No
XXI	Construction of WHS in M.garh and Rewari	No
	Sukhna Catchment	
XXII	Afforestation	No
XXIII	Land treatment silt retention dam	No
XXIV	Wire crate structure	No

2.2 List of Activities undertaken under CAMPA for 2013-14

Annual Plan of Operation under the state CAMPA for the year 2013-14

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	No
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	No
IV	Plantation of Tall Plantation in linear forests 250 per RKM	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	No
VI	Plantation of Native Species in Kurukshetra Forests and Duloth Forest	No
VII	Land reclamation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services)	Yes
IX	Building for Frontline Staff	No
X	Plantation of Native Species in Jind Bir	No
XI	Plantation of Chaal and Jhingen in Shiwalic Hills	No
	Sukhna Catchment	
XII	Afforestation	No
XIII	Plantation of Bhabar grass	No
XIV	Land treatment by check dams	No
	Construction of crate wire structures	No

2.3 Agencies undertaking plantations and other CAMPA works in the District

Kurukshetra Territorial Forest Division and Community Forestry Project Division (CFP) are the nodal agencies to undertake the plantation work in the district. The Afforestation works were carried out in 3 ranges of two divisions in 8 blocks of the district during 2012-13 and 2013-14.

Sr.No.	Division	Range	Blocks	Beat
1.	Community Forestry Project (CFP)	KKR Kurukshetra Community Range	---	---
2.	Kurukshetra Territorial Forest Division	Thanesar	Jyotisar Thanesar Ladwa Thol	Dhurala Lukhi Jyotisar Pipli Thanesar Babain Kalsana
3.		Pehowa	Ramgarh Seonsar Pehowa Bhourkh	Seonsar Seonsar Tower Ramgarh Barason Bakhli Gumthala East Jalbera Dewana

CHAPTER-III

3.1 Inventory of the plantations

The plantations carried out during 2012-13 and 2013-14 by the Territorial Forest Division, Kurukshetra and Haryana Community Forestry Project (HCFP) are as follows :

3.1.1 List of plantations undertaken by Haryana Community Forestry Project (HCFP), Kurukshetra during 2012-13

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
CFP Range, Kurukshetra	Forest Land	Linear Tree Groves (LTG)	Ishak to Cheeka Rd KM 0-3 L&R viz Plot No. 2	0	5	1250
			Grand Total			

3.1.2 List of plantations undertaken by Haryana Community Forestry Project (HCFP), Kurukshetra during 2013-14

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
CFP Range, Kurukshetra	Forest Land	Linear Tree Groves (LTG)	Jirbadi to Amin Rod	0	6	1500
			Tikri to Jurasi Kalan Rd	0	6	1500
			Ishak to Kakrala Rd	0	8	2000
			Grand Total			**5000**

3.1.3 List of plantations undertaken by Territorial Forest Division, Kurukshetra during 2012-13

Agency/Range	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Thanesar	Forest Land	Ridge Plantation	Thanesar-Jhansa Road Km 12 to 20 L&R	0	14	7000
			Sutlej Yamuna Link KM 21.5 to 24.5 L side	0	7	3500
			Sutlej Yamuna Link KM 29.5 to 33 L side	0	9	4500
		Tall Plantation	Right Bundh RD 0 to 6 L&R	0	7	1750
		Urban Forestry Tall Plantation	SK Road KM 74 to 76 L&R	0	3	750
			Urban Area Thanesar/ Kurukshetra City	0	17	4250
			Sub Total	**0**	**57**	**21750**
Pehowa	Forest Land	Ridge Plantation	RF Seonsar Rect No. 58, 59 & 62	0	10	5000

			RF Seonsar Tower Rect No. 125	0	10	5000
			RF Ramgarh Rect No. 94-95	0	10	5000
			RF Barason Rect. No. 34 and 35	0	10.57	5285
			RF Barason Rect No. 39, 52 & 53	0	10	5000
			RF Barason in Bakhli Beat Rect No. 47, 48, 49, 58 & 59	0	7	3500
			RF Barason in Bakhli Beat Rect No. 57	0	13	6500
			Sub Total	**0**	**70.57**	**35285**
			Grand Total	**0**	**127.57**	**57035**

3.1.4 List of plantations undertaken by Territorial Forest Division, Kurukshetra during 2013-14

Agency/Range	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Thanesar	Forest Land	Tall Plantation	Rakshi Drain	0	10	2500
			Ladwa Babain Road KM 0-12 L&R	0	15	3750
			Shahbad Babain Road KM 10 to 15 L&R	0	5	1250
			Golpura Road KM 0 to 8 L&R and Sulkhani Road KM 2 to 3 L&R	0	5	1250
			Salpani Bhusthala Megha Majra Road KM 0 to 6 L&R Lukhi Bachki Mandi Road KM 0 to end L&R	0	10	2500
			Shahbad Ajrana Road Km 8 to 12 L&R and Ajrana Kalan to Ajrana Khurad Road KM 0 to 2 L&R	0	5	1250
			Sub Total		**50**	**12500**
Pehowa	Forest Land	Tall Plantation	Gumthala Minor RD 0-28 L&R	0	10	2500
			Sarswati Canal RD 25-40 L&R	0	5	1250
			Guledwa to Guldera Road KM 3-7 L&R and Gumthala-Bhagal Road KM 5 to 7 L&R	0	8	2000
			Ambala Hisar Road KM 55 to 60 L&R	0	5	1250
			Markanda Distributory RD 13 to 40 L&R	0	10	2500
			Mohanpur to Kalsa Road KM 0 to 5 L&R and Kagan Wali Link Road KM 0 to 2 L&R and Mohanpur to Sohanpur Road KM 0 to 2 L&R	0	5	1250
			Sub Total	**0**	**43**	**10750**
			Grand Total	**0**	**93**	**23250**

3.2 Species and number of seedlings planted

Total number of plants planted during 2012-13 and 2013-14 under CAMPA scheme in Kurukshetra district are 86535. These plants are of the species of *Eucalyptus, Terminalia arjuna, Melia azedarach, Alestonia, Holoplelia integrofolia, Emblica officinalis, Sizygium cumni* etc.

3.2.1 Species planted by HCFP Division Kurukshetra and Territorial Forest Division, Kurukshetra in Kurukshetra district during 2012-13

Sr.No.	Name of plant	Botanical Name	Total number of Plants	
			HCFP Kurukshetra	Territorial Forest Division, Kurukshetra
1	Kachnar	*Bauhinia variegata*	125	0
2	Silver Oak	*Grevillea robusta*	150	0
3	Alstonia	*Alstonia scholaris*	150	0
4	Bottle Brush	*Clestomon lanceolata*	70	50
5	Toon	*Toona ciliata*	150	750
6	Jamun	*Syzygium cumini*	285	0
7	Drek	*Melia azedarach*	300	1000
8	Amaltash	*Cassia fistula*	20	0
9	Safeda	*Eucalyptus* spp.	0	50285
10	Shisham	*Dalbergia sissoo*	0	1700
11	Ornamental Plants		0	3250
	Total		**1250**	**57035**

3.2.2 Species planted by HCFP Division Kurukshetra and Territorial Forest Division, Kurukshetra in Kurukshetra district during 2013-14

Sr.No.	Name of plant	Botanical Name	Total number of Plants	
			HCFP Kurukshetra	Territorial Forest Division, Kurukshetra
1	Jamoya	*Jamoya* spp.	350	100
2	Arjun	*Terminalia arjuna*	180	1150
3	Kadam	*Anthicephalis indica*	220	500
4	Shisham	*Dalbergia sissoo*	3500	18750
5	Jamun	*Syzygium cumini*	750	0
6	Drek	*Melia azedarach*	0	150
7	Papri	*Holoptelia integrifolia*	0	1150
8	Hathifal	*Kegelia pinnata*	0	150
9	Chakrasia	*Chakrasia* spp.	0	300
10	Amla	*Emblica officinalis*	0	350
11	Toon	*Toona ciliata*	0	650
	Total		5000	23250

CHAPTER-IV

4.1 Information about the Scheme/Project

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Got. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department namely Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within the outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

4.2 Aims and Objectives

State CAMPA shall seed to promote :

a. Conservation protection, regeneration and management of existing natural forests;
b. Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
c. Compensatory Afforestation;
d. Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder and water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
e. Research, training and capacity building

4.3 Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas is mesquite though other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts, excessive grazing and biotic pressure and inappropriate technique of

plantations. The crop is malformed, irregular and open. Middle aged to mature trees of miscellaneous species are largely scattered. The species found are Mesquite Kikar, Safeda, Neem, Bakain, Dhak and Shisham. Natural regeneration of species is poor except for mesquite. Ornamental species present are kigelia, cassia, bottle brush, gulmohar and bougan villea.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practical under rainfed condition, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages to seed people participation at all level of project activities. The project which include Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

4.4 Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations has had an adverse affect on the environment. Now a days it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i) Maintenance of Environmental Stability through preservation and restoration of ecological balance.

ii) Conserving the natural heritage by preserving the remaining natural forests with the vast variety of flora and fauna.

iii) To conserve the existing forest and vegetative cover in the district of Kurukshetra.

iv) To meet the bonafide, domestic requirements of Timber, Fuelwood and Fodder of the local people

v) To improve the growing stock and production capacity of the forests by protection, regeneration and introduction of valuable and fast growing species.

vi) To stock the understocked and bland areas and to increase the percentage of valuable species as far as possible.

vii) To manage the forests scientifically for the maximum sustained yield of timber, fuelwood and other raw material

viii) To provide employment opportunities to the rural people living in the vicinity of these forests.

ix) To improve the habitat of the wildlife in the sanctuary areas.

x) To preserve bio-diversity in block forests

xi) To create a people movement with the involvement of women for achieving the above said objectives.

Assessment of Survival Rate

CHAPTER-V

5.1 Sampling Methodology

Ten per cent of the total area of the plantations under each land category was sampled. Whereas sufficient plantation areas were available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation either plantation of forest land or community land. In case of strip and ridge plantations line samples of 100 m long were taken along roadside and canal side plantations. The samples taken were unbiased and random. In all these sampling units, all the line and dead plants wee separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

Basis of selection of sampling sites

Name of the Division	Agency (Forest range)	Land category	Scheme	Site details		Sites selected for sampling			
				No. of sites	Plants planted	No. of sites	Plants therein	No. of samples taken	Plants sampled
Community Forestry Project (CFP) Division Kurukshetra	Kurukshetra Community Range (KKR)	Forest Land	LTG Linear Tree Groves	4	6250	3	4750	19	475
Territorial Forest Division Kurukshetra	Thanesar	Forest Land	Ridge plantation	3	15000	2	10500	21	1050
	Thanesar	Forest Land	Tall plantation	9	19250	4	9250	37	925
	Pehowa	Forest Land	Ridge plantation	7	50285	3	13785	28	1378
	Pehowa	Forest Land	Tall plantation	6	10750	3	5750	23	575

Assessment of Survival Rate

6.0 Results Plantation 2012-13

The results of the survival study of the tree plantation raised by the various agencies in Kurukshetra district of Haryana in 2012-13 are tabulated below:

6.1.0 Linear Tree Groves (2012-13)

6.1.1 Number of sampling units and survival percentage in Kurukshetra Community Range (KKR) under Community Forestry Project (CFP) Division during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Ishak to Cheeka Rd KM 0-3 L&R, Via Plot No. 2	LTG Linear Tree Grooves	Area = 5 RKM Nos. of plants = 1250 Species = Kachnar, Silver Oak, Alestonia, Bottle Brush, Tun, Jamun, Drake, Amaltash	1 2 3 4 5	89.6 92.8 85.6 87.2 83.8	87.8

6.2.0 Ridge Plantation (2012-13)

6.2.1 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Thanesar-Jhansa Road KM 12-20 L&R	Ridge Plantation	Areas =14 RKM No of plants = 7000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14	65.5 67.2 62.8 59.6 72.8 74.8 76.2 64.6 78.4 68.6 69.2 68.6 72.2 76.4	69.77

6.2.2 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Syl KM 21.5 to 24.5 L side	Ridge Plantation	Areas =7RKM No of plants = 3500 Species = Eucalyptus	1 2 3 4 5 6 7	92.8 94.2 96.6 95.8 90.6 91.6 92.8	93.48

6.2.3 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
RF Seonsar Tower Rect No. 125	Ridge Plantation	Areas =10 RKM No of plants = 5000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10	92.8 94.2 91.2 90.5 88.2 88.8 89.2 92.8 86.4 87.6	90.17

6.2.4 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
RF Barason Rect No. 34, 35	Ridge Plantation	Areas =10.57 RKM No of plants = 5285 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11	89.5 87.6 92.2 91.5 86.6 89.2 88.8 90.2 92.6 84.2 86.8	89.01

6.2.5 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
RF Barason in Bakhli Beat Rect No. 47, 48, 49, 58, 59	Ridge Plantation	Areas =7 RKM No of plants = 3500 Species = Eucalyptus	1 2 3 4 5 6 7	87.2 84.4 88.2 82.5 86.2 82.8 81.6	84.7

6.3.0 Tall Plantation (2012-13)

6.3.1 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2012-13

Site	Scheme	Site details	Sample No	Survival	Average
Right Bundh RD 0 to 6 L&R	CAMPA Tall Plantation	Areas =7RKM No of plants = 1750 Species = Toon and Drek	1 2 3 4 5 6 7	74.2 72.4 68.5 66.2 75.6 74.8 70.2	71.7

Assessment of Survival Rate

CHAPTER-VII

7.0 Results Plantation 2013-14

The results of the survival study of the tree plantation raised by the various agencies in Kurukshetra district of Haryana in 2013-14 are tabulated below:

7.1.0 Linear Tree Groves (2012-13)

7.1.1 Number of sampling units and survival percentage in Kurukshetra Community Range (KKR) under Community Forestry Project (CFP) Division during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Ishak to Kakrala Rd	LTG Linear Tree Grooves	Area = 8 RKM Nos. of plants = 2000 Species = Shisham	1 2 3 4 5 6 7 8	88.8 84.5 90.6 86.4 83.4 84.2 82.6 82.2	85.3

7.1.2 Number of sampling units and survival percentage in Kurukshetra Community Range (KKR) under Community Forestry Project (CFP) Division during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Tikri to Jurasi Kalan Rd	LTG Linear Tree Grooves	Area = 6 RKM Nos. of plants = 1500 Species = Shisham	1 2 3 4 5 6	88.6 89.2 91.8 93.4 86.6 85.5	90.4

7.2.0 Tall Plantation (2013-14)

7.2.1 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Rakshi Drain	Tall Plants (TP)	Areas =10 RKM No of plants = 2500 Species = Shisham	1 2 3 4 5 6 7 8 9 10	92.2 84.8 88.6 86.4 88.2 84.6 89.2 84.2 86.2 90.8	87.52

7.2.2 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Ladwa Babain Road KM 0 to 12 L&R	Tall Plants (TP)	Areas =15 RKM No of plants = 3750 Species = Shisham	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	65.5 64.5 67.2 74.8 78.2 76.4 69.8 66.2 64.8 76.2 79.2 68.8 67.2 68.6 72.6	72.6

7.2.3 Number of sampling units and survival percentage in Thanesar Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Shahbad Babain Road KM 10 to 15 L&R	Tall Plants (TP)	Areas =5 RKM No of plants = 1250 Species = Shisham	1 2 3 4 5	68.8 65.6 74.4 72.6 75.6	71.4

7.2.4 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Guledwa to Guldera Road KM 3 to 7 L&R and Gumthala Bhagal Road KM 5 to 7 L&R	Tall Plantation (TP)	Areas =8 RKM No of plants = 2000 Species = Shisham Beating up Arjun, Papri, Amla	1 2 3 4 5 6 7 8	72.6 74.2 68.8 64.2 66.8 71.2 76.2 65.6	69.95

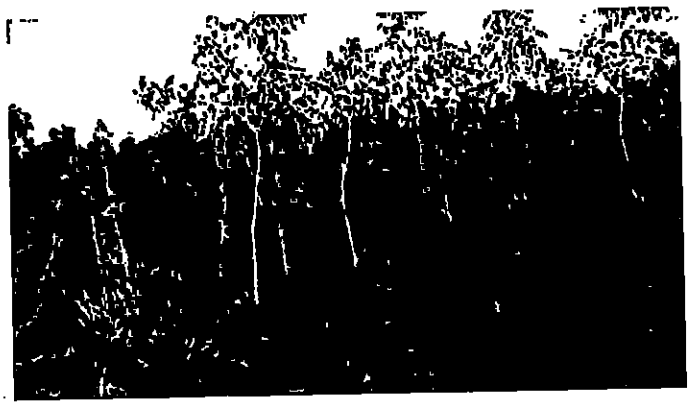
7.2.5 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Markhanda Distributory RD 13 to 40 L&R	Tall Plantation (TP)	Areas =10 RKM No of plants = 2500 Species = Shisham, Papri, Chakrasia, Amla, Toon	1 2 3 4 5 6 7 8 9 10	68.2 61.8 64.5 72.2 74.8 69.2 68.8 66.6 70.2 71.8	68.81

7.2.6 Number of sampling units and survival percentage in Pehowa Forest Range under the Territorial Forest Division Kurukshetra during 2013-14

Site	Scheme	Site details	Sample No	Survival	Average
Mohanpur to Kalsa road KM 0 to 5 L&R and Kagan Wali link road KM 0 to 2 L&R Mohanpur to Sohanpur Road KM 0 to 2 L&R	Tall Plantation (TP)	Areas =5 RKM No of plants = 1250 Species = Shisham	1 2 3 4 5	62.8 64.2 66.5 68.8 67.2	65.9

Successful Plantation



8.0 Analysis of Results

The overall survival rate of tree plantation in Ambala district of Haryana during 2012-13 and 2013-14 are tabulated below :

8.0.1 : Survival rate of plantation in Forest Land (2012-13)

Land category	Agency	Scheme	No of sample Taken	Average Survival in %
Forest Land	Community Kurukshetra Range (KKR)	Linear Tree Groves	19	87.83
	Thanesar	Ridge + Tall Plantation	58	77.74
	Pehowa	Ridge + Tall Plantation	51	77.75

8.0.2 : Survival rate of plantation in Forest Land under Community Forestry Project (2012-13)

Land category	Agency	Scheme	No of sample Taken	Average (%)	Overall Survival in %
Forest Land	Community Forestry Project Division, Kurukshetra	Linear Tree Groves	5	87.8	87.8

8.0.3 : Survival rate of plantation in Forest Land under Community Forestry Project (2013-14)

Land category	Agency	Scheme	No of sample Taken	Average (%)	Overall Survival in %
Forest Land	Community Forestry Project Division, Kurukshetra	Linear Tree Groves	14	87.85	87.85

8.0.4 : Survival rate of plantation in Forest Land under Territorial Forest Division, Kurukshetra (2012-13)

Land category	Agency	Scheme	No of sample Taken	Average (%)	Overall Survival in %
Forest Land	Territorial Forest Division, Kurukshetra	Ridge Plantation	49	85.42	78.56
		Tall Plantation	7	71.7	

8.0.5 : Survival rate of plantation in Forest Land under Territorial Forest Division, Kurukshetra (2013-14)

Land category	Agency	Scheme	No of sample Taken	Average (%)	Overall Survival in %
Forest Land	Territorial Forest Division, Kurukshetra	Tall Plantation	53	87.72	87.72

8.1 Summary of the Result

8.1.1 Table showing survival under different administrative systems irrespective of land use (2012-13)

Sr.No.	Administrative System		Overall Survival (%)
1	**Territorial Forest**		83
	a) Thaneshwar Forest Range	77.6	
	b) Pehowa Forest Range	87.9	
2	**Community Forest**		88
	a) Kurukshetra Community Forestry Range	87.8	

8.1.2 Table showing survival under different topographic/land use/planting system situations (2012-13)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Ridge Plantation	a) Jhansa Road KM 12-20 L&R	69.7	85
		b) SYL KM 21.5-24.5 L Side	93.4	
		c) RF Seonsar Tawer Rect No. 125	90.1	
		d) RF Barosan Rect. No. 34-35	89.0	
		e) RD Barasan in Bakhli Beat Rect 47,48,49,58,59	84.7	
2	Tall Plantation	Right Bundh RD 0 to 6 L&R	71.7	71

8.1.3 Table showing survival under different Administrative systems irrespective of land use 2013-14

Sr.No.	Administrative System		Overall Survival (%)
1	**Territorial Forest**		
	a) Thaneshwar Forest Range	72.6	70
	b) Pehowa Forest Range	68.2	
2	**Community Forest** Kurukshetra Community Forestry Range	87.8	88

8.1.4 Table showing survival under different topographic/land use/planting system situations (2013-14)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	Tall Plantation	a) Rakshi Drain	87.5	73
		b) Ladwa Babin Road KM 0-12 L&R	72.6	
		c) Shahbad Babin Road KM 10-15	71.4	
		d) Guledwa to Guldera Road KM 3-7 L&R and Gumthala Bhagal Road KM 5-7 L&R	69.9	
		e) Markhanda Distributory RD 13 to 40 L&R	68.8	
		f) Mohanpur to Kalsa road KM 0 to 5 L&R and Kagan Wali link road KM 0 to 2 L&R Mohanpur to Sohanpur Road KM 0 to 2 L&R	65.9	

Afforestation Awareness Programme
(through Nukkar Sabha)

Departmental Nursery

CHAPTER-IX

9.0 Conclusion and Suggestions

9.1 Comment on survival rates

Performance of the plantation is variable, depending upon various factors such as soil depth, texture and structure; climate and edaphic factors; the quality of planting stock and the maintenance of plantations.

Overall survival percentage with respect to different ranges are 87.83 per cent, 77.75 per cent and 77.74 per cent for Kurukshetra Community Range, Pehowa and Thanesar ranges, respectively. Kurukshetra Community Range range has highest survival percentage of 87.83 per cent whereas, survival was observed lowest (77.74%) for Thanesar range. The survival percentage was found to be satisfactory in plantations raised in reserved forests irrespective of the different schemes. However, the maximum (93.48%) survival percentage was observed in Sutlej Yamuna Link (SYL) KM 21.5 to 24.5 L Side site of Thanesar range in under afforestation scheme of CAMPA, whereas, minimum of 65.90 per cent survival percentage was recorded in the tall plantation at site Mohanpur to Kalsa Road 0 to 5 L&R and kangan Wali link road KM 0 to 2 L&R in Pehowa Forest Range.

Plantation along road side and railway side in ridges and tall plantation were also having good survival percentage. Most of the plantation in ridge were done in Pehowa forest range where survival varied from 90.17 to 84.70 per cent. Where as in case of Tall Plantation most of the plantations were done in Thanesar Forest Range where survival varies from 87.52 to 71.70 per cent.

In Kurukshetra district 245.57 RKM area was planted with 86535 number of seedlings of various species during 2012-13 and 2013-14. The survival percentage was good in Community Forestry Project as compared to reserve forest and protected forest where there is less biotic interference. The plantations have been well established where the area is covered out. The survival rate was observed lower in areas where maintenance could not be done. The area along road side and railway side is prone to grazing and browsing which has resulted in lower survival

percentage. The fire incidence at all the forest ranges has resulted in less survival percentage. Flood hazards have also shown impact on survival percentage in some sites. Weed growth, in few sites has also suppressed the growth of the seedlings. The overall survival rate is good in Kurukshetra district.

9.2 People's Participation

Peoples are actively involved in Afforestation programme. Local peoples are engaged for Afforestation activity and for watch and ward. People get grass from the forest in reward to maintenance and care of the plantation area. They are avoiding grazing in the forest area. This participation has helped in establishment and survival of plant species. Social fencing and people's participation in combating the fire has enhanced sense of belonging of forest resource.

9.3 Choice of species and condition of planting stock

Considering the edaphic, climatic and ecological conditions of the plantation areas, the choice of species is good which suit to the conditions. However, the condition of planting stock at planting can not be judged at this stage.

9.4 Maintenance of records

The plantation register have been well maintained with all plantations.

9.5 Project constraints

It was observed that there was regular flow of funds in CAMPA schemes. Low wages norms are also the constraints of the project.

9.6 Suggestions for improvement and recommendations

To increase the economic gain from low volume high value cash crop i.e. Medicinal and Aromatic plants. In order to improve the performance of the plantation the following suggestions are made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in ridge and tall plantations along road side and railway sides

- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.
- To increase the forest cover through afforestation activities, involve the local communities.
- The concept of social forestry and strip plantation should be increased in the project area.

9.7 Technological points

- Vigorous seedlings should be planted. Poor planting stock should be discouraged.
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Tending operations should be done timely.
- Root trainers technology to raise the nursery stock can be adopted.
- Temporary nursery under CAMPA scheme near plantation site should be established.

9.8 Administrative points

- Maintenance of plantations should be done for more than three years, if possible.
- Adequate women representation should be there in the village forest committees.
- Villagers should be provided incentives for maintenance of the plantations.
- Administrative decisions should be taken timely for seed procurement, nursery raising, plantation and other operations at concerned levels.
- As most of the project area falls under rainfed conditions, trench planting techniques should be adopted for better survival of plantations.

Annexure-I : Final APO State CAMPA for the year 2012-13 (Forest Division : Community Forestry Range, Kurukshetra)

Sr. No.	Name of Scheme/ Component	Name of Range	Name of Block	Name of Beat	Name of Site	Nature of Soil	Nature of Plantation Kallar Ridge/Normal	Kind of plantation clear felling new plantation	Target achievement (Ha)		Species	Total No. of Plants	Spacing	Expenditure	
									Ha	Nos.				2012-13	2013-14
1	LTG	KKR Range			Ishak to Cheeka Rd KM 0-3 L&R via Plot No. 2 (2012-13)	Alkali	Normal	New	0	5	Jamun Jamoya Daink Amaltash Kachnar Silver Oak Alestonia Bottle Brush Tun	285 300 20 125 150 150 70 150	4x4	121175	22233
								Total		5		1250			

Annexure-II : Final APO State CAMPA for the year 2013-14 (Forest Division : Community Forestry Range, Kurukshetra)

Sr. No.	Name of Scheme/ Component	Name of Range	Name of Block	Name of Beat	Name of Site	Nature of Plantation Kallar Ridge/ Normal	Kind of plantation clear felling new plantation	Target achievement (Ha)		Species	Total No. of Plants	Expenditure	
								Ha	Nos.			2012-13	2013-14
1	LTG	KKR Range	Thanesar	Pipli	Jirbardi to Ameen Road KM 0 to 5 L&R	Normal		0	6	Jamun Jamoya Arjun Kadam	750 350 180 220	196181	64745
							Total		6		1500		
2	LTG	KKR Range	Borakh	Jalbhera	Tikri to Jurasi Road KM 0 to 3.72 L&R	Normal		0	6	Shisham	1500	203254	74641
3	LTG	KKR Range	Borakh	Diwana	Ishak to Kakrala Road KM 0 to 4.5 L&R	Normal		0	8	Shisham	2000	254279	112429

Annexure-III : Actual expenditure of State CAMPA Kurukshetra Forest Division for the year 2012-13

Sr.No.	Sub Detailed Head	Original	Amount Released	Previous	Current	Total
	17 Minor Works					
	CA					
1	Ridge Plantation (100.57 RKM) 500 plants per RKM	3243684	3243684	3243684	0	3243684
2	Tall Plants (7 RKM) 250 plants per RKM	259518	259518	259518	0	259518
	Total CA	**3503202**	**3503202**	**3503202**	**0**	**3503202**
	NPV					
	Urban Forestry					
1	Tall Plants (20 RKM) 250 plants per RKM	1313000	1313000	700000	613000	1313000
	Total CA	**1313000**	**1313000**	**700000**	**613000**	**1313000**
	Total 17 Minor Works	**4816202**	**4816202**	**4203202**	**613000**	**4816202**
	18 Maints					
1	Ridge Plantation (55.87 RKM) 500 plants per RKM (2011-12)	307955	307955	307955	0	307955
2	ANR (40 Ha) 2011-12)	66800	66800	66800	0	66800
3	TP (10 RKM) 2011-12	90000	90000	90000	0	90000
4	Ridge (13 RKM) 2011-12)	54600	54600	54600	0	54600
5	Tall Plantation (12.19 RKM) 2010-11	56485	56485	56485	0	56485
6	Ridge Plantation (60 RKM) 2012-11	126660	126660	126660	0	126660
7	ANR (50 Ha) 2010-11	0	0	0	0	0
8	TP (50 RKM) 2010-11	100000	100000	100000	0	100000
	Total 18 Maints	**802500**	**802500**	**802500**	**0**	**802500**
	G. Total	**5618702**	**5618702**	**5005702**	**613000**	**5618702**

Annexure-IV : Actual expenditure of State CAMPA Kurukshetra Forest Division for the year 2013-14

Sr. No.	Component	Fund released upto previous year	Fund released during the year	Total fund	Expenditure previous year	Expenditure during current year	Total expenditure	Physical target fixed	Physical target achieved
	CA								
	17 Minor Works								
1	Tall Plants (92.8 RKM)	3526400	0	3526400	2589199	937201	3526400	92.8	92.8
2	Raised of Tall Plants	8215000	0	8215000	0	821500	8215000	0.0	0.0
	Total CA 17 Minor Works	**4347900**	**0**	**4347900**	2589199	**1758701**	**4347900**	**92.8**	**92.8**
	18 Maints								
	2012-13								
1	Ridge Plantation (100.57 RKM) 500 plants per RKM	554342	0	554342	418420	135922	554342	0	0
2	Tall Plants (7 RKM) 250 plants per RKM	74487	0	74487	74487	0	74487	0	0
	2011-12								
1	Ridge Plantation (55.87 RKM) 500 plants per RKM (2011-12)	117942	0	117942	117942	0	117942	0	0
	18 Maints	746771	0	746771	610849	135922	746771	0	0
	Total CA	5094671	0	5094671	3200048	1894623	5094671	92.8	92.8
	NPV								
	17 Minor Works								
1	Native Species (10 ha)	3138000	0	3138000	249200	603600	852800	10	0
	Total 17 Minor Works	**3138000**	**0**	**3138000**	**249200**	**603600**	**852800**	**10**	**0**
	18 Maints								
	2012-13								
	Urban Forestry								
1	Tall Plants (20 RKM) 250 plants per RKM	180000	0	180000	180000	0	180000	0	0
	2011-12								
	ANR (40 ha) 2011-12	0	0	0	0	0	0	0	0
	TP (10 RKM) 2011-12	20000	0	20000	20000	0	20000	0	0
	Ridge (13 RKM) 2011-12	26000	0	26000	26000	0	26000	0	0
	Total 18 Maints	**226000**	**0**	**226000**	**226000**	**0**	**226000**	**0**	**0**
	G. Total	**3364000**	**0**	**3364000**	**475200**	**603600**	**1078800**	**10**	**0**
		8458671	**0**	**8458671**	**3675248**	**2498223**	**6173471**	**102.8**	**92.80**

Annexure-V : APO CAMPA for the year 2012-13 (Forest Division : Community Forest Division, Kurukshetra)

Sr. No	Name of Scheme Component	Name of Range	Name of Site	GPS Point		Nature of Soil	Nature of Plantation Kallar Ridge/Normal	Kind of Plantation clear felling new plantation	Target achievement (ha)		Species	Total no of Plants	Spacing
				Latitude	Longitude				Ha	No.			
1	LTG	KKR Range	Ishak t Cheeka Rd KM 0-3 L&R Via Plot No. 2	30°5`24.32	"76°40`2.60	Alkali	Normal	New	0	5	Jamun Jamoya Daink Amaltash Kachnar Silver Oak Alestonia Botle Brush Tun	285 300 20 125 150 150 70 150	4x4
							Total			5	1250		

Annexure-VI : APO CAMPA for the year 2013-14 (Forest Division : Community Forest Division, Kurukshetra)

Sr. No	Type of Land (Forest/Non Forest Land)	Name of Scheme Component	Name of Range	Name of Block	Name of Beat	Name of Site	GPS Point		Target achievement (ha)		Spacing	Species	Total no of Plants
							Latitude	Longitude	Ha	No.			
1	Forest Land	LTG	KKR Range	Thanesar	Pipli	Jirbardi to Ameen Road KM 0 to 5 L&R	29°55`47.0"N 29°55`31.0"N 29°54`42.8"N	76°53'46.7E 76°53'8.2E 76°52'36.4E	0	6	4x4	Jamun Jamoya Arjun Kadam	750 350 180 220
							Total		0	6			1500
2	Forest Land			Borakh	Jalbhera	Tikri to Jurasi Road KM 0 to 3.72 L&R	30°01`31.530"N	76°36'35.740E	0	6	4x4	Shisham	1500
3	Forest Land			Borakh	Diwana	Ishak to Kakrala Road KM 0 to 4.5 L&R	30°01`26.1"N	76°28'46.3E	0	8	4x4	Shisham	2000
						Total			0	14			3500
						Grand Total			0	20			5000

Annexure-VII : APO of CAMPA for the year 2012-13 of Kuruksheta Forest Division, Kurukshetra

Range	Block	Beat	Scheme/ compo-nent	Reach & Location	Target		No. of Plants	Species	Location			
					RKM	ha.			Starting point		End point	
									Longitudinal (N)	Latitude(E)	Longitudinal (N)	Latitude(E)
Thanesar	Jyotisar	Dhurala	CA-Ridge	Thanesar-Jhansa road 12-20 L&R	14	0	7000	Eucalyptus	76°49'22.8	30 00'04.3	076 47'27.7	30 03'48.2
Thanesar	Jyotisar	Dhurala	CA-Ridge	SYL 21.5-24.5 Km L/Side	7	0	3500	Eucalyptus	76°43'46.703	"30 8'33.927	076 45'14.109	"30 3' 53.178
Thanesar	Jyotisar	Lukhi	CA-Ridge	SYL 29.5-34 Km L/Side	9	0	4500	Eucalyptus	76°45' 14.109	"30 3'53.178	076 46' 53.932	"29 57'43.179
			Total		30	0	15000					
Pehowa	Ramgarh	Seonsar	CA-Ridge	RF Seonsar Rect. No. 58,59,62	10	0	5000	Eucalyptus	76°28' 31.2	"29 58'27.2	076 28' 21.4	29 58'"18.7
Pehowa	Ramgarh	Seonsar tower	CA-Ridge	RF Seonsar Tower Rect. No. 125	10	0	5000	Eucalyptus	76°28'44.6	"29 58'20.3	076 28'22.2	29 58'24.6
Pehowa	Ramgarh	Ramgarh	CA-Ridge	RFBarason Rect. No. 34,35	10.57	0	5285	Eucalyptus				
Pehowa	Seonsar	Barason	CA-Ridge	RF Barason Rect. No. 94,85	10	0	5000	Eucalyptus	76°31'15.8	"29 58'48.6	076 31'16.4	29 58'40.1
Pehowa	Seonsar	Barason	CA-Ridge	RF Barason Rect. No. 34,35	7	0	3500	Eucalyptus	76°31'15.8	"29 58'48.6	076 31'16.4	29 58'40.1
Pehowa	Seonsar	Bakhli	CA-Ridge	RF Barason Rect. No. 39,52,53	13	0	6500	Eucalyptus	76°31'12.4	"29 58'15.7	076 31'18.8	"29 58'16.2
Pehowa	Seonsar	Bakhli	CA-Ridge	RF Barason in Bakhli Beat Rect. No. 47-49,58-59	10	0	0	Eucalyptus	76°31'12.4	"29 58'15.7	076 31'18.8	"29 58'16.2
			Total		70.57	0	30285					
Thanesar	Jyotisar	Jyotisar	CA-TP	Right Bundh 0-6 RD L&R	7	0	1750	Toon, 750 Drek, 1000	76°44' 2.470	"29 58'03.920	076 44' 02.470	"29 58'03.920"
			Total		7	0	1750					
Thanesar	Thanesar	Pipli	NPV-TP	SK Road 74-76 km L&R	3	0	750	Bottal bush 50, Shisham 700	76° 58'30.099	"29 59'16.123	76 55"52.281	29 59'54.116
Thanesar	Thanesar	Thanesar	NPV-TP	Urban area Thanesar/ Kurukshetra city	17	0	4250	Shisham 1000 Ornamental 3250	29°"57'19.600"N	"76 47'31.406E	29"57'19.600"N	76 47'31.406E"
			Total		20	0		5000				

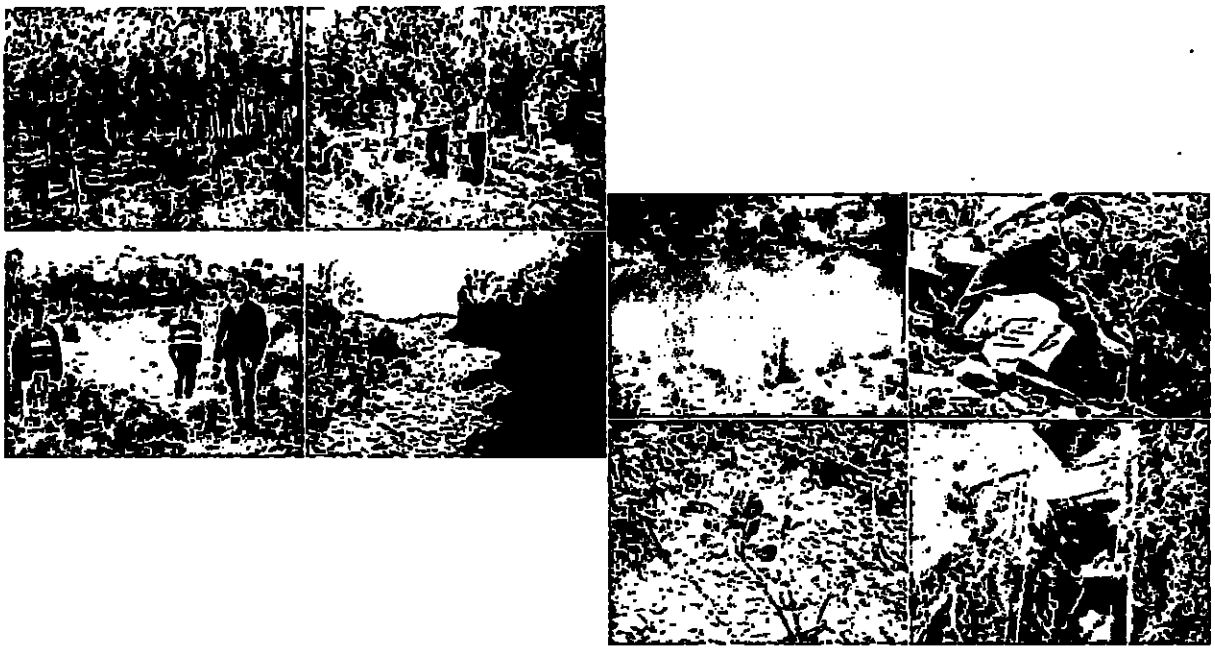
Annexure-VIII : APO of CAMPA for the year 2013-14 of Kurukshetra Forest Division, Kurukshetra

Range	Block	Beat	Scheme/ component	Location	GPS Coordinates		Target		Plant Planted	Species
					Latitude	Longitude	RKM	Ha.		
Thanesar	Thanesar	Pipli	CA TP	Rakshi drain	29 57'43.436	77 02'49.337	10	0	2500	Shisham 2500
Thanesar	Ladwa	Babain	CA TP	Ladwababain road 0-2 km L&R	30 02'28.612	77 00'56.945	15	0	3750	Shisham 3750
Thanesar	Ladwa	Babain	CA TP	Shahbadbabain road 10-15 km L&R	30 10'15.617	76 53'29.510	5	0	1250	Shisham 1250
Thanesar	Thol	Kalsana	CA TP	Golpura road 0-8 km L&R &Sulkhani road 2-3 km L&R	30 10'52.738	76 55'51.588	5	0	1250	Shisham 1250
Thanesar	Jyotisar	Dhurala	CA TP	SalpanibhusthalameghaMajra road 0-6 km L&R, LukhiBachkiMandi road 0- end km L&R	30 04'31.640	76 43'07.080	10	0	2500	Shisham 2500
Thanesar	Jyotisar	Dhurala	CA TP	Shahbadajrana road 8-12 km L&R &Ajranakalan to Ajranakhurad road 0-2 km L&R	30 10'32.238	76 48'54.485	5	0	1250	Shisham 500 Kadam 500 Toon 250
			Total				50	0	12500	
Pehowa	Pehowa	Gumthala east	CA TP	Gumthala Minor 0-28 RD L&R	29 57.534	76 42.662	10	0	2500	Deak 150, Jamoa 100, Shisham 2250
Pehowa	Pehowa	Gumthala east	CA TP	Sarswati Canal 25-40 RD L&R	29 56.643	76 30.933	5	0	1250	Shisham 1250
Pehowa	Pehowa	Gumthala east	CA TP	Guledwa to Guldera Road 3-7 km L&R and Gumthala-Bhagal road 5-7 km L&R	29 56.814	76 31.547	8	0	2000	Shisham 2000
Pehowa	Pehowa	Gumthala east	CA TP	AmbalaHisar road 55-60 km L&R	30 03.510	76 39.035	5	0	1250	Arjun 1000, Papri 100, Kajelia 150
Pehowa	Bhourkh	Jalbera	CA TP	MarkhandaDistrbutry 13 -40 RD L&R	30 52432	7640260	10	0	2500	Shisham 500, Papri 1000, Chakrasia 300 Awal 300, Toon 400
Pehowa	Bhourkh	Dewana	CA TP	Mohanpur to Kalsa road 0-5 km I&R&Kaganwali link road 0-2 km L&R and Mohanpur to Sohanpur road 0-2 km L&R	30 05.687	76 28.441	5	0	1250	Shisham 1250
			Total				43	0	10750	
			Total CA				93	0	23250	

Annexure-IX : List of species/plants used in plantation programme 2012-13 and 2013-14

Sr.No.	Name of plant	Botanical Name
1	Kachnar	*Bauhinia variegata*
2	Silver Oak	*Grevillea robusta*
3	Alstonia	*Alstonia scholaris*
4	Bottle Brush	*Clestomon lanceolata*
5	Toon	*Toona ciliata*
6	Jamun	*Syzygium cumini*
7	Drek	*Melia azedarach*
8	Amaltash	*Cassia fistula*
9	Safeda	*Eucalyptus* spp.
10	Shisham	*Dalbergia sissoo*
11	Ornamental Plants	
12	Jamoya	*Jamoya* spp.
13	Arjun	*Terminalia arjuna*
14	Kadam	*Anthocephaius indica*
15	Papri	*Holoptelia integrifolia*
16	Hathiphal	*Keglia pinnata*
17	Chakrasia	*Chakrasia* spp.
18	Amla	*Emblica officinalis*

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Panchkula District (Haryana) under State CAMPA Scheme



Regional Centre

National Afforestation and Eco-Development Board

(Ministry of Environment and Forests, GoI)

Dr YS Parmar University of Horticulture and Forestry

Nauni, Solan (H.P.) 173 230

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Panchkula District (Haryana) under State CAMPA Scheme

P. Kaushal
Dinesh Sharma
Sarwan Kumar

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried out the ***Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Panchkula District (Haryana) under State CAMPA Scheme*** *in Panchkula district (Haryana). This report is the outcome of the sincere efforts of members of the research team who are associated with the preparation of this report.*

We are thankful to the Haryana State Forest Department, Divisional Forest Officer, Panchkula and Community Forestry Project, Range Officer Raipur Rani for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P Kaushal
Regional Director/Coordinator

CONTENTS

CHAPTER-I

Background Panchkula District (Haryana)

The state of Haryana has an area of 42212 sq. km. 82 per cent of which is under cultivation. Recorded forest area is about 1685 sq. km. which is about 3.8 per cent of the total area of the state, where as per capita forest cover is only 0.013 ha. About 40 per cent of the forest area is concentrated in the Shivaliks, lying in the Panchkula, Ambala and Panchkuladistricts.

Panchkula districts has an area of 816.15 sq. km out of which 381.66 sq. km. comes under protected and reserved forests which is about 46.7 per cent of the total area of district. Whole area of Morni-Pinjore forest division falls under district Panchkula. The boundary of the district touches the boundaries of Punjab and Himachal Pradesh.

Geographical Location

The area is comprised of plain tract and part of Shivalik hills. Geographically the area is situated between 30^0 27'to 30^0 55'N latitude $76^0$47' to $77^0$11' E. The elevation varies from 370 m to 1570 m above mean sea level. Higher hills are located in the northern and eastern part of the tract while low hills found on the southern and western part of the tract. The "Morni Hills" commonly known as "Kotaha" are off shoots of Shiwalik ranges of Nahan and run to two parallel ranges from South-East to North-West. The hills are characterized by relatively high intensity of erosion of various forms like torrent and land slips. There are deep ravines and vertical cuts. The northern part of Morni hills drains into Ghaggar and Southern part into Tangri and Markanda streams which ultimately join Ghaggar river in the plain. Other area forms the catchment of the Ghaggar, the Kaushalya, the Jhajra, the Sirsa and the Sukhna rivulets. Most of them are seasonal torrents. The area is mostly drained by small rivulets, which are dry except in the rainy season. The only important torrential river is Ghaggar, which flows in the zig-zag course traveling south-west wards, then nearly west and finally turning south near

Chandigarh. The Ghaggar and its tributaries have built up many river terraces, which form a striking feature of the topography of the region. These graded terraces occur at different elevations. The highest terrace has been recorded at Mandhana at 750 m height.

Geology and soil types

Geologically, the entire area falls in the Shivalik system. Shivalik system takes its name from the Shivalik hills of Haridwar region between Ganga and the Yamuna rivers. In Haryana, it extends continuously along the foot of Himalayas from Panchkuladistrict in the east of Panchkula district in the west. The Shivalik system is made up of sand stones, grits, conglomerates, pseudo conglomerates, clay and silt having the characters of alluvial deposits of torrential streams and floods in shallow fresh water basins. The Shivaliks have been involved in the later phases of Himalayan orogeny, find them often folded, faulted, over trusted and lying at steep angles against other formations. Mineral resources are found as clay bands of 1 to 10 m thickness occur in the shivalik rocks. These have been explored in Kona Nala (Morni-hills). These are calcareous, have very little detrital material and can be used for the manufacture of tiles, bricks, pans and post.

Soil

Mostly the soils are sandy, However, sandy loam, loamy sand and silt loam soils are also found. The pH of the soil varies from 6.7 to 8.11. Water holding capacity of the soil is good. Alluvial and co-alluvial soils are predominates in the valleys. Soils are generally dry because of excessive surface run-off. Soils are deficient in humus contents. However, soils are fairly fertile and suitable for raising forest crops in the entire area. Availability of potash and phosphorus in the soil is medium to high. Soils are rich in nitrogen contents. Salt concentration in the soil is also within the permissible limit so far as the raising of tree crops is concerned.

Climate

Generally, the climate of the area is subtropical but the higher elevations are comparatively cooler. The minimum temperature varies from 2^0C to 3^0C and

maximum ranges from 20^0C to 40^0C. Months of December and January are the coldest and May and June are the hottest. The annual rainfall varies from 350 mm to 1200 mm. About 50 to 70 per cent of the total rainfall occurs during the monsoon season and winter showers are also not uncommon. Showers and hails storms are experienced in April also. Snowfall occurs very rarely in high hills of Banasar above 1400 meters elevation but does not stay for long. Frost is common in valleys lower down. The rainfall is minimum in the month of October and November. Relative humidity in the area generally remains very high. The relative humidity is low during the months of April, May and June and loss of water through transpiration is more. Despite of good annual rainfall, the water supply is very erratic. During rains the torrents bring plenty of fresh flood which are intermittent and lost in a short duration after the rain is over.

Background of CAMPA in Haryana

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilizing funds received towards Compensatory Afforestation (CA), Net Present Value (NPV), etc. currently available with the Adhoc CAMPA. The State CAMPA in Haryana was created in the year 2 010 vide notification No. 5330-Ft-409/511 dated 18-1-2010.

CHAPTER-II

Information About The Scheme/Project

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

Aims and Objectives

State CAMPA shall seed to promote :

i. Conservation protection, regeneration and management of existing natural forests;

ii. Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;

iii. Compensatory Afforestation;

iv. Environmental services, which includes :

a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.

b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.

c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.

d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.

- Research, training and capacity building

Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia procera, Delonix regia, Cassia siames, Melia azadirach, Terminalia arjuna* etc. However, the distribution depends upon the edaphic factor, although other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja*

(Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas. Poor people earn their livelihood by selling products of domestic animals, like milk, meat and wool. They keep large herds of cattle. It has resulted in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing, therefore, grazing by cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon weather conditions and incidence of grazing and browsing. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire. Generally, it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practiced under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages seeking people participation at all level of project activities. The project which includes Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value

- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations have an adverse effect on the environment. Now a day it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i. To conserve and extend the existing forest and vegetative cover in the district of Ambala for soil and moisture conservation and to preserve the natural biodiversity.

ii. To improve the growing stock by protection, regeneration and planning of local indigenous species.

iii. To conserve the forest habitats critical to biodiversity and protection of ecosystem.

iv. To protect the wildlife by providing them shelter and food.

v. To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.

vi. To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.

vii. To provide employment opportunities to the rural people living in the vicinity of these forests.

viii. To encourage the plantation and sustainable harvesting of NTFPs.

ix. To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

CHAPTER-III

List of activities undertaken under CAMPA scheme for the year 2012-13

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Plantation of native species in Saraswati forest	No
vii.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	No
viii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	No
ix.	Buildings for frontline staff	Yes
x.	Training of frontline and ministerial staff	No
xi.	Capacity building and strengthening of village level forestry institution	No
xii.	Urban forestry plantation of tall plants in Urban areas	No
xiii.	Silt retention dam at Khol-hi-raittan	No
xiv.	Crate wire structure at Bir Shikargah	No
xv.	Digging of ponds in Sarswati conservation reserve forests	No
xvi.	Deepeining of ponds in Bhor Shaidan Crocodile breeding centre	No
xvii.	Silt retention structure in Amwali khol of Kalesar wildlife sanctuary	No
xviii.	Crate wire structure Bir sikargh WLS behind VCC	No
xix.	Protection centre in Nahar wildlife sanctuary	No
xx.	Pasture development in Nahar wildlife sanctuary	No
xxi.	Construction of WHS in Mohinder garh and Rewari	No
	Sukhna Catchment	
xxii.	Afforestation	Yes
xxiii.	Land treatment silt retention Dam	Yes
xxiv.	Wire crate structure	Yes

List of activities undertaken under CAMPA scheme for the year 2013-14

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
vii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	Yes
viii.	Buildings for frontline staff	Yes
ix.	Plantation of native species in Jind bir	No
x.	Plantation of Chaal & Jhingen in Shiwalic hills	Yes
	Sukhna Catchment	
xi.	Afforestation	Yes
xii.	Planation of bhabar grass	Yes
xiii.	Land treatment silt retention Dam	Yes
xiv.	Construction of crate wire structure	Yes

Agencies Undertaking Plantations and other CAMPA works in the District

In Panchkula district, there are two agencies namely Territorial Forestry Division, Morni Hills, Pinjore and Community Forestry Project (CFP) range of Raipur Rani of Ambala Community Forestry Project Division who have undertaken the Afforestation and soil conservation activities. The Afforestation work, soil conservation for the treatment of Sukhna catchment and maintenance of fire lines were carried out by Morni Forest Division in five ranges i.e. Pinjore, Kalka, Panchkula, Morni and Raipur Rani. The Community Forestry Project Range Raipur Rani has carried out the soil and moisture conservation works only under state CAMPA scheme

Inventory of the plantations

The plantations carried out during 2012-13 and 2013-14 by the Territorial Forest Division Morni Hill (Pinjore) are as follows :

List of plantation during 2012-13

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Territorial Forest Division Morni Hills, Pinjore	Govt. land	Net Present Value (NPV)				
		Tall plants in Linear Forest	Ambala Kalka Road NH 53-54		10	2500
			NH No. 22		15	3750
			Mata Mansa Devi Complex		3	750
			Ayush office Panchkuola		1	250
			Commando Training Centre Complex		1	250
			Nada R-70-C1		10	2500
			Burj Kotla R70-C5		25	6250
			Nada Forest PF		25	6250
			Nada R70C1		25	6250
			Birgarh PF		25	6250
			Toka Sabilpur Link Road L/R		13.	3250
			Sub total		**153**	**38250**
		Ridge Plantation	Kot Section 5		50	25000
			Begna Nadi		15	7500
			Run Nadi		22.5	11250
			Kamredi Ka Khola		8.5	4250
			Gular Wali		4	2000
			Sub total		**100**	**50000**
		Added Natural Regeneration (ANR)	Burj Kotlan R70C5		20	4000
			Sub total		**20**	**4000**
		Compensatory Afforestation Scheme				
		Ridge Plantation	Birgarh PF		10	5000
			Kambala C58		5	2500
			Thadlan C58		5	2500
			Sub total		**20.**	**10000**
		Tall Plantation	DP-226 Thani Ki Ser		4	1000
			Dera Mahri Area		4	1000
			R71C6		8	2000

			Sub total		**16**	**4000**
		Tall Plantation	DP 235		10	2500
			Mirpur Bakshiwala		10	2500
			Thana Badyal Road		20	5000
			Bagroli Jodi to Barisher Road		12	3000
			Sub total		**52**	**13000**

List of plantation during 2013-14

Agency	Land category	Scheme	No. of sites	Area		Plants planted
				Ha	RKM	
Territorial Forest Division Morni Hills, Pinjore	Govt. Land	NPV (ANR)	Samlehri	15		3000
			Kambala C57	15		3000
			Kambala C 68	20		4000
			Sub total	**50**		**10000**
		ANR Additional Target	Bakshiwala PF	30		6000
			R69, C11	20		4000
			Sub total	**50**		**10000**
		ANR	Khetpurali C93	25		5000
			Nadla Forest	25		5000
			Sub total	**50**		**10000**
			C No. 149	12.5		2500
			C No. 196	12.5		2500
			C No. 89	12.5		2500
			C No. 173	12.5		2500
			Sub total	**50.0**		**10000**
			C-3	30		6000
			C-150	20		4000
			C-50	12		2400
			C-30	12		2400
			C-32	15		3000
			C-36	16		3200
			C-80	10		2000
			C-71	10		2000
			C-56	15		3000
			C-72	10		2000
			Sub total	**150**		**30000**
		ANR Additional Target	C-19		10	2500
			C-161		5	1250
			C-50		6	1500
			C-30		5	1250
			C-31		4	1000
			C-36		5	1250
			C-80		4	1000

			C-71		3	750
			C-56		4	1000
			C-72		4	1000
			Sub total		**50**	**12500**
			R-70 C-1		10	2500
			Kot Sec-5		10	2500
			Assrewali PF		30	7500
			C-99		20	5000
			C-101		10	2500
			C-94		20	5000
			Sub total		**100**	**25000**
		Jhingan/ Chhal (660 plants/ha)	C-89	6		3960
			Sub total	**6**		**3960**
		Afforestation (1100 plants/ha)	R-71C-1	30		33000
			R-71C-2	70		77000
			Sub total	**100**		**11000**

Treatment of Sukhna Catchment during 2012-13 and 2013-14 under CAMPA Net Present Value (NPV)

Activity	Location	Unit	Target	Plants planted
Plantation	Surajpur R-71, C-2	Ha	25	27500
	Dhamala R-71, C-3	Ha	25	27500
	Dhamala R-71, C-4	Ha	50	55000
Bhabbar Planting	Surajpur R-71, C-2	Ha	25	1000000
	Dhamala R-71, C-3	Ha	25	1000000
	Dhamala R-71, C-4	Ha	50	2000000
Agave planting	Surajpur R-71, C-2	No.		25000
	Dhamala R-71, C-3	No.		10000
	Dhamala R-71, C-4	No.		15000
Ipomea planting	Surajpur R-71, C-2	No.		55000
	Dhamala R-71, C-3	No.		80000
	Dhamala R-71, C-4	No.		115000
Construction of Check Dams	Dhamala R-71, C-4	CUM	1435.5	
Construction of crate wire structure	Dhamala R-71, C-3	CUM	192	
Construction of silt detention dam	Dhamala R-71, C-4	No.	1	

Maintenance of fire lines during 2012-13 and 2013-14

Sr.No.	Location
1	Lohrandi to Neemwali BP
2	Kona R-71 C-9 to R-71 C-10
3	Nanakpur Kahiwala to R71 C-7 and 8
4	Surajpur Devi to UT area
5	Dhamala Lohgarh to UT area
6	Muvas to Ashrewali
7	Ashrewali to Mandhana beat
8	Berwala to Ashrewali
9	Ashrewali to TBRL
10	Berwala to TBRL
11	Ridge to Morni road

Soil and Moisture Conservation (Cement Structure) in Community Forestry Project (2012-13 and 2013-14)

Sr.No.	Location	Unit	Target
1	Pani Wali Khali Kaimbwala	M^3	150.27
2	Sukhi Wali Khali Kaimbwala	M^3	135.19
3	Anjan Wali Khali Banswala	M^3	154.1
4	Bandhre ka Khala Rana	M^3	115.77
5	Sen Wala Khala-1 Dhadeon	M^3	136.78
6	Sen Wala Khala-2 Dhadeon	M^3	165.02
7	Sukha Wala Khala Bheriwala	M^3	180.26
8	Turon Khali Turon	M^3	135.43
	Total		**1172.82**

Species and number of seedlings planted

Total number of plants planted during 2012-13 under CAMPA in Panchkula district are 119250. These plants are of the species of *Eucalyptus* spp., *Terminalia arjuna, Tectona grandis, Ficus religiosa, Melia azedarach, Grevillea robusta, Alestonia, Holoptelia integrifolia, Dendrocalamus, Emblica officinalis, Terminalia bellerica, Sizygium cumni* etc.

Number of plants of different species planted during 2013-14 in district Panchkula

Sr.No.	Name of plant	Botanical Name	Total number of Plants
1.	Teak	*Tectona grandis*	17680
2.	Khair	*Acacia catechu*	9500
3.	Papri	*Holoptelia integrifolia*	31786
4.	Shisham	*Dalbergia sissoo*	7605
5.	Dek	*Melia azedarach*	950
6.	Bamboo	*Dendrocalamus strictus*	4500
7.	Kachnar	*Bauhinia variegata*	4970
8.	Toon	*Toona ciliata*	17674
9.	Amla	*Emblica officinalis*	46391
10.	Kadam	*Anthocephaius indica*	995
11.	Imli	*Tamarandus* spp.	30548
12.	Arjun	*Terminalia arjuna*	11800
13.	Gular	*Ficus glomerata*	205
14.	Jamun	*Syzygium cumini*	7121
15.	Chir	*Pinus roxburghii*	5000
16.	Mango	*Mangifera indica*	282
17.	Chakrasia	*Chakrasia* spp.	110
18.	Silver Oak	*Grevillea robusta*	722
19.	Others		23621
	Total		**221460**

CHAPTER-V

Budget Details

The budget details of CAMPA scheme in Panchkulaforest division for the year 2012-13 and 2013-14 are as under :

Budget Detail (CAMPA) Community Forest Range Panchkula, 2012-13

Sr. No.	Structure Name	Use	Dimension	Budget
1	C.S.M.S. Sukha Khalla Behri Wala Dam	For Soil conservation works	Base=10m Top=15m Height=4m	374540
2	C.S.M.S. Turoan Kholi	-do-	Base=8m Top=13m Height=3.5m	284070
3	C.S.M.S. Sonwala Khalla Dam No. 1	-do-	Base=6m Top=14m Height=3.5m	285990
4	C.S.M.S. Sarswati Khalla Dam No. 2	-do-	Base=8m Top=15m Height=4m	343650
5	C.S.M.S. Bandhra Khalla Rana Dam	-do-	Base=6m Top=10m Height=3.5m	242770
6	C.S.M.S. Pani Wali Kholi Kambala Dam	-do-	Base=8m Top=13m Height=4m	312740
7	C.S.M.S. Sukhowali Khalli Kambola Dam	-do-	Base=8m Top=13m Height=3.5m	283970
8	C.S.M.S. Anjan Wali Kholi Banswala Dam	-do-	Base=8m Top=14m Height=4m	321840

Budget Detail (CAMPA) Community Forest Range Panchkula, 2013-14

Sr. No.	Structure Name	Use	Budget	Remarks
1	W.H.S. Dhandioan	Irrigation, wild fire, Recharge of water, soil conservation	915000	Repair of dam
2	W.H.S. Kambala	-do-	353084	Repair of dam
3	W.H.S. Rana	-do-	259126	Repair of dam
4	W.H.S. Barswala	-do-	245000	Repair of dam
5	W.H.S. Bhesiwola	-do-	233300	Repair of dam
6	W.H.S. Turoan	-do-	300000	Repair of dam
7	Batour Nursery Tube Well and Room (12'x12'x10 ½')	For raising and monitoring of plants in nursery	300000	New work

CHAPTER-VI

Sampling Methodology

10 per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantations areas was available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants wee separately counted, recorded and survival percentage was calculated.

The basis of selection of sampling sites

Year	Agency	Land category	Scheme	Site details		Site selected for sampling			
				No. of site	Plant planted	No. of sites	Plants there in	No. of sample taken	Plant sampled
2012-13	Territorial forest division Panchkula	Govt. land	CAMPA TP linear plantation	11	38250	2	6250	25	625
	-	-	CAMPA Ridge	5	50000	1	7500	15	750
	-	-	CAMPA ANR	1	4000	1	2000	10	200
	-	-	CAMPA ANR Additional	1	33000	1	33000	30	3300
2013-14	Territorial forest division Panchkula	Govt. land	CAMPA ANR additional	2	10000	1	4000	20	400
-	-	-	CAMPA ANR	2	10000	1	5000	20	500
-	-	-	CAMPA ANR C-149	4	10000	1	2500	12	250
-	-	-	CAMPA NPV (ANR)	3	1000	1	4000	20	400
	Total			**29**	**156250**	**9**	**64250**	**152**	**6425**

CHAPTER-VI

Results

The results showing the survival percentage of plantation carried out in Panchkula district during the year 2012-13 and 2013-14 are given below :

Number of sampling units and survival percentage in Pinjore Forest Range during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Ambala Kalka Road (NHW) 53-54	NPV Linear plantation	Areas =10 RKm No of plants = 2500 Species = Shisham, Bottle brush, Silver oak, Amla	1 2 3 4 5 6 7 8 9 10	72.00 80.00 60.00 56.00 76.00 64.00 52.00 48.00 80.00 72.00	66.00

Number of sampling units and survival percentage in Pinjore Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
R-69-C-11 Mallah	NPV (ANR)	Areas =20 ha No of plants = 4000 Species = Amla, Jamun, Silver oak, Toon, Arjun	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	65.00 60.00 55.00 50.00 45.00 30.00 80.00 65.00 75.00 65.00 55.00 45.00 50.00 80.00 55.00 65.00 65.00 70.00 45.00 65.00	59.25

Number of sampling units and survival percentage in Kalka Forest Range during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
R71C1 Surajpur	Afforestation	Areas = 30 ha No of plants = 33000 Species = Hathiphal, Arjun, Imli, Khair, Amla	1	77.25	
			2	66.00	
			3	73.22	
			4	52.10	
			5	44.55	
			6	77.10	
			7	62.70	
			8	53.10	
			9	42.40	
			10	45.00	
			11	48.00	
			12	77.25	
			13	85.20	
			14	77.10	
			15	75.40	63.82
			16	59.10	
			17	89.50	
			18	35.00	
			19	76.00	
			20	68.30	
			21	62.50	
			22	55.10	
			23	58.20	
			24	60.10	
			25	59.70	
			26	40.50	
			27	80.70	
			28	75.10	
			29	62.80	
			30	65.80	

Number of sampling units and survival percentage in Panchkula Forest Range during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
NHW No. 22	NPV Tall Plantation in linear forest	Areas = 15 RKM No of plants = 3750 Species = Hathiphal, Kadam, Toona, Kachnar and Shisham	1	84.00	
			2	88.00	
			3	64.00	
			4	72.00	
			5	56.00	
			6	76.00	
			7	52.00	70.66
			8	92.00	
			9	60.00	
			10	72.00	
			11	76.00	
			12	84.00	
			13	48.00	
			14	64.00	
			15	72.00	

Number of sampling units and survival percentage in Panchkula Forest Range during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
R-70C5 Burjkotla	NPV ANR	Areas = 10 ha No of plants = 2000 Species = Imli, Jamun, Papari, Teak	1 2 3 4 5 6 7 8 9 10	85.00 70.00 65.00 75.00 45.00 45.00 60.00 75.00 55.00 70.00	64.50

Number of sampling units and survival percentage in Panchkula Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Kot Section-5	ANR Tall Plantation	Areas = 10 RKM No of plants = 2500 Species = Chakrasia, Champa, Kadam, Arjun and Mango	1 2 3 4 5 6 7 8 9 10	74.00 68.00 56.00 84.00 72.00 80.00 84.00 76.00 84.00 80.00	77.80

Number of sampling units and survival percentage in Panchkula Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
C-94 Khetpurali	ANR Tall plants	Areas = 20 RKM No of plants = 5000 Species = Papri, Teak, Dek, Arjun and Toona	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	72.00 74.00 60.00 64.00 60.00 84.00 80.00 76.00 80.00 76.00 80.00 84.00 60.00 60.00 52.00 76.00 86.00 52.00 84.00 72.00	71.60

Number of sampling units and survival percentage in Morni Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
C No. 149 Sherla	NPV (ANR)	Areas = 12.5 Ha No of plants = 2500 Species = Chir	1 2 3 4 5 6 7 8 9 10 11 12	75.00 65.00 85.00 45.00 60.00 90.00 95.00 80.00 65.00 50.00 60.00 45.00	67.91

Number of sampling units and survival percentage in Morni Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
C No. 173 Bhuri	NPV (ANR)	Areas = 12.5 ha No of plants = 2500 Species = Chir	1 2 3 4 5 6 7 8 9 10 11 12	85.00 75.00 65.00 55.00 70.00 75.00 65.00 75.00 65.00 70.00 75.00 85.00	71.67

Number of sampling units and survival percentage in Raipur Rani Forest Range during 2012-13

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Begna Nadi	NPV Ridge Plantation	Areas = 15 RKM No of plants = 7500 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	62.00 84.00 92.00 80.00 84.00 90.00 70.00 76.00 46.00 82.00 80.00 74.00 70.00 78.00 86.00	77.46

Number of sampling units and survival percentage in Raipur Rani Forest Range during 2013-14

Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
C 68 Kambala	NPV (ANR)	Areas = 20 Ha No of plants = 4000 Species = Teak, Khair	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	75.00 75.00 65.00 70.00 85.00 85.00 80.00 65.00 60.00 65.00 75.00 65.00 85.00 75.00 65.00 75.00 75.00 80.00 65.00 80.00	73.25

Chapter-VIII

Analysis of Results

The overall survival rate of tree plantation in Panchkula district of Haryana during 2012-13 and 2013-14 are tabulated below :

(2012-13)

Agency	Land category	Scheme	No. of sample taken	Average survival (%)	Overall survival (%)
Morni Hill Forest Division, Pinjore	Govt. Land	NPV Tall Plantation	10	66.00	68.49
		Afforestation	30	63.82	
		NPV Tall Plantation	15	70.66	
		NPV ANR	10	64.50	
		NPV Ridge Plantation	15	77.46	

(2013-14)

Agency	Land category	Scheme	No. of sample taken	Average survival (%)	Overall survival (%)
Morni Hill Forest Division, Pinjore	Govt. Land	NPV ANR	20.0	59.25	70.25
		ANR Tall Plantation	10.0	77.80	
		ANR Tall Plantation	20.0	71.60	
		ANR	12.5	67.91	
		ANR	12.5	71.67	
		ANR	20.0	73.25	

Treatment of Sukhna Catchment

Various activities like plantation, bhabbar planting, agave planting, ipomea planting; construction of check dams, construction of crate wire structure and construction of silt detention dams (SDD) are the part of treatment of Sukhna catchment.

Number of sampling units and survival percentage in Sukhna catchment of Kalka Forest Division

Site	Scheme	Site detail	Sample No	Survival (%)	Average (%)
Dhamla R-71-C3	NPV Treatment of Sukhna Catchment	Area=25 ha No. of plants=22500 Species .: Prospis, Khair, Kikkar, papri	1	71.08	
			2	69.86	
			3	72.28	
			4	71.08	
			5	75.15	
			6	73.49	
			7	77.29	
			8	75.15	
			9	71.08	
			10	69.86	
			11	68.67	
			12	73.49	76.60
			13	71.08	
			14	69.87	
			15	77.29	
			16	74.69	
			17	72.28	
			18	75.90	
			19	75.90	
			20	72.28	
			21	92.73	
			22	95.45	
			23	77.29	
			24	96.38	
			25	95.45	

Bhabbar grass plantation has been carried out in 100 ha with 4,00,000 number of tufts to check the soil erosion. Survival and growth of the bhabbar grass was found to be good. The average survival rate was between 60-70 per cent. Agave and Ipomea planting was carried out in three sites viz. Surajpur R-71-C2,

Dhamla R-71-C3 and Dhamala R-71-C4. These are planted near the crate wire structure along the streams. The survival is good with good growth.

Construction of check dams and crate wire structures were physically verified during field visits in Dhamala 12-71-C4 and Dhamala R-71, C3 locations. A silt detention dam was constructed at a cost of Rs. 22,6,000 at Dhamala R-71, C4 with latitude 30° 48'66.8" N and 76° 52'18.1" E longitude.

Maintenance of Fire Lines

Fire lines were maintained during 2012-13 and 2013-14 in Kalka and Panchkula Forest Range of the Morni Hill Forest Division, Pinjore under CAMPA (NPV). Two fire lines were randomly selected and were visited for inspection. First, Kona R-71, C9 to R-71, C-10 and second Nanakpur Kahiwala to R-71, C7&8 were physically inspected. The maintenance work include grass cutting, bush cutting and uprooting of weeds from 2 m wide strips. The spade work was also seen which has cleared the fire line from any combustible materials. However, no incidence of fire was reported from last two years in the areas where fire lines are existing.

Soil and Moisture Conservation (Construction of Cement Structure) NPV

Implementing Agency : Community Forestry Project Ambala
Range : Raipur Rani

Soil and moisture conservation works were carried out by the community Forestry Project Ambala. The Raipur Rani Range of the Community Forestry Project has carried out works in the Panchkula district under CAMPA scheme.

Water harvesting structures (WHS) at Dhandeon was repaired and spillway was also constructed. This amounted to the cost of Rs. 9,15,000 for irrigation, recharge of water and soil conservation. It also supports the wildlife of the area.

Cement stone masonry structure (CSMS) at Senwala Khala-I and Senwala Khala-2 Dhadeon of Raipur Rai Range were visited and physically verified. Cement stone masonry structure Senwala Khala-I has dimension of Bottom=6m, Top=14m, Height=3.5m which has been constructed at the cost of Rs. 2,85,990. The Cement stone masonry structure Senwala Khalla-2 was constructed with the dimension of Bottom=8m, top=15m, height=4m and which cost Rs. 3,43,650/-. These cement stone masonry structures were constructed to present the soil erosion and to reduce the flow of water. Community Forestry Project has also constructed a tube well house for irrigating the nearby nursery.

CHAPTER-IX

Conclusion and Suggestions

Comment on survival rates

Performance of the plantation is variable, depending upon various factors such as soil depth, soil texture and soil structure. Climate and edaphic factors, the quality of planting stock and the maintenance of plantations are also responsible for the survival.

The overall survival of the plantations of 2012-13 in CAMPA scheme was found to be 68.49 per cent in Panchkula district. The highest (77.46%) survival was observed in NPV ridge plantations of the site Begana Nadi of Raipur Rani Range. The lowest (63.82%) survival was observed for compensatory Afforestation scheme in the site R-71,C1 Surajpur of Kalka Forest Range. NHW22 plantation site of linear tree plantation of tall plants recorded 70.66 per cent of survival in Panchkula Range. The survival rate was low in the block forest as there was high biotic pressure and infestation of weeds.

The plantation raised in 2013-14 recorded overall survival rate of 70.25 per cent. This is greater than the overall survival recorded for the year 2012-13. Kot section 5 of Panchkula Range of the Morni Hill Forest Division had highest (77.80%) survival rate followed by C-68 Kambala (73.25%) in Raipur Rani Forest Range and 71.67 per cent for C173 Bhuri site in Morni Forest Range. The lowest (59.25%) survival was observed in site R-69C-11 Mallah of ANR in Pinjore Range.

The plantation carried out for the treatment of Sukhna catchment recorded average survival rate of 76.60 per cent. The Agae, Bhabbar and Ipomea plantation had also good survival. The fire lines were cleared from weeds and the soil and water conservation works were also found to be satisfactory.

Choice of species and condition of planting stocks

Considering the edaphic, climatic and ecological conditions of the plantation areas, the choice of species is good which suit to the conditions. But, it is too late to judge the condition of planting stock.

Maintenance of records

The plantation register have been well maintained with all plantation information.

Suggestions for improvement and recommendations

In order to improve the performance of the plantation the following suggestions have been made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in strip plantations along road side
- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.

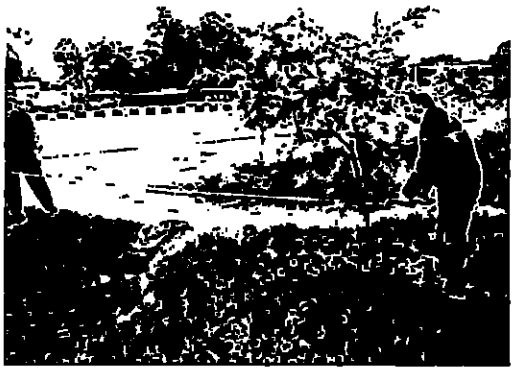
Technological points

- Vigorous seedlings should be planted. Poorly grown seedlings should be culled and destroyed so that they could not be planted in any circumstances
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Tending operations should be done timely.

Administrative points

- Plantation raised should be maintained for more than three years
- Villagers should be provided incentives for maintenance of the plantations.
- Administrative decisions should be taken timely for seed procurement, nursery raising, plantation and other operations at concerned levels.
- There should be smooth flow of funds

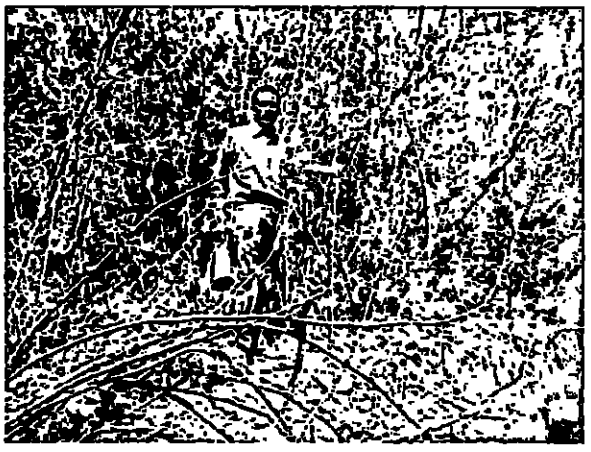
Assessment of Survival Rate (Linear Plantation)



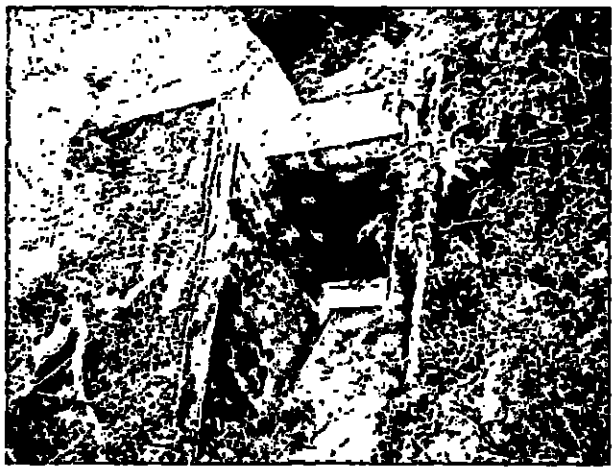
Assessment of Survival Rate (Block Plantation)

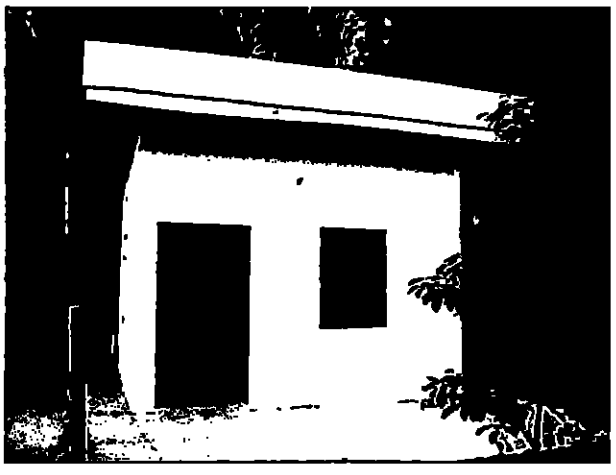
Assessment of Survival Rate (Ridge Plantation)

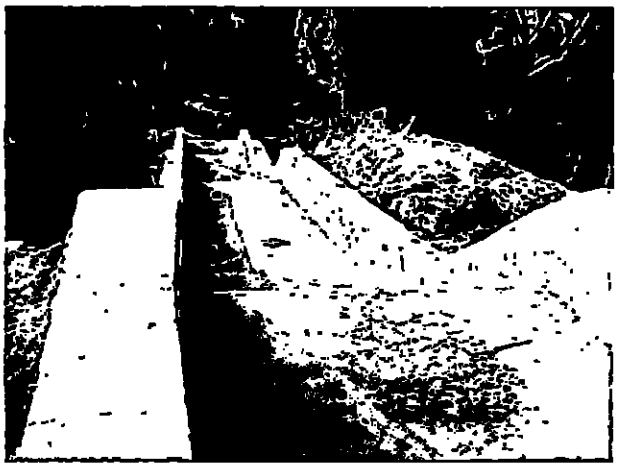
Treatment of Sukhna Catchment



Soil Conservation & other activities by CFP, Ambala Range Raipur Rani







Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Yamuna Nagar District (Haryana) under State CAMPA Scheme

Regional Centre

National Afforestation and Eco-Development Board

(Ministry of Environment and Forests, GoI)

Dr YS Parmar University of Horticulture and Forestry

Nauni, Solan (H.P.) 173 230

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Yamuna Nagar District (Haryana) under State CAMPA Scheme

P. Kaushal
Dinesh Sharma
Sarwan Kumar

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried out the ***Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Yamuna Nagar District (Haryana) under State CAMPA Scheme*** *. This report is the outcome of the sincere efforts of members of the research team who are associated with preparation of this report.*

We are thankful to the Haryana State Forest Department, Divisional Forest Officer, Yamuna Nagar and Range Officer Community Forestry Project, Yamuna Nagar for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P.Kaushal
Dinesh Sharma
Sarwan Kumar

Contents

CHAPTER-I

District Background

Geographical Location: The district of Yamuna Nagar in Haryana is situated between 30^0 to $30^030'$ N latitude and $77^045'$ E longitude having geographical area of 1756 km^2 which falls in the Yamuna and Markanda watershed. There is Uttrakhand to its eastern side and Himachal Pradesh to the north. The district of Ambala is to its West and districts of Kurukshetra and Karnal toward south. Whole area of the Territorial Forest Division Yamuna Nagar falls in this district. Yamuna Nagar is famous for wood based industries and peoples are involved in forest/wood based activities.

Soil type description : The district has variable geology. It is made up of sand stone, conglomerate, clay and silts. The area is mainly composed of tertiary sediments forming low parallel ridges with south facing escarpments. The southwest slopes are gentle but deeply incised by multiple ravines. The northeast slopes are steep, though, less deeply incised. The low lying upper Shiwalik hills present an amphitheater like panorama from a distance. The formation is comprised of regularly bonded alternating layers of grey, dull grey, fine grained sand stone and variegated clays of red, pink, grey and yellow colours. The lower formation exhibits thick strata of inter-bedded clays and sandstone. The outer range of hills consists mainly of a soft, massive and grayish white sand rock inter-bedded with subordinate orange and pinkish clays.

The soils are sandy to silt loam with pH varying from 6-7 to 8.1, deficient in humus with medium to high potash and phosphorus content. Water holding capacity of the soils varies from poor to good but they are generally dry because of excessive surface runoff. Moreover, due to their largely unconsolidated nature, the soils are extremely erodable.

Climate

The tract has subtropical climate. The average rainfall varies from 716 to 1897 mm with centre of variance of 25.6 %. The monsoon shower is received from last week of June to second week of October. The maximum rainfall is recorded in July and August. In winter some amount of rainfall also occur due to western disturbances.

Showers and hailstones are also experienced in April. The rainfall pattern is erratic in intensity, duration and recurrence. A large amount of rain is lost through surface run-off. The area also experience drought on average cycle of once in five year. The summers are hot, dry and windy with temperature rising up to 43^0C during summer months i.e. May, June, Winters are cold with temperature sometime lower down to 2-3^0C in January. The occurrence of frost is common in the area.

Agencies undertaking plantations in the district : In Yamuna Nagar district, there are two agencies namely Territorial Forestry Division, Yamuna Nagar and Community Forestry Project (CFP) range of Yamuna Nagar Range of Kurukshetra Community Forestry Project Division. The Afforestation work and soil conservation was carried out by Yamuna Nagar Forest Division in four ranges i.e. Kalesar, Kalasia, Sadhaura and Jagadhri. The Community Forestry Project Range Yamuna Nagar has carried out the plantation works only.

Background of CAMPA in Haryana

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilizing funds received towards Compensatory Afforestation (CA), Net Present Value (NPV), etc. currently available with the Ad-hoc CAMPA. The State CAMPA in Haryana was created in the year 2 010 vide notification No. 5330-Ft-409/511 dated 18-1-2010.

Aims and Objectives

State CAMPA shall seek to promote :

a. Conservation protection, regeneration and management of existing natural forests;
b. Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
c. Compensatory Afforestation;
d. Environmental services, which includes :

a. Provision of goods such as wood, non-timber forest products, fuel, fodder and water and provision of services such as grazing, tourism, wildlife protection and life support.
b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.

e. Research, training and capacity building

CHAPTER-II

Agencies Undertaking Plantations and other CAMPA works in the District

In Yamuna Nagar district, there are two agencies namely Territorial Forest Division, Yamuna Nagar and Community Forest Project (CFP), Kurukshetra's Range Yamuna Nagar who have undertaken the afforestation work. The Territorial Forest Division have afforestated the area under CAMPA in four ranges i.e. Kalesar, Kalsia, Sadhaura and Jagdhari.

Sr.No.	Range	Blocks
1	Kalesar	Kalesar, Khizrabad, Khillanwalla and Tajewala
2	Sadhaura	Bilaspur and Sadhaura
3	Kalsia	Chhachhrauli
4	Jagadhari	Jagadhari and Yamuna Nagar

CHAPTER-III

Inventory of Plantations

The plantation raised by the various agencies during 2012-13 and 2013-14 in Yamuna Nagar district are as follows :

List of plantation carried out by Territorial Forest Division, Yamuna Nagar during 2012-13

Range	Scheme	Name of sites	Area		Plants planted
			Ha	RKM	
Kalesar	CAMPA ridge plantation	Mandewala PF		17	8500
	ANR	Khizri section 4&5	6		1200
	ANR	Kanni Line	6.5		1300
Kisla	Ridge plantation	Balachaur PF		14.58	7265
	Ridge plantation	Jaidhar Tapu PF		10	5000
	ANR	Balachaur PF	7.5		1500
Sadhaura	Ridge plantation	Sandhai		12	6000
	Tall Plantation	Ramgarh Sawai		5.18	1295
Jagdhari	Tall Plantation	Dadupur Nalvi Canal		4	1000
	Tall Plantation	Gulab Nagar Pabni Road 0 to 6		1	250
	Tall Plantation	Damla TC		4	1000
			20	67.76	34310

List of plantation carried out by Territorial Forest Division, Yamuna Nagar during 2013-14

Range	Scheme	Name of sites	Area		Plants planted
			Ha	RKM	
Kalesar	ANR	R1J Kalesar C-2	20		4000
Jagdhari	Tall Plantation	Mehra Ghilour road 0-6		10	2500
Sadhaura	Tall Plantation	Sandhai		10	2500
			20	20	9000

Community Forestry Project (CFP)

The plantation raised by the Community Forestry Project Division Kurukshetra Range Yamuna Nagar during 2012-13 and 2013-14 are as follows :

List of plantation carried out by Community Forestry Project, Yamuna Nagar during 2012-13

Range	Scheme	Name of sites	Area		Plants planted
			Ha	RKM	
Yamuna Nagar	Farm Forestry Water Logged Area	Sabha Pur	20		4000
	-do-	Singh Pura	20		4000
	-do-	Kurali	10		2000
	-do-	Teha Tehi	18		3600
	-do-	Manakpur	19		3800
	-do-	Bhraman Khera	19		3800
	-do-	Munda Khera	19		3800
			125		25000

List of plantation carried out by Community Forestry Project, Yamuna Nagar during 2012-13

Range	Scheme	Name of sites	Area		Plants planted
			Ha	RKM	
Yamuna Nagar	LTG	Sukh Nagri to Dhalor Road		2	500
	-do-	Rajpur to Ratholi Road		1	250
	-do-	Sarawan to Bhogpur Road		3	750
	-do-	Rampur to Rattuwala Road		4	1000
				10	2500

List of plantation carried out by Community Forestry Project, Yamuna Nagar during 2013-14

Range	Scheme	No. of sites	Area		Plants planted
Yamuna Nagar	LTG	Shergarh		0.6	160
	LTG	Bilaspur to Mulana		4.4	1100
	LTG	Mugalwali to Rattuwala		4	1000
	LTG	Jagdhari to Bilaspur		1	250
				10	2510

Species and number of seedlings planted during 2012-13 and 2013-14

The species and number of seedlings planted by Territorial Forest Division, Yamuna Nagar district during 2012-13 and 2013-14 are as follows :

Number of species planted in Yamuna Nagar Forest Division during 2012-13 and 2013-14

Species	Local Name	Ranges (Number of plants)			
		Kalesar	Kalsia	Sadhaura	Jadghari
Tectona grandis	Teak	3650	12290	428	600
Dalbergia sissoo	Shisham	4300	-	745	587
Eucalyptus spp.	Eucalyptus	1600	-	5000	-
Toona ciliata	Toon	-	-	-	225
Azadirachta indica	Neem	-	-	-	690
Terminalia arjuna	Arjun	600	-	-	44
Syzygium cumini	Jamun	70	170	52	-
Terminalia belerica	Bhera	-	-	10	-
Terminalia chebula	Harar	-	-	10	-
Ficus rumphi	Pilkhan	-	130	20	2
Ficus religiosa	Pipal	-	-	20	2
Melia azedarach	Dek	-	764	-	-
Emblica officinalis	Amla	700	370	-	-
Ficus glomerata	Gullar	-	20	-	-
Mangifera indica	Mango	80	23	-	-
Heterophyllus spp.	Katal	-	25	-	-
Holoptelia integrifolia	Papri	-	-	1000	70
Alestonia spp.	Alestonia	-	-	-	20
	Total	**11600**	**13790**	**7295**	**2250**

CHAPTER-IV

Sampling Methodology

10 per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantations areas was available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants were separately counted, recorded and survival percentage was calculated.

Results

The results showing the survival percentage of plantation carried out in Yamuna Nagar district during the year 2012-13 and 2013-14 are given below :

Number of sampling units and survival percentage in Jagadhri Forest Range during 2012-13

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Jagdhari	Dadupur Nalvi Canal	CAMPA Tall Plantation	Areas =4 RKM No of plants = 1000 Species = Shisham, Teak, Toon	1 2 3 4	64.00 48.00 72.00 56.00	60.00

Number of sampling units and survival percentage in Jagadhri Forest Range during 2012-13

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Kalsia	Mandewalla PF	Ridge Plantation	Areas =17 RKM No of plants = 8500 Species = Shisham, Teak, Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	92.00 56.00 86.00 82.00 96.00 82.00 84.00 78.00 64.00 80.00 80.00 90.00 70.00 60.00 60.00 82.00 86.00	78.12

Number of sampling units and survival percentage in Jagadhri Forest Range during 2012-13

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Kalser	Khizri Section 4 & 5	ANR	Areas =6 ha No of plants = 1250 Species = Shisham, Teak, Amla, Arjun	1 2 3 4 5 6	55.00 45.00 60.00 55.00 50.00 55.00	53.33

Number of sampling units and survival percentage in Jagadhri Forest Range during 2013-14

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Kalser	R1J Kalesar C2	ANR	Areas =20 Ha No of plants = 4000 Species = Gullar, Jamun, Papri, Teak	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	65.00 45.00 75.00 70.00 45.00 85.00 40.00 85.00 70.00 60.00 60.00 65.00 75.00 60.00 40.00 55.00 70.00 65.00 65.00 55.00	62.50

Number of sampling units and survival percentage in Jagadhri Forest Range during 2013-14

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Sadaura	Sandhal	Tall Plantation	Areas =10 RKM No of plants = 2500 Species = Jamun, Shisham, Dek	1 2 3 4 5 6 7 8 9 10	68.00 76.00 80.00 86.00 52.00 48.00 72.00 72.00 64.00 68.00	68.60

Number of sampling units and survival percentage in Community Forestry Project (CFP) Range Yamuna Nagar during 2012-13

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Yamuna Nagar	Sabha Pur	CAMPA Farm Forestry Water Logged	Areas =20 Ha No of plants = 4000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	65.00 85.00 95.00 90.00 95.00 85.00 90.00 90.00 95.00 75.00 80.00 80.00 55.00 55.00 90.00 85.00 80.00 70.00 75.00 80.00	80.75

Number of sampling units and survival percentage in Community Forestry Project (CFP) Range Yamuna Nagar during 2012-13

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Yamuna Nagar	Rampur to Rattuwala RD	CAMPA LTG	Areas =4 RKM No of plants = 1000 Species = Dek, Kadam, Sisoo	1 2 3 4	52.00 64.00 44.00 48.00	52.00

Number of sampling units and survival percentage in Community Forestry Project (CFP) Range Yamuna Nagar during 2013-14

Range	Site	Scheme	Site details	Sample No	Survival (%)	Average (%)
Yamuna Nagar	Mugalwali to Rattuwala	CAMPA LTG	Areas =4 RKM No of plants = 1000 Species =Kadam, Sisoo, Toon	1 2 3 4	68.00 72.00 52.00 78.00	67.50

Results of the Survival Study

The results of the overall survival study of the tree plantation in Yamuna Nagar district of Haryana during 2012-13 and 2013-14 are tabulated below :

2012-13

Agency	Land category	Scheme	No of sample Taken	Average (%)	Overall Survival (%)
Territorial Forest Division Yamuna Nagar	Govt. Land	CAMPA Tall Plantation	4	60.00	63.82
		Ridge Plantation	17	78.12	
		ANR	6	53.33	

2013-14

Agency	Land category	Scheme	No of sample Taken	Average (%)	Overall Survival (%)
Territorial Forest Division Yamuna Nagar	Govt. Land	ANR	20	62.50	65.55
		Tall Plantation	10	68.60	

Community Forestry Project (2012-13)

Agency	Land category	Scheme	No of sample Taken	Average (%)	Overall Survival (%)
Community Forestry Project Yamuna Nagar	Community Land	Farm Forestry water logged	20	80.75	80.75
	Govt. Land	CAMPA LTG	4	52.00	52.00

2013-14

Agency	Land category	Scheme	No of sample Taken	Average (%)	Overall Survival (%)
Community Forestry Project Yamuna Nagar	Govt. Land	CAMPA LTG	4	67.50	67.50

CHAPTER-VI

Conclusion and Suggestions

Comment of survival

Survival rate of plantation depends upon the climatic, edaphic and biotic conditions of an area. In Yamuna Nagar district the plantation carried out by the Territorial Forest Division during 2012-13 had an average of 63.82 per cent survival rate in all the schemes of CAMPA. The ridge plantation of Mandewalla PF of Kalsia range recorded highest (78.12%) survival rate, whereas, the survival rate of tall plantation at Dadupur Nalvi canal side in Jagadhri range had 60 per cent of survival rate and lowest (53.33%) was observed in Khizri section 4 & 5 of Kalesar range of the district. During 2013-14 overall survival percentage of 65.55 was observed in the district.

The plantation carried out by the Community Forestry Project, Kurukshetra, Range Yamuna Nagar during 2012-13 in community land under Farm Forestry of waterlogged area in Sabhapur village recorded very good survival rate of 80.75 per cent. The plantation along road side in Rampur to Rattuwalla road recorded survival rate of 52.00 per cent. The plantation carried out during 2013-14 under LTG scheme implemented by Community Forestry Project has recorded survival rate of 67.50 per cent. The plantation is in good health and have attained good height and diameter.

Choice of species and condition of planting stocks

The species planted are local and are suitable to the edaphic and climatic conditions of the area. Since the plantation is 2-3 years old so it is too late to judge the condition of planting stock.

Maintenance of records

The plantation register have been well maintained with all plantation information.

Suggestions for improvement and recommendations

In order to improve the performance of the plantation the following suggestions have been made:

- There should be protection from grazing and browsing along road side and canal sides
- Cultural operations should be done timely and properly
- Timely intervention should be made annually to control the fire.

Technological points

- Good quality seedlings should be planted. Weak seedlings should be destroyed so that they could not be planted in any circumstances
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Cultural operations should be done timely.

Administrative points

- There should be timely release of funds.
- Plantation raised should be maintained for more than three years
- Villagers should be provided incentives for maintenance of the plantations.
- The target of plantation should be given in advance to field level officers.

Assessment of Survival Rate

Dadupur Nalvi Canal Plantation 2012-13 in Jagadhari Range

Mandewala PF Ridge Plantation 2012-13 in Kalesar Range

Assessment of Survival Rate

Sandhai Tall Plantation 2013-14 in Sadhaura Range

Assessment of Survival Rate (Community Forestry Project)

Mugalwali to Rattuwala Rd Plantation 2013-14 in CFP Yamuna Nagar

Sabhapur Wterlogger area plantation 2013-14 in CFP Yamuna Nagar

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Jhajjar District (Haryana) Under State CAMPA Scheme

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Jhajjar District (Haryana) under State CAMPA Scheme

P. Kaushal
Dinesh Sharma
Sarwan Kumar

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

ACKNOWLEDGMENTS

The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India has carried "Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Jhajjar District (Haryana)". This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.

The Centre expresses thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Jhajjar and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P Kaushal
Regional Director/Coordinator

CONTENTS

CHAPTER-I

DISTRICT BACKGROUND

The Jhajjar district of Haryana lies between 28^0 33' N and 28^0 42' latitude and 76^0 28' 45" E and 76^0 84; 15" E longitude. On its north lies the Rohtak subdivision of Rohtak district and in the south lies the subdivision Rewari of the Rewari district. In the east lies Fikri border of National Capital Delhi of India and in the west lies Charkhi Dadri subdivision. of Bhiwani district. The district is having an area of 1834 sq. kms which is 4.05 percent of total area of the state. Throughout the district lies the network of roads, canals, drainage distributaries and railway lines along which state owned strip forests are situated.

The district forms a part of Indo Gengetic plain marked with vast stretches of almost flat land and occasional local undulations. The southern and south western part of the Jhajjar subdivision constitutes sandy region. It is covered by many sand dunes and the land slopes from the south about 244 m (above MSL) to Jhajjar town in the north, about 216 m (above MSL). This region is covered with permanent sand dunes to a very large extent in addition to a few small rocky hills in the south west.

Geology (Rock and Soil)

The area forms a part of Indo Gangetic plan and is represented by very flat country with general depression in southern part which forms the floods plains of *Sahibi* and *Krishnawati* rivers. The general slope is from north-east to south-west. The area is underlain by alluvial deposits of quaternary age. These overlie the rocks of Algonkean system outcropping in the southern part. The alluvium in these plains consists of clay, silt and various grades of sand. The thickness of alluvium varies from 155.14 to 315.50 m in the southern part and it is more than 300 m in the northern part. The younger alluvium deposits are restricted in the river beds and floods plains of *Sahibi and Krishnawati* rivers. In the southern part of the area, there are a few isolated hills of quartzit, slats, siltstone and shale. These rocks belong to the Ajaibgarh formation of the Delhi group of rocks. The trend of the rock formation is North East. The dip is very steep towards west and the rocks are highly sheared. The shears are marked by presence of ferruginous material and shearing is parallel to the bedding of rock formation. Due to shearing, the quartzite bands are brecciated. The southern part of the area is covered by windblown sand forming stabilized dunes and sandy flat rolling sand hammocks, semi-permanent and active dunes have been noticed in

the south western part of the areas. The active dunes are oriented in North-West direction, while the stabilized dunes have alignment in the North South direction.

The soils are deep alluvial in nature and show great variations in physical and chemical characteristics. The soils found in different parts of the areas, are clayey loam, sandy loam and loamy sand. At some places, saline and alkaline soils are also met with, which are generally devoid of any useful vegetation. These soils are formed due to drainage and occurrence of caly/kankar pan at varying depths in the sub-soil. The pH of the of the soil various from 6.7 to 9.1.

Climate

The climate of the tract is subtropical and semiarid. The climate is characterized by excessive variation in temperature and relatively low rainfall which has created adverse conditions for the establishment and growth of trees species. The rains are erratic in respect of volume, place and time. The bulk of the precipitation (about 80%) is received through south-west monsoon from June to September.

The tract is situated in subtropical zone whose main features are extreme heat during summer extreme cold during winter. Hot winds, locally called *"Loo"* blow during May and June. The temperature recorded is as high as 47^0 C in May, while it drops down to 1^0 C in January. May and June are the hottest months, whereas, December and January are the coldest. The temperature exhibits great diurnal and seasonal variations. The minimum mean relative humidity varies from 17 percent during April and May to 95 percent in August/ September

During the monsoon particularly in July and August the sky uses to be heavily clouded. In the rest of the year, the sky is generally clear or lightly clouded. In January, February and March, the sky becomes cloudy and sometime overcast due to western disturbances.

Winds are generally light during the post monsoon and winter months. They strengthen a little during the summer and monsoon months. Winds are predominately easterly or south-easterly in the monsoon seasons. They are mostly westerly or north-westerly during the morning and blow from directions between north and north- west during afternoons. April to June is the period with the highest incidence of thunderstorms and dust storms. Violent squalls (andhi) often accompany such storm. While some of the thunderstorms are dry, others are accompanied by thunder. Dense fogs are common in the winter month in the rear of the western disturbances.

INFORMATION ABOUT THE SCHEME/PROJECT

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia procera, Delonix regia, Cassia siames, Melia azadirach, Terminalia arjuna* etc. However, the distribution depends upon the edaphic factor, although other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas. Poor people earn their livelihood by selling products of domestic animals, like milk, meat and wool. They keep large herds of cattle. It has resulted in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing, therefore, grazing by cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon weather conditions and incidence of grazing and browsing. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire. Generally, it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practiced under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages seeking people participation at all level of project activities. The project which includes Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations have an adverse effect on the environment. Now a day it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i. To conserve and extend the existing forest and vegetative cover in the district of Ambala for soil and moisture conservation and to preserve the natural biodiversity.
ii. To improve the growing stock by protection, regeneration and planning of local indigenous species.
iii. To conserve the forest habitats critical to biodiversity and protection of ecosystem.
iv. To protect the wildlife by providing them shelter and food.
v. To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.
vi. To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.
vii. To provide employment opportunities to the rural people living in the vicinity of these forests.
viii. To encourage the plantation and sustainable harvesting of NTFPs.
ix. To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

List of activities undertaken under CAMPA scheme for the year 2012-13

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Plantation of native species in Saraswati forest	No
vii.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	No
viii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	No
ix.	Buildings for frontline staff	Yes
x.	Training of frontline and ministerial staff	No
xi.	Capacity building and strengthening of village level forestry institution	No
xii.	Urban forestry plantation of tall plants in Urban areas	No
xiii.	Silt retention dam at Khol-hi-raittan	No
xiv.	Crate wire structure at Bir Shikargah	No
xv.	Digging of ponds in Sarswati conservation reserve forests	No
xvi.	Deepeining of ponds in Bhor Shaidan Crocodile breeding centre	No
xvii.	Silt retention structure in Amwali khol of Kalesar wildlife sanctuary	No
xviii.	Crate wire structure Bir sikargh WLS behind VCC	No
xix.	Protection centre in Nahar wildlife sanctuary	No
xx.	Pasture development in Nahar wildlife sanctuary	No
xxi.	Construction of WHS in Mohinder garh and Rewari	No
	Sukhna Catchment	
xxii.	Afforestation	No
xxiii.	Land treatment silt retention Dam	No
xxiv.	Wire crate structure	No

List of activities undertaken under CAMPA scheme for the year 2013-14

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
vii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	Yes
viii.	Buildings for frontline staff	Yes
ix.	Plantation of native species in Jind bir	No
x.	Plantation of Chaal & Jhingen in Shiwalic hills	No
	Sukhna Catchment	
xi.	Afforestation	No
xii.	Planation of bhabar grass	No
xiii.	Land treatment silt retention Dam	No
xiv.	Construction of crate wire structure	No

Agencies undertaking plantations and other CAMPA works in the District

Jhajjar Territorial Forest Division is the nodal agency, which carried out CAMPA work activities during 2012-13 and 2013-14 and Community Forestry Project (CFP) of Jhajjar range under take the Plantation work in the district. The afforestation work was carried out by the Territorial Forest Division in three ranges i.e. Jhajjar, Matanhail and Bahadurgarh.

Number of species and plants planted in CAMPA during 2012-13

Sr. No.	Name of species	Total number of plants
1	*Melia azaderach*	1630
2	*Holoptelia integrifolia*	2500
3	*Dalbergia sissoo*	4590
4	*Azadarachta indica*	1000
5	*Eucalyptus spp.*	15805
6	*Ailanthus exculsa*	3735
7	*Tamarix articulata*	10000
8	*Acacia nilotica*	200
	Total	**39460**

Number of species and plants planted in CAMPA scheme during 2013-14 by Jhajjar Forest Division

Sr. No.	Name of species	Total number of plants
1	*Terminalia arjuna*	7820
2	*Azadirachta indica*	1550
3	*Dalberiga sissoo*	3160
4	*Syzygium cumini*	700
5	*Holoptelia integrifolia*	5810
6	*Melia azaderach*	3830
7	*Azadarachta indica*	890
8	*Legestroemia indica*	400
9	*Acacia nilotica*	18600
	Total	**42,760**

CHAPTER-IV

INVENTORY OF PLANTATION

The plantations raised by the various agencies during 2012-13 and 2013-14 under CAMPA scheme in Jhajjar district are as follows:

Plantation raised by Jhajjar forest division under CAMPA scheme for the year 2012-13

Type of land	Scheme CAMPA	Range/block/ beat	Site	Khasra No.	Plantation month/ year	Target		Species	Total plants
						Ha	RKM		
Forest land	TP	Jhajjar/ Jhajjar W/ Jhajjar W	Jhajjar bye pass	2-6	July -12	0	4	Bakain 650, papri 350	1000
Forest land	TP	Jhajjar/ Jhajjar E/ Jhajjar E	Jhajjar Farukhnagar Road & hhajjar nala	Km 1-11 & RD 4.5 - 7	July-12	0	12	Papri 1800, Shisham 50, Bakain 400, Neem 750	3000
Forest land	TP	B-garh/B-garh	Nahra bahri road	Km 2-13	July-12	0	4.76	Bakain 580, Shisham 360, Neem 250	1190
Forest land	TP	Jhajjar/Beri/Dighal	Bahrana chhara road	RD 0-4	Feb-13	0	5	Shisham 900, papri 350	1250
	Total Road side					0	25.76		6440
Forest land	Ridge	Jhajjar/Beri/Dighal	Bahrana minor	Kalawad road to tail	Feb-13	0	18	Euc.5500, Ailantus 3500	9000
Forest land	Ridge	Jhajjar/Beri/Dighal	KCB drain	Kultana to dighal kalawar	Feb-13	0	20.47	Frans 10000, Ailantus 235	10235
Forest land	Ridge	B-garh/B-garh	Bahadurgarh minor	RD 45 to tail L&R	July-12	0	22	Shisham 2460.Euc 8340. Kikar 200	11000
Forest land	Ridge	B-garh/B-garh	Surkhpur minor	RD 0-12	July-12	0	4	Shisham 820. Euc 1180	2000
Forest land	Ridge	B-garh/B-garh	Daooda minor	RD 10-30	July-12	0	1.57	Eucalyptus 785	785
	Total Canal side					0	66.04		33020
	Total Forest Land Plantation						91.80		39460

Plantation raised by Jhajjar forest division under CAMPA scheme for the year 2013-14

Type of land	Scheme CAMPA	Range/ block/ beat	Site	Khasra No.	Plantation month/ year	Target		Species	Total plants
						Ha	RKM		
Forest land	TP	Matanhail/ Matanhail Ch-wasW	Chhuchhakwas Jhajjar road	0-6 km	Aug. 13	0	7	Arjun. Neem. Shisham. Jamova	1750
Forest land	TP	Matanhail/ Matanhail Ch-wasW	Ch-was Bhindawas Hassanpur road	5-18 km	Aug. 13	0	14	P. Papri. Bakain	3500
Forest land	TP	Matanhail/ Matanhail Ch-wasW	Delhi Dadri road	21-27 km	July, 13	0	11	Arjun, Neem. Shisham. P. Papri	2750
Forest land	TP	Matanhail/ Khanpur/Sasroli	Sasroli Dadri road	3-9 km	Aug. 13	0	6	Shisham. Bakain	1500
Forest land	TP	Matanhail/ Khanpur	Ch-was Kairoli road (MDR 130)	24-28 km	July. 13	0	6	Pahri Papri	1500
Forest land	TP	Matanhail/Matanhail	Ch-was Koyalpur road	0-7 km	Aug. 13	0	6	Bakain	1500
Forest land	TP	Jhajjar/Beri Beri W	Beri kabulpur road	0-7 km	Aug. 13	0	10	Ajun. Neem. Shisham. P Papri. Bakain	2500
Forest land	TP	Jhajjar/Beri/ Dubaldhan	Dubaldhan Palra road	0-5 km	July, 13	0	6	Shisham, P. Papri, Bakain	1500
Forest land	TP	Jhajjar/Beri/ Beri W	Palra Mangawas road	0-3 km	Aug. 13	0	5	Arjun, Neem, Shisham. P. Papri B-brush	1250
	Total Road side					0	71		17750
Forest land	Ridge	Jhajjar/Beri/ Dighal	Bahrana minor	0-40 RD	July. 13	0	50	Kikar. Arjun	25000
	Total Canal side					0	50		25000
	Total Forest Land Plantation						121		42750

Plantation by Community Forestry Project (CFP)-Jhajjar range during the year 2012-13

Community Forestry Project (CFP) range Jhajjar has raised a plantation Eucalyptus species in 121 ha of farm land in Dubaldhan village. The plantation was raised under bio drainages scheme of CAMPA in the farm land of 99 farmers of the village as enlisted below :

Sr. No.	Farmer name	Number of plants
1	Manjeet s/o Dileep Singh	423
2	Anil s/o Gyani Ram	347
3	Sucha Singh s/o Kishan Singh	343
4	Radha s/o Kishan	261
5	Bullu s/o Npha Singh	95
6	Jai Kishan s/o Rajkumar	157
7	Ram kishan s/o Ram Kumar	145
8	Rajesh s/o Guniya	122
9	Manja Ram s/o Sardara	81
10	Dev Pal s/o Gogi Ram	364
11	Matu s/o Nanhad	89
12	Ram Phal s/o Bhajbana	93
13	Surjya s/o Hajari	73
14	Dharm Vir s/o Om Singh	114
15	Dayanand s/o Chandgi Ram	208
16	Billu s/o Lagayaa	163
17	Balwan s/o Jorawar	789
18	Naresh s/o Ram Singh	120
19	Jagbir s/o Phul Singh	393
20	Virender s/o Prakesh	301
21	Raja s/o Umad	473
22	Sham Shar s/o Kamal Singh	73
23	Sanjay s/o Dhup Singh	161
24	Sanju s/o Rajinder	776
25	Surrender s/o Fathi Singh	1214
26	Sukh Vir s/o Ram Kishan	228
27	Sehtash s/o Charan Singh	451
28	Naresh s/o Vir Bhan	215
29	Balram s/o Umad	1385
30	Bablu s/o Mukhtayar	473
31	Virender s/o Prakesh	161
32	Satyavaan s/o Laxmi Naryan	121
33	Rajvir s/o Mukhtar	312
34	Umad s/o Dariyav Singh	52
35	Ajmar s/o Man Singh	171
36	Ved Pal s/o Gogi Ram	400
37	Ashok s/o Ram Kishan	77
38	Mohan Sharma s/o Gokhi Ram	157
39	Dharma s/o Laal ji	399
40	Sham Shar s/o Kamal Singh	240
41	Ashok s/o Prakesh	299

42	Ved Prakesh s/o Randhir	28
43	Honi s/o Gogi Ram	13
44	Azad s/o Gogi Ram	157
45	Ram Kishan s/o Dayanand	603
46	Majaya Ram s/o Shri Chand	112
47	Dhulu s/o Legayaa	132
48	Jagdish s/o Chand Ram	228
49	Randhir s/o Rishal	222
50	Sanjay s/o Randhir	160
51	Sunder s/o Dhanpat	120
52	Mima s/o Ram Singh	71
53	Bhupinder s/o Mange Ram	279
54	Harikishan s/o Richpal	164
55	Raja s/o Mulchand	281
56	Sonu s/o Rajinder	79
57	Dhanu s/o Siya Ram	159
58	Dipeek s/o Kapoor Singh	293
59	Hari Ram s/o Hazari Ram	333
60	Rajesh s/o Guniya	139
61	Ajmair s/o Maan Singh	137
62	Mahavir s/o Hari Singh	121
63	Kubar s/o Ram Singh	149
64	Hari Om s/o Pawan Kumar	329
65	Sanjay s/o Surajmal	82
66	Asha Ram s/o Bharat Ram	237
67	Rajesh s/o Hazari	215
68	Virender s/o Amar Singh	79
69	Narender s/o Mahavir	170
70	Pawan s/o Ram Kishan	159
71	Surjalmal s/o Bihari	108
72	Surender s/o Jagdev	100
73	Surajbhan s/o Gopi Ram	228
74	Lal Singh s/o Bhan Singh	160
75	Umad s/o Ranjeet Singh	120
76	Satpal s/o Lal Chand	373
77	Dhan Singh s/o Nihal Singh	128
78	Badhu Ram s/o Bishamber	83
79	Prakesh s/o Juglal	160
80	Satbir s/o Ram Sarwoop	1557
81	Baljeet s/o Ishwar Singh	320
82	Shri Bhagwan s/o Mukhtayar	90
83	Pt. Sajjan s/o Hukam Chand	340
84	Pt Vijay s/o Hukam Chand	160
85	Rajesh s/o Guniya Ram	160
86	Pt. Dhanu s/o Siya Ram	80
87	Mater Hri Kishan Sharma	400
88	Randhir s/o Harnam	140
89	Bholia s/o Harnam	140
90	Ram Phal s/o Harnam	140
91	Hardwari s/o Harnam	140
92	Satbir s/o Ram Kishan	320

93	Balu Khati	80
94	Ex Sarpanch Rajesh	80
95	Rajvir s/o Ram Kumar	240
96	Baljeet s/o Abha Ram	120
97	Jagdish s/o Narayan	80
98	Vikash s/o Tarak Singh	240
99	Mangya s/o Sardara	140
	Total	**24200**

Plantation by Community Forestry Project (CFP)-Jhajjar range during the year 2013-14

Plantation of Eucalyptus species under bio-drainage scheme of CAMPA was raised in 100 ha area in 62 numbers of farmer's farmland.

Sr. No.	Name of Farmer	Father/ Husband Name	Areas planted (ha.)	Running mts.	Plants planted
1	Ram Niwas	Jai Narain	2.60	780	520
2	Om Prakash	Jai Narain	2.40	720	480
3	Bed Prakash	Jai Narain	2.80	840	560
4	Kalu	Raghubir	3.33	1000	667
5	Balwant	Chandgi Ram	4.33	1300	867
6	Ram Niwas	Chottu Ram	2.80	840	560
7	Dilbag	Kabli	0.40	120	80
8	Sadhu Pardhan		1.00	300	200
9	Manish	Uday Bhan	0.60	180	120
10	Mahabir	Hans Ram	1.20	360	240
11	Lilu	Chand Ram	2.00	600	400
12	Raju	Omal	2.80	840	560
13	Anil	Bhoop Singh	3.60	1080	7200
14	Surajmal	Hukam Chand	4.17	1250	833
15	Diwan	Hukam Chand	5.00	1500	1000
16	Baljeet	Hukam Chand	4.20	1260	840
17	Vedpal	Rishal	1.40	420	280
18	Raju	Ramkala	1.60	480	320
19	Sanjay	Jagdev	2.40	720	480
20	Nagender	Rishal	0.60	180	120
21	Jagdish	Daya Nand	0.60	180	120
22	Pawan	Ram Kishan	1.60	480	320
23	Vinod	Kamla	0.40	120	80
24	Ravi	Mange Ram	1.40	420	280
25	Bholu	Samunder	0.80	240	160
26	Surje	Hazari	0.90	270	180
27	Rakesh	Ram Kumar	0.60	180	120
28	Om Parkash	Chander	0.70	210	140
29	Situ	Ram Niwas	0.80	240	160
30	Pale	Ram Niwas	0.20	60	40
31	Dilbag	Ram Singh	0.80	240	160
32	Basant	Pandit	0.40	120	80
33	Gabdu	Balmat	1.00	300	200

34	Binder	Amar Singh	1.00	300	200
35	Kale	Chanderbhan	1.40	420	280
36	Bablu	Nafe Singh	1.30	390	260
37	Sandeep	Om Kumar	0.60	180	120
38	Bablu	Muktyar	2.00	600	400
39	Ram Kumar	Lokram	1.10	330	220
40	Sanjay	Mahabir	0.40	120	80
41	Jage	Narain	0.80	240	160
42	Anoop Singh	Service Station	2.40	720	480
43	Satyawan	Laxmi Narain	0.60	180	120
44	Naveen	Ram Singh	1.00	300	200
45	Sanda	Bhagwan	0.60	180	120
46	Jitender	Jiwan	1.20	360	240
47	Sanju	Rajinder	4.00	1200	800
48	Hari Krishan Master		1.40	420	280
49	Dhapad Mandir		1.00	300	200
50	Bagwala Mandir		1.00	300	200
51	Amarli	Aladeen	0.57	170	113
52	Puneet	Om Prakash	2.40	720	480
53	Shilak	Hari Ram	0.40	120	80
54	Rakesh	Jille Singh	0.40	120	80
55	Vikram	Mahabir	3.60	1080	720
56	Manish	Azad	2.73	820	547
57	Raju	Shamsher	1.87	560	373
58	Gopi Ram	Jagat Singh	1.60	480	320
59	Bholu	Smasher	2.40	720	480
60	Ramphal	Hazari	0.80	240	160
61	Vedpal	Buta Ram	0.80	240	160
62	Suresh	Metal	1.20	360	240
	Total		**100**	**30000**	**26480**

BUDGET DETAILS

The budget details of CAMPA scheme in Jhajjar forest division for the year 2012-13 and 2013-14 are as under :

Budget details of the CAMPA scheme for the year 2012-2013

Budget sub head	Organization (Rs.)	Modification (Rs.)	Previous (Rs.)	Current (Rs.)	Total (Rs.)
Ridge plantation 66.04 RKM @ 32253.09	2545414	2129994	566286	1563708	2129994
TP 25.76 RKM @ 3704	0	955020	0	955020	955020
New building const. range res. Jhajjar	1500000	1500000	500000	1000000	1500000
Total 17 Minor	**4045414**	**4585014**	**1066286**	**3518728**	**4585014**
18 Maint.					
Ridge plantation 60.93 RKM (2011-12)	335846	335846	195677	140169	335846
NPV 10 RKM (2011-12)	90000	90000	63672	26328	90000
Ridge 36.74 RMK (2010-11)	133500	133500	71711	26256	97967
Total Maint	**559346**	**559346**	**331060**	**192753**	**523813**
Total scheme CAMPA	**4604760**	**5144360**	**1397346**	**3711484**	**5108827**

Budget details of the CAMPA scheme for the year 2013-2014

Budget sub head	Organization (Rs.)	Modification (Rs.)	Previous (Rs.)	Current (Rs.)	Total (Rs.)
Ridge plantation 50 RKM	1650000	1650000	735560	914440	1650000
TP 71 RKM	2783000	2783000	1098610	1684390	2783000
Raising of TP (50057 No.)	500570	500570	0	500570	500570
Over head	0	192665	192665	0	192665
Total 17 Minor	**4933570**	**5126235**	**2026835**	**3099400**	**5126235**
18 Maint.					
Ridge plantation 66.04RKM (2011-12)	291705	291705	178200	113505	291705
NPV 25.76 RKM (2012-13)	244435	244435	67150	177285	244435
Ridge 60.93 RMK (2012-13)	121860	121860	19100	102760	121860
NPV 10 RKM (2011-12)	22000	22000	0	22000	22000
Total Maint	**680000**	**680000**	**264450**	**415550**	**680000**
Total scheme CAMPA	**5613570**	**5806235**	**2291285**	**3514950**	**5806235**

SAMPLING METHODOLOGY

Ten per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantation areas were available, sampling units measuring 50 m x 20 m (1000 m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants were separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

The basis of selection of sampling sites

Year	Agency	Land category	Scheme	Site details		Site selected for sampling			
				No of site	Plant planted	No. of sites	Plants there in	No. of sample taken	Plant sampled
2012-13	Territorial forest division Jhajjar	Govt. land	CAMPA TP	4	6440	2	4000	16	400
	-	-	CAMPA Ridge	5	33020	2	20000	40	2000
	CFP Jhajjar	Farmer land	Bio-drainage	1	24200	6	6432	20	643
2013-14	Territorial forest division Jhajjar	Govt. land	CAMPA TP	9	17750	3	8750	35	875
	-	-	CAMPA Ridge	1	25000	1	25000	50	2500
	CFP Jhajjar	Govt. land	Bio-drainage	1	26480	6	4480	18	448
	Total			**21**	**132890**	**20**	**68662**	**179**	**6866**

RESULTS

The results showing the survival percentage of plantation carried out in Jhajjar district during the year 2012-13 are given below :

Number of sampling units and survival percentage in Jhajjar Forest Division during 2012-13

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Jhajjar Bypass	CAMPA TP	Area (ha) No. of plant Major Species	4 RKM 1000 Bakain Papri	1 2 3 4	64.00 68.00 72.00 60.00	66.00
Jhajjar Farukhnagar road and Jhajjar Nala	CAMPA TP	Area (ha) No. of plant Major Species	12 RKM 3000 Shisham neem Bakain Papri	1 2 3 4 5 6 7 8 9 10 11 12	52.00 64.00 68.00 60.00 60.00 72.00 78.00 64.00 56.00 68.00 72.00 76.00	65.83
Bahrana minor	CAMPA Ridge	Area (ha) No. of plant Major Species	18 RKM 9000 Eucalyptus Ailanthus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	48.00 68.00 64.00 52.00 70.00 42.00 60.00 64.00 56.00 58.00 64.00 68.00 42.00 32.00 64.00 78.00 56.00 48.00	57.44

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Surlehpur Minor	CAMPA Ridge	Area (ha)	4 RKM	1	82.00	
		No. of plant	2000	2	86.00	
		Major Species	Shisham	3	72.00	79.50
			Eucalyptus	4	78.00	
Bahadurgarh Minor	CAMPA Ridge	Area (ha)	22 RKM	1	88.00	
		No. of plant	11000	2	84.00	
		Major Species	Shisham	3	68.00	
			Eucalyptus	4	78.00	
			Kikar	5	94.00	
				6	92.00	
				7	100.00	
				8	82.00	
				9	72.00	
				10	76.00	
				11	84.00	
				12	86.00	
				13	88.00	77.73
				14	64.00	
				15	60.00	
				16	90.00	
				17	68.00	
				18	88.00	
				19	84.00	
				20	72.00	
				21	78.00	
				22	94.00	

Number of sampling units and survival percentage in Jhajjar Forest Division during 2013-14 .

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Chhuchhukwas Bindawas to Hassanpur road	CAMPA TP	Area (ha)	14 RKM	1	72.00	
		No. of plant	3500	2	68.00	
		Major Species	Bakain	3	88.00	
			Papri	4	88.00	
				5	76.00	
				6	60.00	
				7	56.00	74.00
				8	68.00	
				9	76.00	
				10	80.00	
				11	84.00	
				12	84.00	
				13	72.00	
				14	64.00	

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Delhi Dadri road	CAMPA TP	Area (ha)	11 RKM	1	76.00	
		No. of plant	2750	2	72.00	
		Major Species	Shisham	3	64.00	
			Papri	4	68.00	
				5	72.00	
				6	76.00	79.64
				7	84.00	
				8	56.00	
				9	80.00	
				10	64.00	
				11	64.00	
Beir kabulpur road	CAMPA TP	Area (ha)	10RKM	1	72.00	
		No. of plant	2500	2	68.00	
		Major Species	Arjun	3	64.00	
			neem	4	60.00	69.20
			Shisham	5	76.00	
			Papri	6	88.00	
			Bakari	7	56.00	
				8	64.00	
				9	68.00	
				10	76.00	
Brahmna minor	CAMPA Ridge	Area (ha)	50 RKM	1	64.00	
		No. of plant	250000	2	60.00	
		Major Species	Kikar	3	72.00	
			Arjun	4	70.00	
				5	58.00	
				6	60.00	
				7	52.00	
				8	48.00	
				9	90.00	
				10	82.00	
				11	70.00	
				12	60.00	
				13	52.00	
				14	62.00	
				15	64.00	
				16	68.00	
				17	52.00	
				18	70.00	
				19	72.00	
				20	80.00	
				21	88.00	
				22	68.00	
				23	66.00	
				24	44.00	67.00
				25	80.00	
				26	88.00	
				27	86.00	
				28	70.00	
				29	56.00	

				30	82.00	
				31	80.00	
				32	70.00	
				33	52.00	
				34	48.00	
				35	40.00	
				36	66.00	
				37	80.00	
				38	76.00	
				39	72.00	
				40	76.00	
				41	44.00	
				42	46.00	
				43	76.00	
				44	44.00	
				45	56.00	
				46	72.00	
				47	66.00	
				48	68.00	
				49	70.00	
				50	82.00	

Number of sampling units and survival percentage of plantation raised by Community Forestry Project (CFP) Jhajjar during 2012-13

Site	Scheme	Site detailed		Sample No.	Survival %	Average survival %
Dubaldhan	Bio drainage	Name of farmer Area Plant Species	Balu 142 RM 261 Eucalyptus	1 2	93.94 100.00	96.97
		Name of farmer Area Plant Species	Surrender Singh 1821 RM 1241 Eucalyptus	1 2 3	100.00 90.90 98.48	96.46
		Name of farmer Area Plant Species	Bal Ram 2077 RM 1385 Eucalyptus	1 2 3	96.96 100.00 98.48	98.48
		Name of farmer Area Plant Species	Satveer 2336 RM 1557 Eucalyptus	1 2 3 4 5	100.00 90.90 84.85 93.94 100.00	93.93
		Name of farmer Area Plant Species	Bal Ram 2077 RM 1385 Eucalyptus	1 2 3 4 5	84.85 98.48 100.00 96.96 100.00	96.05
		Name of farmer Area Plant Species	Ram Kishan 905 RM 603 Eucalyptus	1 2	89.39 100.00	94.69

Number of sampling units and survival percentage in plantations raised by Community Forestry Project (CFP) Jhajjar during 2013-14

Site	Scheme	Site detailed		Sample No.	Survival %	Average survival %
Dubaldhan	Bio drainage	Name of farmer Area Plant Species	Ram Niwas 780 RKM 520 Eucalyptus	1 2	90.90 100.00	95.45
		Name of farmer Area Plant Species	Om Prakesh 720 RKM 480 Eucalyptus	1 2	96.96 98.48	97.72
		Name of farmer Area Plant Species	Ved Prakesh 840 RKM 560 Eucalyptus	1 2 3	100.00 98.48 90.90	96.46
		Name of farmer Area Plant Species	Diwan Singh 1.5 RKM 1000 Eucalyptus	1 2 3 4 5	98.48 100.00 100.00 100.00 100.00	99.67
		Name of farmer Area Plant Species	Baljeet 1.2 RKM 840 Eucalyptus	1 2 3	100.00 96.96 100.00	98.99
		Name of farmer Area Plant Species	Sunjmal 1.2 RKM 88. Eucalyptus	1 2 3	96.96 100.00 84.85	93.94

ANALYSIS OF RESULTS

The analysis results of the survival rate study are being presented in this chapter

Overall average survival percentage different components during 2012-13 in Jhajjar district

Range	Land category	Scheme	Sample taken	Average %	Overall average
Jhajjar range	Govt. land	CAMPA-TP	04	66.00	69.30
	-do-	CAMPA-TP	12	65.83	
	-do-	CAMPA-Ridge	18	57.44	
Bhadmagarh	Forest land	CAMPA-Ridge	04	79.50	
	-do-.	CAMPA-Ridge	22	77.73	

Overall survival percentage under different component during 2013-14 in Jhajjar district

Agency	Land category	Scheme	Sample taken	Average %	Overall average
Matanhalil	Forest land	CAMPA-TP	14	74.00	72.46
	-do-	CAMPA-TP	11	79.64	
Jhajjar	-do-	CAMPA-TP	10	69.20	
	-do-	CAMPA-Ridge	50	67.00	

The Average survival rate (percentage) for Jhajjar district under different scheme

Year	Scheme	Average survival
2012-13	CAMPA-TP	65.92
	CAMPA-Ridge	71.56
2013-14	CAMPA-TP	74.28
	CAMPA-Ridge	67.00

CONSTRUCTION OF BUILDING

In Jhajjar district under CAMPA scheme two buildings were constructed during 2012-13. One, a Range Forest Office of Jhajjar Territorial Forest Division and the other Range Office of Community Forestry Project Range Jhajjar. The community forest range have spent Rs. 23,61.975 for the construction of their range office building. The building of the range office of the territorial division Jhajjar Rs. 1,50,000 were spent on the new building construction of range forest officer residence during 2012-13 by the territorial forest division Jhajjar under CAMPA scheme.

CHAPTER-IX

CONCLUSION AND SUGGESTIONS

Comment on survival rates

Performance of the plantation was found variable in terms of its survival rate as it depends upon various edaphic and climatic factors and the maintenance of the plantation

During 2012-13 plantation raised in Jhajjar district observed 69.30 percent survival rate irrespective of the different schemes. Surlehpur minor site of Bahadurgarh range recorded highest (79.50 %) survival rate under CAMPA ridge scheme which was followed by Bahadurgarh minor having survival rate of 77.73 per cent. Lowest survival (57.44 percent) was recorded in Brahmna minor under CAMPA ridge scheme in Jhajjar range of the district. Jhajjar bypass site of the Jhajjar range recorded highest 66.00 percent survival rate in CAMPA TP-plantation. The survival of plantation is higher where they are raised in ridge as compared to the tall plant plantation. This may be attributed due to good earthwork in the ridges.

Survival rate of plantation raised during 2013-14 is higher than that of the previous year of 2012-13. In 2013-14 the survival rate of the district irrespective of the different scheme is 72.46 per cent.

Plantation site Delhi Dadrai road recorded highest (79.64 percent) survival rate which was followed by the site Chhuchhukwas Bindwas to Hassanpur road site of Matanhail forest range of the Jhajjar district under CAMPA-TP scheme. The lowest of 67.00 survival rate was recorded for Brahma minor under CAMPA ridge scheme in Jhajjar range of the district.

The plantation raised by the community forestry project range Karnal of Panipat division have very good survival rate for the year 2012-13 and 2013-14. The overall survival rate for both the years is more than 90 percent. These plantation are raised in the farmlands of the local people under the bio-drainage scheme CAMPA in Dubaldhan village of the district. The *Eucalyptus* species planted there have attained good height and diameter of a farmer named. Diwan Singh had survival rate nearing 100 per cent in about an area of 1.5 RKM

Suggestion for Improvement and Recommendations :

Technical Point

1. Protection from grazing and browsing should be there in strip plantation along road side and canal side
2. Cultural operations should be done timely and properly
3. They should be protection from fire and plantation areas should be adequately forced
4. Vigorous seedlings should be planted. Poorly grown seedlings should be called and destroyed so that they could not be planted in any circumstance
5. Beating up should be done with original species.

Administrative Points

1. Plantation raised should be maintained for more than three years.
2. Administrative decisions should be taken in time for transplantation.
3. Migratory graziers should be allocated a grazing route so that they do not damage the plantations
4. There should be timely relies of funds.

Ridge Plantation

Tall Plantation on Road Side

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Karnal District (Haryana) Under State CAMPA Scheme

Regional Centre

National Afforestation and Eco-development Board

(Ministry of Environment and Forests, Govt. of India)

Dr YS Parmar University of Horticulture and Forestry

Nauni, Solan 173 230 (HP)

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Karnal District (Haryana) under State CAMPA Scheme

P. Kaushal
Dinesh Sharma
Sarwan Kumar

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

ACKNOWLEDGMENTS

The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried "Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Karnal District (Haryana)". This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.

The Centre express thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Karnal and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P Kaushal
Regional Director/Coordinator

CONTENTS

CHAPTER-I

DISTRICT BACKGROUND

Geographic Location

The district has been named after the town Karnal, which owes its origin to Raja Karna. the mythical champion of Kauravas in the epic war of Mahabharata. The district is situated between 29^0 15' to 29^0 58'N latitude and $76^0$20' to 77^0 10 E longitude, approximately 11,754 ha area is under the control of forest department, which is about 2.8 percent of the total area of the districts. The areas is bounded on the east by the river Yamuna, on the north by Kurukshetra district, on the west by Jind and Kurukshetra district and on the South by Panipat district.

Geology and Soil

Geologically, the area constitutes a part of indo-genetic alluvial plain exposing quarternary deposits, which owe their origin to (tectonic changes) downwarp caused by the upliftment of the Himalayas. These quaternary sediments comprise alternating layers of sand, silt and silty clay of alluvial origin. The depth of alluvium contributed by the river Yamuna has not been ascertained but gravity, magnetic and seismic explorations reveal that it varies from less than 1000 to over 2000 mts. Underlying the alluvium are consolidated Shiwalik and older tertiary sediments of Himalayan piedomont and below these lie more consolidated older formations such as Gondwana and Cretaceous. There is no exposure of hard rock in this area.

Tropical arid soils are found in Karnal district, as the rainfall zone lies between 650 to 750 m and the common problems are salinity, alkalinity and water logging. The soils are deep and alluvial. In general, soils are having pH 7.5 to 8.5.

The areas along the river Yamuna contain light soils and water tables lies close to the surface. Sandy and sandy loam soils are found near the banks of streams traversing the district forming Khaddar (low-lying plain) areas where water logging and excessive moisture remain for greater part of the year, creating the problem in the establishment of the plantations. These areas having younger alluvial deposits are flood plains formed by the river along its course with lot of receding fine silt, which is easy to work, as it remains wet for most part of the year but too much water quite often creates problems. These soils are deep and grade varies.

The areas having older alluvial deposits *'Banger'* are on higher plains and the soils are sandy loam in texture, which are generally associated with kankar nodules having hard-bed at different depths of soils with a considerable width. In many areas of Karnal there is occurrence of salt affected soils also. This problem exits not only in strips but in many reserved forests also.

Climate

The climate of the district is characterized by extreme dryness of the air with an intensely hot summer and a cold winter. It is only during the three monsoon months of July, August and September that the moist air of oceanic origin penetrates into the division. The year may be divided into four seasons. The cold seasons is from mid-November to about mid- March. It is followed by hot seasons, which continues till about the end of June. The period from July to about mid-September is the southwest monsoon season, after which a period of one month constitutes the transition period between the monsoons to winter season.

The average annual rainfall in the district is 467 mm and generally increases from southwest to northeast. About 81 percent of the normal annual rainfall in the district is received during June to September, July being the rainiest month. Some rain is also received during the cold season in association with passing western disturbances.

The cold season generally starts by about mid-November when temperature begins to decrease rapidly. January is generally the coldest month with the mean daily maximum temperature of 20.0^{0}C and the mean daily minimum of 7.0^{0}C. In association with eastward passage of western disturbances in the cold, seasons, cold waves affect the district and the minimum temperature sometimes goes down to about a degree or so below the freezing point of water. From about the middle of March, temperature beings to rise rapidly. May and June are the hottest months with the mean daily maximum temperature at about 40 to 45^{0}C. From about April, hot westerly winds, locally known as *'Luh'* begin to blow and the weather progressively become hot and dry. In May and June the maximum temperature may sometimes go above 45^{0}C. with the advance of the southwest monsoon, the day temperature begin to fall and the weather is sultry and unpleasant due to the increased moisture in the monsoon air.

The air is generally dry during the greater part of the year. Humidity is generally high, ranging between 60 and 85 percent during the monsoon and decreases thereafter. April and May are usually the driest months with relative humidity being about 20 percent or less in the afternoons.

During the southwest monsoon and particularly during July and August the skies are heavily clouded. In the rest of the year the skies are clear or lightly clouded. During January to March, however, the skies are often clouded and overcast in association with the passage of western disturbances.

Winds are light except during the summer season when they strengthen in forces. During the monsoon seasons, winds are mostly easterly or southeasterly. In the rest of the year winds are predominantly westerly or northwesterly.

April to September is the period with the highest incidence of thunderstorms. Dust storms mostly occur during April to June. Violent squalls may accompany such storms. Some of the thunderstorms are accompanied with heavy rain and occasional hail. A thunderstorm also occurs in winter months in association with passing western disturbances. Fog, sometime dense, occurs in the cold season.

CHAPTER-II

INFORMATION ABOUT THE CAMPA SCHEME / PROJECT

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests:
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

Problems to be addressed

The areas under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia procera, Delonix regia, Cassia siamea, Melia azadirach, Terminalia arjuna* etc. However, the distribution depends upon the edaphic factor, although other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontaneum* (Kans) are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas. Poor people earn their livelihood by selling products of domestic animals, like milk, meat and wool. They keep large herds of cattle. It has resulted in a huge increase in grazing

pressure on forest areas. Because no pasture land is available for grazing, therefore. grazing by cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon weather conditions and incidence of grazing and browsing. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire. Generally, it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practiced under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages seeking people participation at all level of project activities. The project which includes Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation

- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations have an adverse effect on the environment. Now a day it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i. To conserve and extend the existing forest and vegetative cover in the district of Ambala for soil and moisture conservation and to preserve the natural biodiversity.
ii. To improve the growing stock by protection, regeneration and planning of local indigenous species.
iii. To conserve the forest habitats critical to biodiversity and protection of ecosystem.
iv. To protect the wildlife by providing them shelter and food.
v. To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.
vi. To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.
vii. To provide employment opportunities to the rural people living in the vicinity of these forests.
viii. To encourage the plantation and sustainable harvesting of NTFPs.
ix. To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

List of activities undertaken under CAMPA scheme for the year 2012-13

Sr No.	Component	Yes/No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Plantation of native species in Saraswati forest	No
vii.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
viii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	Yes
ix.	Buildings for frontline staff	Yes
x.	Training of frontline and ministerial staff	No
xi.	Capacity building and strengthening of village level forestry institution	No
xii.	Urban forestry plantation of tall plants in Urban areas	No
xiii.	Silt retention dam at Khol-hi-raittan	No
xiv.	Crate wire structure at Bir Shikargah	No
xv.	Digging of ponds in Sarswati conservation reserve forests	No
xvi.	Deepeining of ponds in Bhor Shaidan Crocodile breeding centre	No
xvii.	Silt retention structure in Amwali khol of Kalesar wildlife sanctuary	No
xviii.	Crate wire structure Bir sikargh WLS behind VCC	No
xix.	Protection centre in Nahar wildlife sanctuary	No
xx.	Pasture development in Nahar wildlife sanctuary	No
xxi.	Construction of WHS in Mohinder garh and Rewari	No
	Sukhna Catchment	
xxii.	Afforestation	No
xxiii.	Land treatment silt retention Dam	No
xxiv.	Wire crate structure	No

List of activities undertaken under CAMPA scheme for the year 2013-14

Sr No.	Component	Yes/No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	No
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
vii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	No
viii.	Buildings for frontline staff	Yes
ix.	Plantation of native species in Jind bir	No
x.	Plantation of Chaal & Jhingen in Shiwalic hills	No
	Sukhna Catchment	
xi.	Afforestation	No
xii.	Planation of bhabar grass	No
xiii.	Land treatment silt retention Dam	No
xiv.	Construction of crate wire structure	No

Agencies undertaking plantations in the district

Karnal Territorial Forest Division is the nodal agency, which carried out afforestation activity of CAMPA during 2012-13 and 2013-14 in the Karnal district. The community forestry project division Panipat having Range Office at Karnal also carried out afforestation work under CAMPA in the district.

The Territorial Forest division Karnal carried out activities of CAMPA in three ranges namely, Karnal, Indri and Asandh.

Number of species and plants planted in Karnal forest division during 2012-13 in CAMPA scheme

Sr.No.	Name of species	Number of plants
1	Eucalyptus species	35850

Number of species and plants planted in Karnal forest division during 2013-14 in CAMPA scheme

Sr.No.	Name of species	Number of plants
1	Eucalyptus species	60,000
2	Dalbergia sissoo	5,000
3	Other (Melia, Gmelina)	22,500
	Total	**87,500**

The Community Forestry Project (CFP) Karnal range has planted 6250 number of plants of the species of *Melia azaderach; Delibergia sissoo, Azadarachta indica* etc. in the 24.8 RKM of area.

INVENTORY OF PLANTATION

The plantation raised by the various agencies during 2012-13 and 2013-14 under CAMPA scheme in Karnal district are as follows:

Plantation raised by Karnal forest division under CAMPA for the year 2012-13

Name of scheme	Range/block/beat (VFC)	Name of site	Khasra No. Km & RD	Target Achieved		Plantation details	
				Ha.	RKM	Species	Total No. of plants
CA schemes	Karnal /Munak/ Khora kheri	Old Badashahi canal	RD Sandhu Dera to Sarpanch Dra	0	10	Eucalyptus-5000	5000
CA schemes	Assandh/Assandh/ Assandh (N)	Chatang Drain	Rattak Rahra road to Khizrabad seema	0	10	Eucalyptus-5000	5000
CA schemes	Indri/Indri/Garthi Birbal	WJC Lower	RD 167-169, L/Side	0	5	Eucalyptus-2500	2500
CA schemes	Indri/Budhera/ Budhera	SYL Canal	KM 62-63. L/Side	0	5	Eucalyptus-2500	2500
CA schemes	Indri/Nikokheri / Nilokheri	Sirsa Branch	RD 18-20 L/Side	0	4.7	Eucalyptus-2350	2350
	Total Compensatory Afforestation (Ridge work)			0	34.7		17350
State CAMPA NPV	Indri/Indri/Indri	WJC Lower	RD 163-167, L/Side	0	10	Eucalyptus-5000	5000
-do-	Indri/Nilokheri/ Nilokheri	Sirsa Branch	RD 20-25, L/Side	0	10	Eucalyptus-5000	5000
-do-	Karnal/Munak/Khora Kheri	Old Badshahi canal		0	17	Eucalyptus-8500	8500
	Total CAMPA- NPV (Ridge work)			0	37		18500
	Grand total (CA+NPV)				71.7		35850

Plantation raised by Karnal forest division under CAMPA for the year 2013-14

Range/block /beat	Component	Name of reach	RD/KM	Target achieved		No. of plants	Species
				Ha.	RKM		
Karnal/Munak/ khora kheri	TP	Gharaunda Phurlak satondi road	0-10 KM L&R	0	10	2500	Shisham. Durma Drek
Assandh/ Jundha/ Jaini	TP	Karnal Hansi Road	6-13.5 KM L&R	0	10	2500	Shisham
Indri/Nilokheri/ Nilokheri	TP	Nilokheri Dhand road	0-5 KM L&R	0	10	2500	Shisham
	Total Compensatory TP				**30**	**7500**	
Karnal/ Karnal/ Sitamai	Ridge	Sitamai to Bhola Khalsa road	0-6 KM L&R	0	10	5000	Eucalyptus
Karnal /Munak/ Balla	Ridge	Joshi Drain	Gohana Distry. To Hansi Br.	0	10	5000	Eucalyptus
Assandh/ Jundla Peont & Padha	Ridge	Karnal Assandh road	18-26 KM L&R	0	10	5000	Eucalyptus
Assandh/ Nissing / Nissing west	Ridge	Nissing Minor	RD Chakda Pul to Brass Pul L&R	0	10	5000	Eucalyptus
Indri/ Nilokheri/ Shamgarh	Ridge	Nardak Disty.	0-8 RD L&R	0	10	5000	Eucalyptus
Indri/Nilokheri/ Shamgarh	Ridge	GT Road	132-136 KM L&R	0	10	5000	Eucalyptus
Indri/ Nilokheri / Taroari	Ridge	GT Road	138-141 KM L&R	0	10	5000	Eucalyptus
Indri/ Indri/ Indri	Ridge	WJC Lower	167-171 RD L/S	0	30	5000	Eucalyptus
	Total Compensatory Afforestation (CA) Ridge				**100**	**40000**	
Indri/ Budheera / Nigdhu	TP	Ramana-Ramani Forest	38,39,43	0	40	10000	Eucalyptus Gmelina
	Total NPV				**40**	**10000**	
Indri/ Budheera / Nigdhu	Ridge	Ramana-Ramani Forest	16,17,18,45	0	40	10000	Eucalyptus Gmelina
	Total NPV				**40**	**10000**	
	Grand total				**210**	**67500**	

Plantation raised by Community Forestry Project, Karnal under LTG CAMPA scheme during 2012-13

Location	Range	Block	Beat	Unit	Target	No. of plants
Rampaura School and Shamshan Ghat	Karnal	Indri	Indri	RKM	2.0	500
Rampaura PL	Karnal	Indri	Indri	RKM	3.5	875
Sawaran Majra to Rampura link road	Karnal	Indri	Indri	RKM	1.0	250
Dadlana Power House	Karnal	Gharaunda	Gharaunda	RKM	2.5	625
Stondi to Picholiya road	Karnal	Gharaunda	Gharaunda	RKM	3.5	875
British Public School Shekupura	Karnal	Gharaunda	Gharaunda	RKM	0.3	125
Rajdhahani Pol. College, Shekupura	Karnal	Gharaunda	Gharaunda	RKM	1.0	250
Pikadli Sugar Mill, Bhadson PL	Karnal	Gharaunda	Gharaunda	RKM	11.0	2.750
	Total				**24.8**	**6,250**

CHAPTER-V

BUDGET DETAILS

The budget details of CAMPA scheme in Karnal forest division for the year 2012-13 and 2013-14 are as under :

Budget details of the CAMPA scheme in Karnal Forest Division for the year 2012-2013

Budget sub head	Original (Rs.)	Modification (Rs.)	Previous (Rs.)	Current (Rs.)	Total (Rs.)
Compensatory Afforestation					
Ridge plantation @500 plant per RKM (34:7)	1119500	0	321453	798037	1119490
Plantation of tall plant @ 250 plants per RKM	0	0	0	0	0
Net Present Value (NPV)		0			
Plantation of tall plant in linear forests 250 plants per RKM including brush wood round fence	0	0	0	0	0
Plantation on ridges in depression areas in linear forest 500 plant per RKM (37)	912153	0	0	581544	581544
070 Buildings construction of New building and other	730144	0	999001	-268857	730144
Agro forestry workshop	300000	0	300000	0	300000
Payment for IGA consultant (JICA project)	12900	0	12900	0	12900
Contractual services of empowerment of village level institutions	60000	0	0	60000	60000
Total 17 Minor	**3134697**	0	**1633354**	**1170724**	**2804078**
18- Maintenance		0			
Maintenance of 12.64 RKM 2011-12 ridge plantation (compensatory afforestation)	69630	0	63021	6609	69630
Maintenance of 8.43 RKM 11-12 TP (compensatory afforestation)	89700	0	81029	8671	89700
Maintenance of tall plants 10 RKM 11-12 (NPV)	90000	0	83000	7000	90000
Maintenance of ridge work 30 RKM 11-12 (NPV)	126000	0	126000	0	126000
Maintenance of 41.53 RKM 11-12 (compensatory afforestation)	87670	0	85673	1997	87670
Maintenance of tall plants 35 .53 RKM 10-11 (NPV)	70000	0	68115	1885	70000

Maintenance of ridge work 120 RKM 10-11 (NPV)	240000	0	227000	13000	240000
Maintenance of ridge work 120 RKM 10-11 (NPV) previous balance for the year 10-11	281145	0	0	281145	281145
Total 18 Maintenance	**1054145**	**0**	**733838**	**320307**	**1054145**
Plantation and irrigation machineries (on tractor, one trolley and one tanker)	0	0	0	0	0
Total state CAMPA scheme 2012-13	**4188842**	**0**	**2367162**	**1491031**	**3858223**

Budget details of the CAMPA scheme in Karnal Forest Division for the year 2013-2014

Component	Funds released upto previous month	Funds released during the current month	Total funds	Expenditure upto previous month	Expenditure during the current month	Total expenditure
Componentry afforestation 17 minor work (CA)						
Ridge plantation @ 500 plant RKM at (100RKM)	2475000	825000	3300000	2528900	771100	3300000
Plantation tall plant @ 250 plant per RKM (30 RKM)	883500	292500	1176000	768110	405993	1174103
Total 17- minor works	**3358500**	**1117500**	**4476000**	**3297010**	**1177093**	**4474103**
18- Maintenance work						
Maintenance of ridge plantation 41.53 RKM 11-12	62295	0	62295	62295	0	62295
Maintenance of ridge plantation 12.64 RKM 11-12	25280	0	25280	25300	-20	25280
Maintenance of TP 8.43 RKM	25349	0	25349	25326	23	25349
Maintenance of ridge plantation 34.7 RKM 12-13	178184	0	178184	178184	0	178184
Total 18 maintenance	**291108**	**0**	**291108**	**291105**	**3**	**291108**
G total CA	**3649608**	**1117500**	**4767108**	**3588115**	**1177096**	**4765211**
17 Minor works NPV						
Plantation of tall plant in linear forest 250 plants per RKM including brush wood round fence (40 RKM)	1150000	390000	1540000	1130000	410000	1540000
Plantation on ridge in depression areas in linear forests 500 plants per RKM (40 RKM)	990500	329500	1320000	944290	375710	1320000

.Urban forestry plantation	0	0	0	0	0	0
Plantation of native species	0	0	0	0	0	0
Raising to tall plant 83832 nos. @ 10/- per plant	838320	0	838320	571048	267272	838320
Total 17 minor works NPV	**2978820**	**719500**	**3698320**	**2645338**	**1052982**	**3698320**
18 maintenance works NPV						
Maintenance of ridge plantation 120 RKM	0	0	0	0	0	0
Maintenance of TP 35 RKM	0	0	0	0	0	0
Total 18 maintenance works NPV	**268892**	**3000**	**271892**	**269800**	**2092**	**271892**
G. total NPV	**3247712**	**722500**	**3970212**	**2915138**	**1055074**	**3970212**
Other works						
Contractual services of empowerment of village level institutions	31080	0	31080	31080	0	31080
Total other works	**31080**	**0**	**31080**	**31080**	**0**	**31080**
Grand total 2013-14	**6928400**	**1840000**	**8768400**	**6534333**	**2232170**	**8766503**

SAMPLING METHODOLOGY

Ten per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantation areas were available, sampling units measuring 50 m x 20 m (1000 m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants were separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

The basis of selection of sampling sites

Year	Agency	Land category	Scheme	Site details		Site selected for sampling			
				No of site	Plant planted	No. of sites	Plants there in	No. of sample taken	Plant sampled
2012-13	Territorial forest division Karnal	Govt. land	CA Ridge	5	17350	1	5000	10	500
	-	-	NPV Ridge	3	18500	1	5000	10	500
	CFP Karnal	-	LTG	8	6250	2	3250	13	325
2013-14	Territorial forest division Karnal	Govt. land	CA TP	3	7500	1	2500	10	250
	-	-	CA Ridge	8	40000	2	10000	20	1000
	-	-	NPV TP	1	10000	1	10000	40	1000
	-	-	NPV Ridge	1	10000	1	10000	40	1000
	Total			**29**	**109600**	**9**	**45750**	**143**	**4575**

RESULTS (PLANTATION 2012-13)

The results showing the survival percentage of plantation carried out in Karnal district during the year 2012-13 and 2013-14 are given below:

Number of sampling units and survival percentage in Karnal during 2012-13

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Sirsa branch	NPV Ridge	Area	10RKM	1	84.00	
				2	72.00	
		No. of plant	5000	3	64.00	
				4	68.00	
		Major Species	Eucalyptus	5	76.00	
				6	88.00	74.40
				7	86.00	
				8	72.00	
				9	64.00	
				10	70.00	
Chatag drain	Compensatory Ridge	Area	10 RKM	1	78.00	
				2	82.00	
		No. of plant	5000	3	84.00	
				4	72.00	
		Major Species	Eucalyptus	5	76.00	78.80
				6	86.00	
				7	70.00	
				8	68.00	
				9	88.00	
				10	84.00	

Number of sampling units and survival percentage in Karnal during 2013-14

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Nissing Minor	Compensatory Ridge	Area	10 RKM	1	70.00	
				2	74.00	
		No. of plant	5000	3	92.00	
				4	80.00	
		Major Species	Eucalyptus	5	82.00	80.40
				6	86.00	
				7	84.00	
				8	68.00	
				9	76.00	
				10	92.00	

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Sitamain to Bhola Khalsa road	Compensatory Ridge	Area	10 RKM	1	84.00	
				2	78.00	
		No. of plant	5000	3	94.00	
				4	100.00	
		Major Species	Eucalyptus	5	100.00	86.8
				6	84.00	
				7	72.00	
				8	90.00	
				9	80.00	
				10	80.00	
Gharaunda Phurlak Road	Compensatory TP	Area	10 RKM	1	88.00	
				2	84.00	
		No. of plant	2500	3	72.00	
				4	76.00	
		Major Species	Shisham, Drek	5	92.00	81.2
				6	88.00	
				7	80.00	
				8	76.00	
				9	72.00	
				10	84.00	
Ranma Ranani Forest	NPV TP	Area	40 RKM	1	96.00	
				2	98.00	
		No. of plant	10,000	3	100.00	
				4	88.00	
		Major Species	Eucalyptus	5	82.00	
				6	88.00	
				7	100.00	
				8	96.00	
				9	92.00	
				10	88.00	
				11	80.00	
				12	78.00	
				13	88.00	
				14	92.00	
				15	96.00	
				16	98.00	
				17	72.00	
				18	82.00	87.80
				19	82.00	
				20	80.00	
				21	92.00	
				22	96.00	
				23	80.00	
				24	86.00	
				25	98.00	
				26	100.00	
				27	82.00	
				28	86.00	

				29	92.00	
				30	84.00	
				31	86.00	
				32	82.00	
				33	76.00	
				34	72.00	
				35	90.00	
				36	88.00	
				37	82.00	
				38	80.00	
				39	96.00	
				40	90.00	
Ranma Ranani Forest	NPV Ridge	Area No. of plant Major Species	40 RKM. 20,000 Shisham Gumar	1	62.00	
				2	82.00	
				3	76.00	
				4	86.00	
				5	88.00	
				6	100.00	
				7	98.00	
				8	92.00	
				9	72.00	
				10	86.00	
				11	82.00	
				12	80.00	
				13	56.00	
				14	96.00	
				15	84.00	
				16	82.00	
				17	80.00	
				18	76.00	
				19	72.00	
				20	68.00	
				21	86.00	
				22	56.00	78.85
				23	62.00	
				24	92.00	
				25	82.00	
				26	84.00	
				27	52.00	
				28	96.00	
				29	98.00	
				30	100.00	
				31	100.00	
				32	56.00	
				33	48.00	
				34	68.0	
				35	58.00	
				36	76.00	
				37	72.00	
				38	78.00	
				39	90.00	
				40	82.00	

Number of sampling units and survival percentage in Community Forestry Project (CFP) Range Karnal during 2012-13

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Picadli sugar Mill, Bhedsar PL	LTG	Area No. of plant Major Species	11 RKM 2,750 Arjun, Derk Neam	1 2 3 4 5 6 7 8 9 10 11	76.00 84.00 88.00 92.00 92.00 80.00 76.40 64.00 86.00 92.00 80.00	82.73
Rampur School and Shashaghat	LTG	Area No. of plant Major Species	2 RKM 500 Arjun, Shisham Anla	1 2	96.00 90.00	93.00

ANALYSIS OF RESULT

The analysis of results of the survival rate study are being presented in this chapter

Overall survival percentage of Karnal Territorial Forest Division 2012-13

Site	Survival (%)	Overall %
Sirsa branch	74.40	76.60
Chatang drain	78.80	

Overall survival percentage of Karnal Territorial Forest Division 2013-14

Site	Survival (%)	Overall %
Nissing Minor	80.4	83.01
Sitamai to Bahalakhalsa Road	86.8	
Gharaunda Phurlak Stondi Road	81.2	
Ramana Ramani Forest	87.8	
Ramana Ramani Forests	78.85	

Survival percentage of Karnal Community Forest Project (CFP) 2012-13

Site	Survival (%)	Overall %
Pikadli Sugar Mill Bhadson PL	82.73	87.86
Rampur School and Shamshan Ghat	93.00	

Range and year wise survival percentage under different scheme and components of CAMPA

Sr. No.	Range	Year	Scheme	Survival %
1	Indri	2012-13	NPV Ridge	74.40
2	Indri	2013-14	NPV TP	87.80
3	Indri	2013-14	NPV Ridge	78.85
4	Asandh	2012-13	CA Ridge	78.80
5	Asandh	2013-14	CA Ridge	80.40
6	Karnal	2014-15	CA Ridge	86.80
7	Karnal	2014-15	CA TP	81.20
8	Karnal CFP	2012-13	LTG	87.86

Scheme wise survival percentage of different years

Sr. No.	Year	Scheme	Survival %
1	2012-13	NPV Ridge	74.40
		CA-Ridge	78.80
		LTG	87.86
2	2013-14	CA-Ridge	83.60
		CA-TP	81.20
		NPV-TP	87.80
		NPV-Ridge	78.85

CONSTRUCTION OF BUILDING

In Karnal district a Range Forest Officer's Office and residence was constructed under CAMPA scheme. It amounted Rs. 18.0 lacs. Rs. 7,30,144/- was spent during the year 2012-13 for the aforesaid construction purpose. The building structure is physically verified.

CHAPTER-IX

CONCLUSION AND SUGGESTIONS

Comment on survival rates

Performance of the plantation is variable depending upon various climatic and edaphic factors. The quality of planting stock and maintenance of plantation are also responsible for the survival.

During the years 2012-13, 71.7 RKM of area was afforested in Karnal district by the territorial forest division under CAMPA scheme. The overall survival rate was 76.60 percent. The maximum (78.80%) survival was observed in Chatang drain site of Asandh forest range under compensatory afforestation. The plantation was raised in ridges. The minimum of 74.40 per cent survival rate was recorded for Sirsa barach under NPV ridge scheme in Indri forest range of the district.

Community forestry project range Karnal had overall survival rate of 87.86 per cent. The survival is higher in the community forestry project areas as there is good protection and maintenance by the local community along with the forest department.

Overall survival rate of 83.01 per cent was recorded for sampled sites in Karnal district for the year 2013-14 under CAMPA scheme. Plantation site of Ramana Ramani forest from Indri Forest range recorded highest (87.80%) of survival rate under NPV, TP scheme, whereas. Ramana Ramani forest division site under NPV ridge plantation recorded lowest of 78.35 percent survival rate. Sitamani to Bhola Khalsa road plantation site in Karnal forest range of the division also recorded 86.80 percent of survival under CA ridge of CAMPA scheme followed by Gharaunda Phurlak stondi road plantation site which observed survival rate of 81.20 percent.

The overall survival rate for the year 2013-14 was higher than the survival rate observed for the year 2012-13.

The overall survival rate irrespective of different locations and planting year was observed higher for the plantations raised in ridges. This may be due to fact that ridges provide good site qualities for the transplanted species. It also offers resistance from biological interferences. The tall plant (TP) plantations along strips are subjected to animal grazing and to encroaching fire from the farmers field land.

Choice of species and condition of planting stocks

The species planted are local and are suitable to the topographical conditions of the area. Since the plantation is 2-3 years old, so, it is too late to judge the condition of planting stock.

Suggestion for improvement and recommendation

In order to improve the performance of the plantations following suggestion has been made.

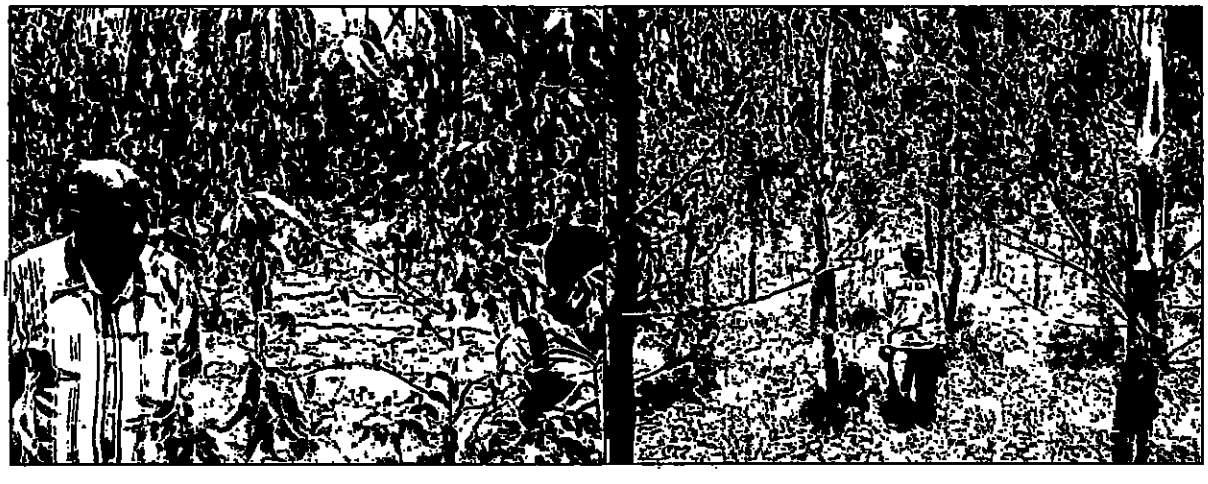
Technological points ;

1. Genetically improved and vigorous seeding should be planted
2. Protection from grazing and browsing should be there along road side planation
3. Beating up should be done with original species and cultural operations should be done timely
4. Prevention of fire after paddy and wheat harvest along road side fields should be ensured.
5. Periodic weeding and cleaning should be ensured.

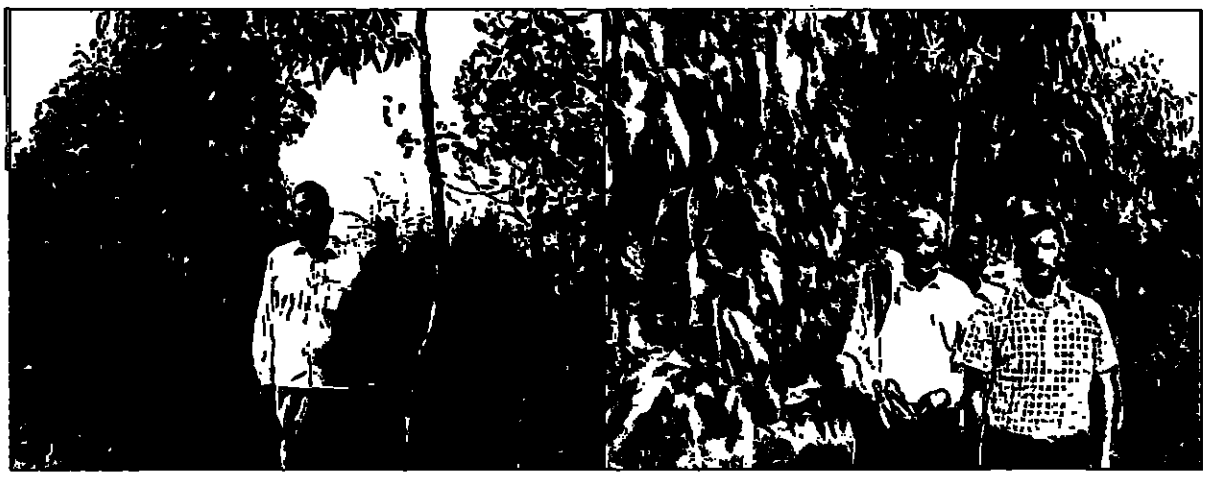
Administrative points :

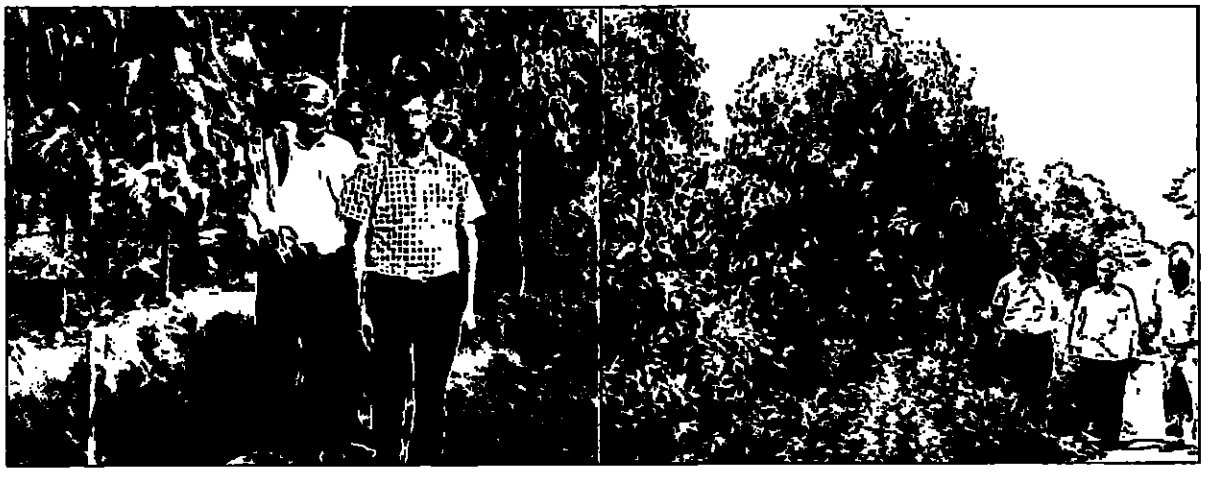
1. Planation raised should be maintained for more than three years.
2. Targets of plantation should be given well in advance to field level officers
3. There should be timely releases of funds.
4. Frequent transfers of field officers should be avoided to ensure continuity and accountability.

Ridge Plantation



Ridge Plantation

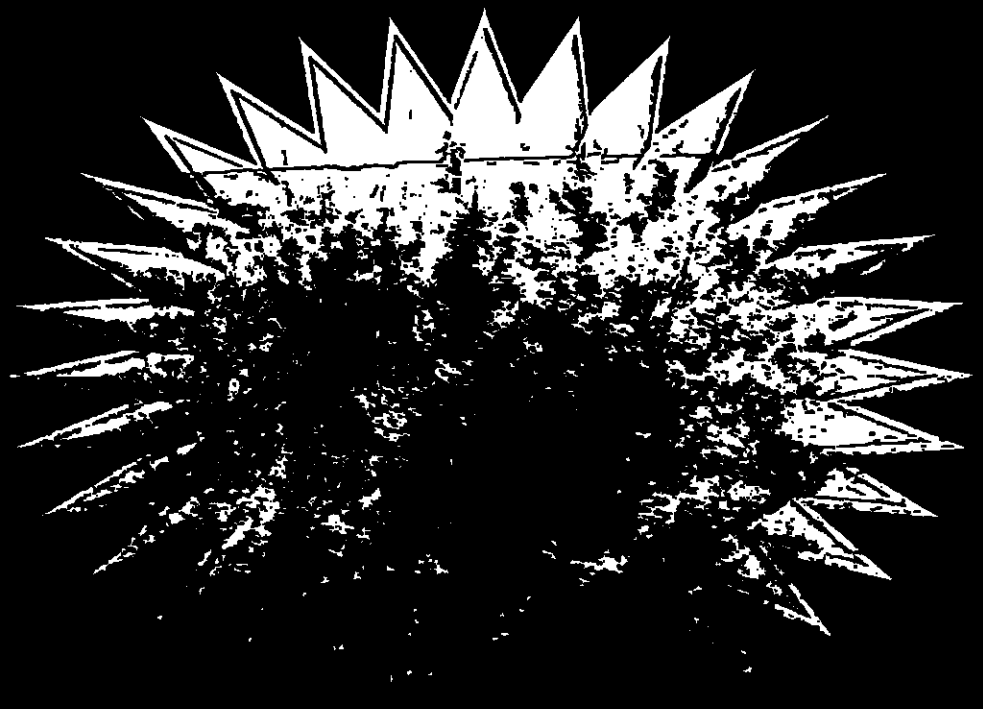




NPV Ridge Plantation

LTG Community Plantation

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Rohtak District (Haryana) under State CAMPA Scheme



Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Rohtak District (Haryana) under State CAMPA Scheme

P. Kaushal
Sunil Kumar
Pawan Thakur

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

Acknowledgments

*The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried " **Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Rohtak District (Haryana)**". This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.*

The Centre express thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Rohtak and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P.Kaushal
Sunil Kumar
Pawan Thakur

TABLE OF CONTENTS

CHAPTER-I

1.0 Background Rohtak District (Haryana)

The state of Haryana has an area of 42212 sq. km. 82 per cent of which is under cultivation. Recorded forest area is about 1685 sq. km. which is about 3.8 per cent of the total area of the state, where as per capita forest cover is only 0.013 ha.

The Rohtak District is surrounded by Sonepat in the east and norther, Jhajjar in South Bhiwani Jind and Hissar in West. The district is situated between $28^0$19.30 to 29.167^{0}6' and 76^0 13 to $76^0$58'E. It covers a total area of about 1668 sq. km with 147 villages. The Rohtak district exhibits mostly desert conditions with ecologically fragile area. The territorial forest division, Rohtak has two ranges namely Rohtak Forest Range and Mahem Forest Range and it has only one Community Forest Range i.e. Rohtak.

Climate of this region is arid, characterized by low annual rainfall 550 mm on the average. Extremes of temperature ranging from sub-zero in winter nights to 47^0C in summer afternoons and also hot winds followed by dust storms. This district is inhabited by approximately 9.40 lakhs humans and cattle population is approximately 3.7 lakhs.

Agricultural and animal husbandry are the mainstay of this predominantly rural economy even though average land holding per family is just 1.81 ha. Barring a few landlords, traders or service personnel, rural economy is fundamentally subsistence economy and social status of individual farmer varies in proportion to land holding. Most of the landless families come from socially lower strata. Gender inequality is quite significant. This area is being cultivated extensively and comprises scatteed block forests on village common lands. These areas are generally degraded forests. Unfit for agriculture, they are mostly used for grazing cattle and meeting villagers other biomass needs. The limited productivity of this arid ecosystem has been continuously subjected to unregulated deforestation and open access of ever growing cattle population for several decades. The soil so exposed has been blown

by windstorms and washed by rainstorms. Consequently such uplands are left with little green cover, no soil, no moisture and no capacity to recuperate. Due to scanty rainfall, the ecosystem has been incapacitated to utilize even the meager precipitation it receives. The rains, instead of rejuvenating the hills and recharging the wells to irrigate agricultural fields, cause havoc. These rains wash down whatever little soil is left. The flash floods so generated take this devastation story far beyond degraded forests to the agricultural fields habitation and other infrastructure on the way adding to the poverty of already poor.

These degraded forests are the only areas on which landless families depend for their fuelwood and fodder needs. In rural society, onus of collection of these products lies on women even in farming families. Hence, beside economic flows, the productivity of degraded forests has direct bearing on life of these two sections of society – women in general, and landless in particular. These degraded forests can produce a wealth of fodder, fruits, fibers and medicines besides fuel and timber, if rehabilitated and managed properly.

1.1 Altitude

The plain evaluation varies from 236-200 meter from mean sea level.

1.2 Geology

Quarternary sediments in this part comprise alluvial and Aeolia sediments. These are unconsolidated and flat. The older alluvium sediments occupy most of the district. Its thickness is about 300 m in Southern part and increases six cycles of sediments within 300 m depth from surface.

1.3 Rocks

Topographically the area is a flat alluvial plain without any conspicuous topographical feature. This is no out crop in the area. Hard rock formation is not traced even in deep drill holes sunk for installation of tube-wells.

1.4 Soil

In the district soils are mostly loam (Bagar and Nardak) and silty and clay (Naili and Chhra dark). The soil is well-known for several occurrences of salt peter which is of great economic importance. The ordinary potter's clay which is a common feature in the alluvial plains is used for the manufacture of earthenwares and bricks.

1.5 Climate

The district has a sub tropical continental monsoon climate where we find seasonal rhythm, hot summer, cool winter, unreliable rainfall and great variation in temperature. It is only the rainy season comprising the months of July, August and September, that the moist air of oceanic origin penetrates in to the district and gives rain. The year may be divided into four seasons.

1.6 Temperature

The cold season starts by the end of November when the temperature starts to decrease rapidly. January is the coldest month with mean daily minimum temperature at about 7 and mean daily maximum at 20. With the passage of western disturbances eastward, cold waves effect the whole district and the minimum temperature go down to about a degree. From mid March, the temperature begins to rise rapidly. May and June are hottest months with maximum temperature touching 47^0C. From April hot westerly winds known as "Luh" begins to blow and weather becomes intensively hot. In May and June, the temperature may go above 47^0C. With the advances of S.W. monsoon towards the end of June, there is a decline in day temperature while the night temperatures are as high as in summer. During monsoon period, the weather is stuffy and unpleasant due to increase in humidity.

1.7 Humidity

The air is generally dry during greater part of the year. During monsoon season, the humidity is between 60 to 85 per cent. Humidity decreases in the post

monsoon season. April and may are usually the driest months with relative humidity being 20 per cent less in the afternoon.

1.8 Winds

Winds are generally light during the post monsoon and winter months. They strengthen a little during the summer and monsoon months. Winds are predominantly Easterly or South-Easterly in the monsoon season. They are mostly Westerly or North-Westerly during the morning and blow from direction between North and North-West during afternoons.

1.9 Natural Flora

Natural flora of the project area can be classed as Northern Tropical Thorn Forests. At certain places in the hills the soil variations give rise to edaphic climax type of Northern Dry Deciduous Forest and its degradation stages.

The forests of the district mainly comprise of rail, road and canal strip forest. The main tree species found in these forests are *Acacia leucophloea, Acacia nilotica, Acacia tortilis, Ailanthus excels, Ailbizia lebbeck, Azadirachta indica, Butea monosperma, Cassia fistula, Dalbergia sissoo, Diospyros cordifolia, Eucalyptus hybrid, Ficus religiosa, Holopetila integrifolia, Moringa oleifera, Morus alba, Parkinsonia aculeate, Phoenix syslvestris, Pithecelobium dylee, Pongamia pinnata, Prosopis uliflora, Salvadora oleoides, Syzygium cumminii, Tamarindus indica, Tamarix articulate, Tecomella undulate, Zizyphus mauritiana.* Main shrub species of the area are *Acacia jacquemontii, Adhatoda vasica, Aerva pseudotomentosa, Argemone maxicana, Calotropis procera, Cannabis sativa, Capparis deciduas, Carissa opaca, Cassia tora, Tamarix dioica, Tribulus terrestris, Vitex negundo, Zizyphus nummularia* etc. Among the grasses main species found in the area are *Cenchrus biflorus, Cenchrus ciliaris, Cymbopogon martini, Cynodon dactylon, Saccharum munja, saccharum spontaneum* etc.

2.0 List of Activities undertaken under CAMPA for 2012-13

Annual Plan of Operation under the state CAMPA for the year 2012-13

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	No
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	Yes
IV	Plantation of Tall Plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Saraswati Forest	NA
VII	Land reclaimation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services), 19/250 tall plants per tree groves/RKM	Yes
IX	Building for Frontline Staff	No
X	Training of Front Line and Ministerial Staff	No
XI	Capacity Building and Strengthening of Village Level Forestry Institutions	No
XII	Urban Forestry Plantation of Tall Plants in Urban Areas	No
XIII	Silt retention dam at Khol-hi-raittan	No
XIV	Crate wire structure at Bir Shaikargah	No
XV	Digging of ponds in Saraswati conservation reserve forests	No
XVI	Deepening of ponds in Bhor Shaidan Crocodile Breeding Centre	No
XVII	Silt retention structure in Amwali Khol of Kalesar wildlife sanctuary	No
XVIII	Crate wire structure Bir Sikargh WLS Behind CC	No
XIX	Protection centre in Nahar Wildlife Sanctury	No
XX	Pasture development in Nahar Wildlife Sanctury	No
XXI	Construction of WHS in M.garh and Rewari	No
	Sukhna Catchment	
XXII	Afforestation	No
XXIII	Land treatment silt retention dam	No
XXIV	Wire crate structure	No

2.1 List of Activities undertaken under CAMPA for 2013-14

Annual Plan of Operation under the state CAMPA for the year 2013-14

Agenda Item No.	Item	Status
A	Compensatory Afforestation	Yes
B	Proposal of Works under NPV	Yes
I	Conservation, Protection and Management of wildlife and its habitat	No
II	Research and Seed Development Activities	No
III	Aided Natural Regeneration in natural forests to improve density of forests 200 plants per ha	Yes
IV	Plantation of Tall Plantation in linear forests 250 per RKM	Yes
V	Plantation on ridges in depression areas in linear forests 500 plants per RKM	Yes
VI	Plantation of Native Species in Kurukshetra Forests and Duloth Forest	No
VII	Land reclamation by plantation on farm lands (Environmental service) 200 plants per ha.	No
VIII	Plantation of tree groves (environmental services)	No
IX	Building for Frontline Staff	No
X	Plantation of Native Species in Jind Bir	No
XI	Plantation of Chaal and Jhingen in Shiwalic Hills	No
	Sukhna Catchment	
XII	Afforestation	No
XIII	Plantation of Bhabar grass	No
XIV	Land treatment by check dams	No
	Construction of crate wire structures	No

2.2 Agencies Undertaking Plantations and other CAMPA works in the District

In Rohtak district, there are two agencies namely Territorial Forestry Division, Rohtak and Community Forestry Project (CFP) Range Rohtak of Panipat Community Forestry Project Division which has undertaken the Afforestation and soil conservation activities. The Afforestation work, soil conservation and maintenance of fire lines were carried out by Rohtak Forest Division in two ranges i.e. Rohtak and Meham. The Community Forestry Project Range Rohtak has carried out the soil and moisture conservation works only under state CAMPA scheme.

3.0 Inventory of the plantations

3.1 Plantation list of Territorial Forest Division Rohtak

The plantations carried out during 2012-13 and 2013-14 by the Territorial Forest Division Rohtak are as follows :

3.1.1 Final APO of State CAMPA of Territorial Forest Division, Rohtak for the year 2012-13

Range	Scheme	Component	Name of Reach	Target Achieved		Plants Planted	Species
				Ha	RKM		
Meham	State CAMPA	FCA TP	Bhali to Baniyani Garhi Road KM 0 to 10 L&R	0	10.92	2730	Arjun, Papri, Shisham
Meham	State CAMPA	FCA TP	Khanaur Distributory RD 40 to 100	0	64.64 75.56	16160 18890	Arjun, Shisham
Rohtak	State CAMPA	FCA TP	Rohtak-Beri Road KM 7-10	0	1	250	Arjun, Papri, Shisham, Siris
Rohtak	State CAMPA	NPV RW	Rohtak-Gohana Road KM 14.5 to 17.5	0	16	8000	Eucalyptus, Frash, Arjun, Amltas, Bakain, Shisham
Rohtak	State CAMPA	NPV RW	Rohtak-Gohana Road KM 8-13	0	13	6500	Eucalyptus, Papri, Shisham, Amla, Alanthus
Rohtak	State CAMPA	NPV RW	Jassia-Kahni Bye Pass Railway line to Rukhi Flyover	0	51	25500	Eucalyptus, Shisham, Papri, Citri Dora, Bakain, Frash, Arjun
Rohtak	State CAMPA	NPV RW	North Bye Pass JLN to Baliyana Road Pull	0	24	12000	Eucalyptus, Shisham, Papri, Citri Dora, Bakain, Frash, Arjun, Milia
Rohtak	State CAMPA	NPV RW	North Bye Pass Sampla	0	25	12500	Eucalyptus, Frash, Arjun
Rohtak	State CAMPA	NPV RW	North Bye Pass Gohana Road to Railway Road	0	7	3500	Eucalyptus, Arjun
Rohtak	State CAMPA	NPV RW	Rohtak South Bye Pass Sunaria	0	12	6000	Eucalyptus, Citri Dora, Papri, Frash
Rohtak	State CAMPA	NPV RW	Rohtak South Bye Pass Sampla	0	2	1000	Arjun
	Total			0	226.56	94140	

3.1.2 APO of Territorial Forest Division, Rohtak for the year 2013-14

Range	Scheme	Compo-nent	Name of Reach	Target allotted		Target Achieved		Plants planted	Species
				Ha	RKM	Ha	RKM		
Rohtak	State CAMPA	FCA TP	Drain No. 8 RD 50 to 50.5	0	0.17	0	0.17	42	Neem, Shisham, Arjun
Rohtak	State CAMPA	FCA TP	Drain No. 8 RD 50.5 to 70	0	10.50	0	10.50	2625	Neem, Shisham, Arjun
Rohtak	State CAMPA	FCA TP	Drain No. 8 RD 70 to 80	0	2.56	0	2.56	640	Neem, Shisham, Arjun
Rohtak	State CAMPA	FCA RW	Drain No. 8 Sunaria	0	13.60	0	13.60	6800	Jamun, Shisham
Rohtak	State CAMPA	FCA RW	Rohtak-Jhajjar Road Sunaria	0	7.30	0	7.30	3650	Kikar
Rohtak	State CAMPA	FCA RW	JSB Sunaria	0	3.92	0	3.92	1960	Jamun, Shisham
Rohtak	State CAMPA	FCA RW	JSB Sunaria RD 0 to 10 L&R	0	10.36	0	10.36	5180	Kikar
Rohtak	State CAMPA	FCA RW	JSB Sunaria RD 0 to 10 L&R	0	0.36	0	0.36	180	Kikar
Rohtak	State CAMPA	FCA RW	JSB Sunaria RD 10 to 23 L&R	0	8.39	0	8.39	4196	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	1.88	0	1.88	940	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	1.90	0	1.90	950	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	0.48	0	0.48	238	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	0.50	0	0.50	250	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	0.30	0	0.30	152	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 23 to 30 L&R	0	0.12	0	0.12	60	Kikar
Rohtak	State CAMPA	FCA RW	JSB Garanwathi RD 30 to 39 L&R	0	4.76	0	4.76	2380	Kikar
Rohtak	State CAMPA	FCA RW	JLN Feeder RD 150-151 R/side	0	0.11	0	0.11	55	Kikar
Rohtak	State CAMPA	FCA RW	JLN Feeder RD 151-155 R/side	0	1.85	0	1.85	923	Kikar
Rohtak	State CAMPA	FCA RW	JLN Feeder RD 124-140 R/side	0	2.34	0	2.34	1172	Kikar
Rohtak	State CAMPA	FCA RW	JLN Feeder Bhaloth	0	4.40	0	4.40	2200	Kikar
Rohtak	State CAMPA	FCA RW	JLN Feeder Bhaloth	0	2.40	0	2.40	1200	Kikar
Rohtak	State CAMPA	FCA RW	Delhi Road Bye Pass Sampla	0	3.12	0	3.12	1560	Kikar
Rohtak	State CAMPA	FCA RW	DHS Road Sampla	0	0.73	0	0.73	365	Kikar
Rohtak	State CAMPA	FCA RW	DHS Road Sampla	0	0.06	0	0.06	31	Kikar
Meham	State CAMPA	FCA RW	Drain No 8 Lahli	0	12.12	0	12.12	6060	Kikar
Meham	State CAMPA	FCA RW	Drain No 8 Lahli	0	19.04	0	19.04	9520	Shisham, Jamun, Siris, Draik, Kikar

Rohtak	State CAMPA	NPV RW	Khani Bye Pass, Gohana Road	0	6.5	0	6.5	3250	Gambhari, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Rohtak-Gohana Road KM 16-19	0	5.0	0	5.0	2500	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Brahmanwas Bye Pass	0	3.0	0	3.0	1500	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Rohtak North Bye Pass Gohana Road to BSB	0	6.5	0	6.5	3250	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Rohtak North Bye Pass Sonipat Road to Baliyana	0	7.0	0	7.0	3500	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Rohtak Bye Pass Sampla	0	1.0	0	1.0	500	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	Rohtak North and South Bye Pass Near Kharawar village	0	10.0	0	10.0	5000	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV RW	DHS Road Sampla KM 48-50	0	1.0	0	1.0	500	Frash, Shisham, Eucalyptus
Rohtak	State CAMPA	NPV ANR	Rohtak Sonipat Road	3	0	3	0	600	Papri, Arjun, Shisham
Rohtak	State CAMPA	NPV ANR	Rohtak Sonipat Road	13	0	13	0	2600	Papri, Arjun, Shisham
Meham	State CAMPA	NPV ANR	Rohtak Distributory Singhpura Road to NH-10	4	0	4	0	800	Papri, Arjun, Shisham
Meham	State CAMPA	NPV TP	Rohtak Jind Road	0	3.0	0	3.0	750	Papri, Shisham
Rohtak	State CAMPA	NPV TP	Khani Bye Pass Jassia	0	5.5	0	5.5	1375	Arjun, Shisham
Rohtak	State CAMPA	NPV TP	Jasrana Minor Sampla	0	2.0	0	2.0	500	Arjun, Shisham
Rohtak	State CAMPA	NPV TP	HSIIDC Rohtak Sampla	0	34.5	0	34.5	8625	Arjun, Papri, Jamun, Neem, Shisham
	Total			20	198.27	20	198.27	88579	

3.2 Plantation list of Community Forest Range, Rohtak

The plantations carried out during 2012-13 and 2013-14 by the Community Forest Project Range Rohtak are as follows :

3.2.1 Final APO of CAMPA Scheme for the year 2012-13 (CFP Range, Rohtak)

Range	Scheme	Component	Name of Reach	Phy Achievement		Plants Planted	Species
				Ha	RKM		
Rohtak	CAMPA	Bio-Drainage (Water logged area)	Muradpur Tekna	30	0	6000	Eucalyptus

Rohtak	CAMPA	Bio-Drainage (Water logged area)	Lahli	10	0	2000	Eucalyptus
Rohtak	CAMPA	LTG	Mokhra Water Works Govt. Land	0	6	1500	Jamoa, Papri
Rohtak	CAMPA	LTG	Madina Shamshan Ghat 990	0	3	750	Jamoa, Pilkhin, Arjun, Neem
Rohtak	CAMPA	LTG	Mokhra Basana Road 0.5 km L&R	0	6	1500	Shisham Arjun, Neem, Bakan, Papri
	Total			40	15	11750	

3.2.2 Final APO of CAMPA Scheme for the year 2013-14 (CFP Range, Kaithal)

Range	Scheme	Component	Name of Reach	Phy Achievement		Plants Planted	Species
				Ha	RKM		
Rohtak	CAMPA	Bio-Drainage (Water Logged Area)	Muradpur Tekna	50	0	10000	Eucalyptus
Rohtak	CAMPA	LTG	Madina Ajaib Bhawar Road 0 to 5 km	0	8	2000	Lasoda, Arjun, Neem, Baken, Shisham, Papri
Rohtak	CAMPA	LTG	Bahu Mokhra Road 0 to 4 km	0	5	1250	Neem, Papri
Rohtak	CAMPA	LTG	Mokhra Muradpur Road 0 to 3 km	0	4	1000	Papri
Rohtak	CAMPA	LTG	Bahu Mokhra Road 0 to 3 km	0	3	750	Papri
	Total			50	20	15000	

3.3 Species and number of seedlings planted

Total number of plants planted during 2012-13 and 2013-14 under CAMPA in Rohtak district are 209469. The year wise data of species of Territorial Forest Division and Community Forest Range, Rohtak are given in the following tables :

3.3.1 Number of plants of different species planted in district Rohtak by Territorial Forest Division, Rohtak during 2012-13

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Arjun	*Terminalia arjuna*	0	226.56	94140
2	Amaltas	*Cassia fistula*			
3	Amla	*Emblica officinalis*			
4	Alanthus	*Ailanthus excels*			
5	Bakain	*Melia azedarach*			
6	Eucalyptus	*Eucalyptus globules*			
7	Frash	*Taxarix aphyla*			
8	Citri dora	*Citri dora* spp.			
9	Shisham	*Dalbergia sissoo*			
10	Papri	*Holoptelia integrifolia*			
	Total		0	226.56	94140

3.3.2 Number of plants of different species planted in district Rohtak by Territorial Forest Division, Rohtak during 2013-14

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Arjun	*Terminalia arjuna*	0	198.27	84579
2	Shisham	*Dalbergia sissoo*			
3	Neem	*Azadirachta indica*			
4	Jamun	*Syzygium indica*			
5	Kikar	*Acacia nilotica*			
6	Siris	*Albizia lebbeck*			
7	Draik	*Melia azedarach*			
8	Gambhari	*Gambhari* spp.			
9	Frash	*Taxarix aphyla*			
10	Eucalyptus	*Eucalyptus* spp.			
11	Papri	*Holoptelia integrifolia*			
12	Arjun	*Terminalia arjuna*	20	0	4000
13	Shisham	*Dalbergia sissoo*			
14	Papri	*Holoptelia integrifolia*			
	Total		20	198.27	88579

3.3.3 List of plantation raised by Haryana Community Forestry Project Range, Rohtak during 2012-13

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Eucalyptus	*Eucalyptus* spp.	40	0	8000
2	Jamoya	*Jamoya* spp.	0	15	3750
3	Papri	*Holoptelia integrifolia*			
4	Pilkhin	*Pilkhin* spp.			
5	Arjun	*Terminalia arjuna*			
6	Neem	*Azadirachta indica*			
7	Draik	*Melia azedarach*			
8	Shisham	*Dalbergia sissoo*			
	Total		40	15	11750

3.2.4 List of plantation raised by Haryana Community Forestry Project Range, Rohtak during 2013-14

Sr.No.	Local Name	Botanical Name	Area covered		Plants planted
			Ha	RKM	
1	Safeda	*Eucalyptus hybrid*	50	0	10000
2	Arjun	*Terminalia arjuna*	0	20	5000
3	Draik	*Melia azedarach*			
4	Lasoda	*Cardia dichotoma*			
5	Neem	*Azadirachta indica*			
6	Shisham	*Dalbergia sissoo*			
7	Papri	*Holoptelia integrifolia*			
	Total		50	20	15000

CHAPTER-IV

4.0 Background Information about the Scheme/Project

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

4.1 Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder, water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

4.2 Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted artificially in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia lebbeck, Holoptelia integrifolia, Syzygium cuminii, Melia azadirach, Terminalia arjuna*

etc. However, the distribution depends upon the edaphic factor. Although though other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) and *Saccharum munja* are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas poor people earn their livelihood by selling products of domestic animals, like milk, meat and wood. They keep large herds of cattle. It has results in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing. Grazing by domestic cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon the weather conditions and incidence of grass growth. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire.

Generally it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practical under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages to seek

people participation at all level of project activities. The project which include Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

4.3 Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations has an adverse affect on the environment. Now a days it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i) To conserve and extend the existing forest and vegetative cover in the district of Rohtak for soil and moisture conservation and to preserve the natural biodiversity.

ii) To improve the growing stock by protection, regeneration and planning of local indigenous species.

iii) To conserve the forest habitats critical to biodiversity and protection of ecosystem.

iv) To protect the wildlife by providing them shelter and food.

v) To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.

vi) To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.

vii) To provide employment opportunities to the rural people living in the vicinity of these forests.

viii) To encourage the plantation and sustainable harvesting of NTFPs.

ix) To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

CHAPTER-V

5.0 Sampling Methodology

10 per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantations areas was available, sampling units measuring 50 m x 20 m (1000m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these,sampling units, all the live and dead plants wee separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

Name of Division	Agency (Forest Range)	Land Category	Scheme/ Component	Site Detail		Site selected for sampling			
				No. of sites	Plants Planted	No. of sites	Plants therein	No. of Samples taken	Plants sampled
Territorial Forest Division, Rohtak	Rohtak	Forest land/non forest land	FCA TP & NPV TP	7	14057	1	8625	34	862.5
	Rohtak	Forest land/non forest land	NPV RW	16	95000	2	18500	37	1850
	Rohtak	Forest land/non forest land	FCA RW	11	34442	1	16486	32.97	1648
	Rohtak	Forest land/non forest land	NPV ANR	2	3200	1	2600	13	260
	Meham	Forest land/non forest land	FCA TP & NPV TP	3	19640	1	2730	10.92	273
	Meham	Forest land/non forest land	FCA RW & NPV ANR	3	16380	2	16380	31.16	1638
Community Forest Division (HCFP) Panipat	CFP Range Rohtak	Non forest land/ Forest land	Bio-drainage (water logged area)	3	18000	1	2000	10	200
	CFP Range Rohtak	Non forest land/ Forest Land	Linear Tree Groves (LTG)	7	8750	2	3500	14	350
Total				52	209469	11	70821	183.05	7081.50

CHAPTER-VI

6.0 Results (Plantation 2012-13)

The results showing the survival percentage of plantation carried out in district Rohtak during the year 2012-13 are given below :

6.1.0 Ridge Work in Territorial Forest (2012-13)

6.1.1 Number of sampling units and survival percentage in Territorial Forest Range, Rohtak during 2012-13

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
North Bye Pass Block Sample	NPV RW	Areas =25 RKM No of plants = 12500 Species = Eucalyptus, Arjun, Frash	1	80.00	
			2	70.00	
			3	64.00	
			4	88.00	
			5	66.00	
			6	80.00	
			7	66.00	
			8	56.00	
			9	56.00	
			10	52.00	
			11	60.00	
			12	62.00	67.28
			13	62.00	
			14	56.00	
			15	68.00	
			16	70.00	
			17	88.00	
			18	56.00	
			19	50.00	
			20	52.00	
			21	56.00	
			22	86.00	
			23	82.00	
			24	80.00	
			25	76.00	

6.1.2 Number of sampling units and survival percentage in Territorial Forest Range, Rohtak during 2012-13

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
Rohtak South Bye Pass (Suneria Beat)	NPV RW	Areas =12 RKM No of plants = 6000 Species = Eucalyptus, Citri Dora, Papri, Frash	1 2 3 4 5 6 7 8 9 10 11 12	78.00 64.00 82.00 66.00 58.00 84.00 88.00 90.00 90.00 92.00 74.00 72.00	75.66

6.2.0 Tall Plantation in Territorial Forest (2012-13)

6.2.1 Number of sampling units and survival percentage in Territorial Forest Range, Meham during 2012-13

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
Bhali to Baniyani Garhi Road Block Kalanaur	FCA TP	Areas =10.92 RKM No of plants = 2730 Species = Arjun, Papri, Shisham	1 2 3 4 5 6 7 8 9 10 11	88.00 76.00 80.00 76.00 64.00 60.00 68.00 68.00 60.00 80.00 80.00	72.72

6.3.0 Bio-drainage Plantation in Community Forest (2012-13)

6.3.1 Number of sampling units and survival percentage in Haryana Community Forest Project Range, Rohtak during 2012-13

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
Muradpur Tekna/Meham/Kalanour	CAMPA Bio-Drainage	Areas =10 Ha No of plants = 2000 Species = Eucalyptus	1 2 3 4 5 6 7 8 9 10	55.00 60.00 75.00 60.00 60.00 70.00 70.00 65.00 60.00 6.00	63.50

6.4.0 LTG Plantation in Community Forest (2012-13)

6.4.1 Number of sampling units and survival percentage in Haryana Community Forest Project Range, Rohtak during 2012-13

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
Mokhra Basana Road (Maham) Kalanour	Linear Tree Groves (LTG)	Areas =6 RKM No of plants = 1500 Species = Shisham, Arjun, Papri, Neem, Bakan	1 2 3 4 5 6	64.00 68.00 72.00 60.00 76.00 80.00	70.00

7.0 Results (Plantation 2013-14)

The results showing the survival percentage of plantation carried out in district Rohtak during the year 2013-14 are given below :

7.1.0 Ridge Plantation in Territorial Forest (2013-14)

7.1.1 Number of sampling units and survival percentage in Territorial Forest Range, Rohtak during 2013-14

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
JSB Rohtak S Block	CAMPA FCA RW	Areas =32.97 RKM No of plants = 16486 Species = Shisham, Jamun, Kikar	1	78.00	
			2	82.00	
			3	72.00	
			4	70.00	
			5	60.00	
			6	54.00	
			7	58.00	
			8	58.00	
			9	56.00	
			10	68.00	
			11	60.00	
			12	80.00	
			13	82.00	
			14	72.00	
			15	76.00	72.26
			16	76.00	
			17	64.00	
			18	62.00	
			19	56.00	
			20	56.00	
			21	88.00	
			22	80.00	
			23	88.00	
			24	90.00	
			25	90.00	
			26	80.00	
			27	82.00	
			28	80.00	
			29	76.00	
			30	74.00	

7.1.2 Number of sampling units and survival percentage in Territorial Forest Range, Meham during 2013-14

Site	Scheme/Component	Site details	Sample No	Survival (%)	Average (%)
Drain No 8 Beat Lahli Block Kalanaur	FCA RW	Areas =19.04 RKM No of plants = 9520 Species = Jamun, Siris, Draik, Kikar, Shisham	1	82.00	
			2	86.00	
			3	86.00	
			4	80.00	
			5	76.00	
			6	76.00	
			7	76.00	
			8	74.00	
			9	72.00	74.73
			10	76.00	
			11	68.00	
			12	64.00	
			13	60.00	
			14	62.00	
			15	66.00	
			16	70.00	
			17	74.00	
			18	84.00	
			19	88.00	

7.1.3 Number of sampling units and survival percentage in Territorial Forest Range, Meham during 2013-14

Site	Scheme/Component	Site details	Sample No	Survival (%)	Average (%)
Drain No 8 Beat Lahli Block Kalanaur	CAMPA FCA RW	Areas =12.12 RKM No of plants = 6060 Species = Kikar	1	86.00	
			2	82.00	
			3	84.00	
			4	80.00	
			5	74.00	
			6	76.00	80.00
			7	74.00	
			8	76.00	
			9	78.00	
			10	88.00	
			11	84.00	
			12	86.00	

7.2.0 ANR Plantation in Territorial Forest (2013-14)

7.2.1 Number of sampling units and survival percentage in Territorial Forest Range, Rohtak during 2013-14

Site	Scheme/Component	Site details	Sample No	Survival (%)	Average (%)
Rohtak-Sonipat Road Kansala Beat	NPV ANR	Areas =13 Ha No of plants = 2600 Species = Papri, Shisham, Arjun	1	80.00	
			2	80.00	
			3	80.00	
			4	80.00	
			5	85.00	
			6	90.00	
			7	90.00	84.62
			8	80.00	
			9	90.00	
			10	90.00	
			11	95.00	
			12	85.00	
			13	80.00	

7.3.0 Tall Plantation in Territorial Forest (2013-14)

7.3.1 Number of sampling units and survival percentage in Territorial Forest Range, Rohtak during 2013-14

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
HSIIDC Rohtak Block Sampla Beat Kharawar	NPV TP	Areas =34.5 RKM No of plants = 8625 Species = Papri, Arju, Neem, Shisham, Jamun	1	80.00	
			2	80.00	
			3	72.00	
			4	76.00	
			5	64.00	
			6	76.00	
			7	68.00	
			8	60.00	
			9	56.00	
			10	64.00	
			11	80.00	
			12	84.00	
			13	84.00	
			14	80.00	
			15	68.00	
			16	64.00	
			17	68.00	73.44
			18	60.00	
			19	88.00	
			20	88.00	
			21	92.00	
			22	96.00	
			23	80.00	
			24	76.00	
			25	68.00	
			26	60.00	
			27	72.00	
			28	76.00	
			29	72.00	
			30	84.00	
			31	56.00	
			32	56.00	
			33	68.00	
			34	72.00	

7.4.0 Linear Tree Groves Plantation in Community Forest (2013-14)

7.4.1 Number of sampling units and survival percentage in Community Forest Range, Rohtak during 2013-14

Site	Scheme/ Component	Site details	Sample No	Survival (%)	Average (%)
Madina Ajaib Bhawar Road/ Meham	Linear Tree Groves (LTG)	Areas =8 RKM No of plants = 2000 Species = Lasoda, Arjun, Papri, Neem, Baken, Shisham	1	68.00	
			2	76.00	
			3	68.00	
			4	68.00	69.50
			5	80.00	
			6	64.00	
			7	60.00	
			8	72.00	

8.0 Analysis of Results

8.0.1 Table showing survival under different administrative systems irrespective of land use (2012-13)

Sr.No.	Administrative System		Overall Survival (%)
1	Territorial Forest		
	a) Rohtak Forest Range	71.47	72
	b) Meham Forest Range	72.72	
2	Community Forest		
	a) Rohtak Community Forestry Range	66.75	67

8.0.2 Table showing survival under different topographic/land use/planting system situations (2012-13)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	NPV RW Plantation	a) North Bye Pass Block Sampla	67.28	72
		b) Rohtak South Bye Pass	75.66	
2	FCA Tall Plantation	Bhali to Baniyani Garhi Road	72.72	72
3	Bio-drainage	Muradpur Tekna	63.50	63
4	Linear Tree Groves (LTG)	Mokhra, Basana Road	70.00	70

8.0.3 Table showing survival under different Administrative systems irrespective of land use 2013-14

Sr.No.	Administrative System		Overall Survival (%)
1	Territorial Forest		
	a) Rohtak Forest Range	76.77	77
	b) Meham Forest Range	77.37	
2	Community Forest		69
	a) Rohtak Community Forest Range	69.50	

8.0.4 Table showing survival under different topographic/land use/planting system situations (2013-14)

Sr. No.	Scheme	Site	Survival (%)	Overall Survival (%)
1	FCA Ridge Work	a) JSB Rohtak S Block b) Drain No. 8 Lahli Beat c) Drain No. 8 Lahli Beat	72.26 74.73 80.00	76
2	NPV ANR	Rohtak Sonipat Road	84.62	85
3	NPV Tall Plantation	HSIIDC Rohtak	73.44	74
4	LTG	Madina Ajaib Bhawar Road	69.50	69

The overall survival rate of tree plantation in Rohtak district of Haryana during 2012-13 and 2013-14 are tabulated below :

8.0.5 The survival rate of plantation in 2012-13

Agency	Land category	Scheme/ component	No. of sample taken	Average survival (%)	Overall survival (%)
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	NPV RW	25	67.28	69
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	NPV RW	12	75.66	
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	FCA TP	11	72.72	
Community Forest Range Rohtak	Non Forest Land/Private Land	Bio-drainage	10	63.50	
Community Forest Range Rohtak	Non Forest Land/Private Land	LTG	6	70.00	

8.0.6 The survival rate of plantation in 2013-14

Agency	Land category	Scheme/ component	No. of sample taken	Average survival (%)	Overall survival (%)
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	FCA Ridge Work	30	72.26	75
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	FCA Ridge Work	19	74.73	
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	FCA Ridge Work	12	80.00	
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	NPV ANR	13	84.62	
Territorial Forest Division, Rohtak	Forest Land/ Non Forest Land	NPV Tall Plantation	34	73.44	
Community Forest Range, Rohtak	Non Forest Land/Private Land	LTG	8	69.50	

CHAPTER-IX

9.0 Conclusion and Suggestions

9.1 Comment on survival rates

Performance of the plantation is variable, depending upon various factors such as soil depth, soil texture and soil structure. Climate and edaphic factors, the quality of planting stock and the maintenance of plantations are also responsible for the survival.

The overall survival of the plantations of 2012-13 in CAMPA scheme was found to be 69.59 per cent in Rohtak district. The highest (75.66%) survival was observed in NPV ridge work of the site Rohtak South Bye Pass, Sunaria beat in Rohtak Territorial Forest Range. The lowest (63.50%) survival was observed for bio-drainage (water logged area) in the site Muradpur Takna in Rohtak Community Forest Range. The 72.72 per cent of survival rate are observed in the site, Bali to Baniyani to Garhi Road under the component of FCA TP in Maham Range and 67.28 per cent of survival rate are observed in the site; North Bye Pass Block Sampla undr the component of NPV RW in Rohtak Forest Range of Territorial Forest Division Rohtak. 70 per cent of survival rate are observed in the site Mokhra Barana Road under LTG component of Community Forest Division, Rohtak.

The plantation raised in 2013-14 recorded overall survival rate is 75.79, this is greater from the overall survival recorded for the year 2012-13. The site Rohtak Sonipat Road Kanrala Beat, Rohtak Range under NPV ANR component observed highest (84.61%) survival rate followed by the site Drain No. 8 Lahli Beat 80 per cent and 74.73 per cent under FCA RW component in Meham Forest Range and 73.53 per cent for HSIIDC Rohtak Block Sampla site under NPV TP and 72.26 per cent for JSB Rohtak 8 Block site under FCA RW component in Rohtak. Forest Range of Territorial Forest Division Rohtak where as the plantation raised in Haryana Community Forest Project range Rohtak 2013-14 in the site Madina Ajaib Bhawar Road/Meham under LTG component recorded 69.38 per cent survival rate.

Finally it is concluded that the plantation raised in 2012-13 and 2013-14 under the different components of CAMPA scheme the survival of plantation in Territorial Forest Division Rohtak and Community Forest Range Rohtak found satisfactory.

9.2 People's Participation

Peoples are actively involved in Afforestation programme. Local peoples are engaged for Afforestation activity and for watch and ward. People get grass from the forest in reward to maintenance and care of the plantation area. They are avoiding grazing in the forest area. This participation has helped in establishment and survival of plant species. Social fencing and people's participation in combating the fire has enhanced sense of belonging of forest resource.

9.3 Choice of species and condition of planting stocks

Considering the edaphic, climatic and ecological conditions of the plantation areas, the choice of species is good which suit to the conditions. But, it is too late to judge the condition of planting stock.

9.4 Maintenance of records

The plantation register have been well maintained with all plantation information.

9.5 Project constraints

It was observed that there was regular flow of funds in CAMPA schemes. Low wages norms are also the constraints of the project.

9.6 Suggestions for improvement and recommendations

In order to improve the performance of the plantation the following suggestions have been made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in strip plantations along road side
- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.

9.7 Technological points

- Vigorous seedlings should be planted. Poorly grown seedlings should be culled and destroyed so that they could not be planted in any circumstances
- Attention should be paid for water harvesting and moisture conservation as most of the plantations have been done in moisture deficit conditions.
- Beating up should be done with original species.
- Tending operations should be done timely.

9.8 Administrative points

- Plantation raised should be maintained for more than three years.
- Villagers should be provided incentives for maintenance of the plantations.
- Adequate women representation should be there in the village forest committees.
- Administrative decisions should be taken timely for seed procurement, nursery raising, plantation and other operations at concerned levels.
- There should be smooth flow of funds.

9.9 Suggestions for improvement and recommendations

To increase the economic gain from low volume high value cash crop i.e. Medicinal and Aromatic plants. In order to improve the performance of the plantation the following suggestions have been made:

- Genetically improved planting stock should be used.
- Protection from grazing and browsing should be there in ridge and tall plantations along road side and railway sides
- Cultural operations should be done timely and properly
- There should be protection from fire and plantation areas should be adequately fenced.
- To increase the forest cover through afforestation activities by involving the local communities.
- The concept of social forestry and strip plantation should be increased in the project area.
- Most of the protected forests in the region are in the form of strip along roads, railway lines, canals and watercourses which are subjected to heavy biotic pressure. Proper fencing is needed to ensure plantation survival in these forest areas. Social fencing may be key factor for plantation success.
- Special projects like agro-forestry, farm forestry must be formulated for rural areas to reduce the pressure on natural forests to meet the requirement of local people for fuel, fodder, small timber and other forest produces.
- Tree improvement for commercially important species must be started to increase the forest productivity.
- Extension activities must be geared up to boost awareness generation among the people to sensitize them towards forestry related activities.

Annexure I : CAMPA APO for the year 2012-13 upto 31-3-2013 Rohtak Forest Division

Sr. No.	Name of Range	Name of Component	Name of Site	Location with exact Khasra No./KM & RD	Nature of Plantation (Kallar ridge and normal)	Target achieved		Type of plants (P. Bags/Tall Plants/Species and No. of Plants)	Total No. of Plant	Spacing (m)
						Ha	RKM			
	FCS									
1	Meham	TP	Bhali to Baniyani Garhi Road	KM 0 to 10 L&R	Normal		10.92	Arjun, Papri, Shisham	2730	4x4
2	Meham	TP	Khanaur Distributory	RD 40 to 100	Normal		64.64	Arjun, Shisham	16160	4x4
3	Rohtak	TP	Rohtak Beri Road	KM 7-10	Normal		1	Arjun, Papri, Shisham, Siris	250	4x4
			Total FCA				**76.56**		**19140**	
	NPV									
1	Rohtak	RW	Rohtak-Gohana Road	KM 14.5 to 17.5	Ridge		16	Euc. 5000, Frash 1000, Arjun 500, Amltas 500, Bakain 500, Shisham 500	8000	2x1
2	Rohtak	RW	Rohtak-Gohana Road	KM 8 to 13	Ridge		13	Euc. 3400, Papri 800, Shisham 1000, Anwala 300, Alanthus 1000	6500	2x1
3	Rohtak	RW	Jassia-Kahni Bye Pass	Railway line to Rukhi Flyover	Ridge		51	Euc. 15000, Shisham 5000, Citri Dora 1500, Papri 500, Bakain 700, Frash 1600, Arjun 1200	25500	2x1
4	Rohtak	RW	North Bye Pass	JLN to Baliyana Road Pull	Ridge		24	Euc. 7000, Shisham 1000, Frash 1500, Milia 500, Citri Dora 500, Papri 500, Bakain 500, Arjun 500	12000	2x1
5	Rohtak	RW	North Bye Pass		Ridge		25	Euc. 5000, Arju 1000, Frash 1000	12500	2x1
6	Rohtak	RW	North Bye Pass	Gohana Road to Railway Line	Ridge		7	Euc. 2500, Arjun 1000	3500	2x1
7	Rohtak	RW	Rohtak South Bye Pass		Ridge		12	Euc. 3500, Citri dora 1000, Papri 750, Frash 750	6000	2x1
8	Rohtak	RW	Rohtak South Bye Pass		Ridge		2	Arjun 1000	1000	2x1
			Total NPV				**150**		**75000**	

Annexure II : CAMPA Final APO for the year 2013-14 upto 31-3-2014 Rohtak Forest Division

Sr. No.	Name of Range	Name of Site	Name of Scheme	Name of Component	Location with exact Khasra No/KM and RD	Nature of plantation (Kallar ridge and Normal)	Target achieved		Total No. of Plant	Type of plants (P. Bags/Tall Plants/ Species and No. of Plants)
							Ha	RKM		
	FCS									
1	Rohtak	Drain No. 8	CAMPA	TP	RD 50 to 50.5	Normal		0.17	42	Neem, Shisham, Arjun
2	Rohtak	Drain No. 8	CAMPA	TP	RD 50.5 to 70	Normal		10.50	2625	Neem, Shisham, Arjun
3	Rohtak	Drain No. 8	CAMPA	TP	RD 70 to 80	Normal		2.56	640	Neem, Shisham, Arjun
		Total FCA TP						13.23	3307	
	Ridge Work									
1	Rohtak	Drain No. 8	CAMPA	RW		Normal		13.60	6800	Shisham, Jamun
2	Rohtak	Rohtak-Jhajjar Road	CAMPA	RW		Normal		7.30	3650	Kikar
3	Rohtak	JSB	CAMPA	RW		Normal		3.92	1960	Shisham, Jamun
4	Rohtak	JSB	CAMPA	RW	RD 0 to 10 L&R	Normal		10.36	5180	Kikar
5	Rohtak	JSB	CAMPA	RW	RD 0 to 10 L&R	Normal		0.36	180	Kikar
6	Rohtak	JSB	CAMPA	RW	RD 0 to 10 L&R	Normal		8.39	4196	Kikar
7	Rohtak	JSB	CAMPA	RW	RD 10 to 23 L&R	Normal		1.88	940	Kikar
8	Rohtak	JSB	CAMPA	RW	RD 23 to 30 L&R	Normal		1.90	950	Kikar
9	Rohtak	JSB	CAMPA	RW	RD 23 to 30 L&R	Normal		0.48	238	Kikar
10	Rohtak	JSB	CAMPA	RW	RD 23 to 30 L&R	Normal		0.50	250	Kikar
11	Rohtak	JSB	CAMPA	RW	RD 23 to 30 L&R	Normal		0.30	152	Kikar
12	Rohtak	JSB	CAMPA	RW	RD 23 to 30 L&R	Normal		0.12	60	Kikar
13	Rohtak	JSB	CAMPA	RW	RD 0 to 10 L&R	Normal		4.76	2380	Kikar
14	Rohtak	JLN Feeder	CAMPA	RW	RD 30 to 39 L&R	Normal		0.11	55	Kikar
15	Rohtak	JLN Feeder	CAMPA	RW	RD 150 to 151 R/side	Normal		1.85	923	Kikar
16	Rohtak	JLN Feeder	CAMPA	RW	RD 151 to 155 R/side	Normal		2.34	1172	Kikar
17	Rohtak	JLN Feeder	CAMPA	RW	RD 124 to 140 R/side	Normal		4.40	2200	Kikar
18	Rohtak	JLN Feeder	CAMPA	RW		Normal		2.40	1200	Kikar
19	Rohtak	Delhi Road Bye Pass	CAMPA	RW		Normal		3.12	1560	Kikar
20	Rohtak	DHS Road	CAMPA	RW		Normal		0.73	365	Kikar
21	Rohtak	DHS Road	CAMPA	RW		Normal		0.06	31	Shisham, Jamun
22	Meham	Drain No. 8	CAMPA	RW		Normal		12.12	6060	Siris, Draik
23	Meham	Drain No. 8	CAMPA	RW		Normal		19.04	9520	Kikar
		Total FCA RW						100.04	50022	
		Total FCA						113.27	53329	

	NPV									
1	Rohtak	Khani Bye Pass, Gohana Road	NPV	RW		Normal		6.5	3250	Gambhari, Shisham, Euc
2	Rohtak	Rohtak Gohana Road	NPV	RW	KM 16 to 19	Normal		5.0	2500	Fransh, Shisham, Euc
3	Rohtak	Brahmanwas Bye Pass	NPV	RW		Normal		3	1500	Fransh, Shisham, Euc
4	Rohtak	Rohtak North Bye Pass	NPV	RW	Gohana Road to BSB	Normal		6.5	3250	Fransh, Shisham, Euc
5	Rohtak	Rohtak North Bye Pass	NPV	RW	Sonipat Road to Baliyana	Normal		7	3500	Fransh, Shisham, Euc
6	Rohtak	Rohtak North Bye Pass	NPV	RW		Normal		1	500	Fransh, Shisham, Euc
7	Rohtak	Rohtak North and South Bye Pass	NPV	RW	Near Kharawar Vill.	Normal		10	5000	Fransh, Shisham, Euc
8	Rohtak	DHS Road	NPV	RW	KM 48-50	Normal		1	500	Fransh, Shisham, Euc
		Total RW NPV						**40.00**	**20000**	
1	Rohtak	Rohtak-Sonipat Road	NPV	ANR		Normal	3		600	Papri, Shisham, Arjun
2	Rohtak	Rohtak-Sonipat Road	NPV	ANR		Normal	13		2600	Papri, Shisham, Arjun
3	Meham	Rohtak Distributory	NPV	ANR	Singhpura Road to NH-10	Normal	4		800	Papri, Shisham, Arjun
		Total ANR NPV					20		4000	
1	Meham	Rohtak-Jind Road	NPV	TP		Normal		3	750	Shisham, Papri
2	Rohtak	Khani Bye Pass	NPV	TP		Normal		5.5	1375	Arjun, Shisham
3	Rohtak	Jasrana Minor	NPV	TP		Normal		2.0	500	Arjun, Shisham
4	Rohtak	HSIIDC Rohtak	NPV	TP		Normal		34.5	8625	Shisham, Papri, Arjun, Jamun, Neem
		Total TP NPV						**45**	**11250**	
		Total NPV					**20**	**85.00**	**35250**	

Annexure III : Plantation Works Executed in 2012-13 (Community Forestry Division, Panipat, Distt Rohtak)

Sr. No.	Type of land (Forest/Non-Forest Land)	Name of Range/ Block/ Beat	Name of Site	Khasra No./KM/RD	Plantation Month	Target achieved			No. of Species	No. of Plants	GPS Coordinates	
						Ha	RKM	No.			Longitude	Latitude
		Name of Scheme/ Component : Bio-Drainage (Water Logged Area)										
1	Forest Land Plantation	0	0	0		0	0	0	0	0	0	0
2	Reserve Forest	0	0	0		0	0	0	0	0	0	0
3	Compact	0	0	0		0	0	0	0	0	0	0
4	Rail	0	0	0		0	0	0	0	0	0	0
5	Road	0	0	0		0	0	0	0	0	0	0
6	Canal	0	0	0		0	0	0	0	0	0	0
7	Bundh	0	0	0		0	0	0	0	0	0	0
8	Unclassed	0	0	0		0	0	0	0	0	0	0
9	Forest U/S 38	0	0	0		0	0	0	0	0	0	0
10	Forest U/S 4&5	0	0	0		0	0	0	0	0	0	0
11	Total Forest Land Plantation	0	0	0		0	0	0	0	0	0	0
12	Non Forest Land Plantation	0	0	0		0	0	0	0	0	0	0
13	Panchayat Land	0	0	0		0	0	0	0	0	0	0
14	Community Land	0	0	0		0	0	0	0	0	0	0
15	Institutional Land	0	0	0		0	0	0	0	0	0	0
16	Farm Land	Rohtak/ Meham/ Kalanour	Muradpur Tekna	475, 477, 45, 63, 64, 65, 58, 60, 476, 421, 21, 46, 36, 25, 46, 65, 68, 28, 29	1/2013	30	0	0	C. Euc.	6000	28°52'46"N 28°52'44"N	76°26'57"E 76°27'0"E
		Rohtak/ Rohtak/ Rohtak	Lahli	376, 379	1/2013	10	0	0	C. Euc.	2000	28°51'39"N 76°27'43"E 28°51'39"N 76°27'41"E	28°51'39"N 76°27'43"E 28°51'39"N 76°27'41"E
17	Private Land	0	0	0	0	0	0	0	0	0	0	0
18	Any other land	0	0	0	0	0	0	0	0	0	0	0
	Total Non-Forest Land Plantation	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**8000**	**0**	**0**
	G. Total (Forest + Non-Forest Land Plantation)	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**8000**	**0**	**0**

		Name of Scheme/ Component : LTG										
1	Forest Land Plantation	0	0	0	0	0	0	0	0	0	0	0
2	Reserve Forest	0	0	0	0	0	0	0	0	0	0	0
3	Compact	0	0	0	0	0	0	0	0	0	0	0
4	Rail	0	0	0	0	0	0	0	0	0	0	0
5	Road	0	0	0	0	0	0	0	0	0	0	0
6	Canal	0	0	0	0	0	0	0	0	0	0	0
7	Bundh	0	0	0	0	0	0	0	0	0	0	0
8	Unclassed	0	0	0	0	0	0	0	0	0	0	0
9	Forest U/S 38	0	0	0	0	0	0	0	0	0	0	0
10	Forest U/S 4&5	0	0	0	0	0	0	0	0	0	0	0
11	Total Forest Land Plantation	0	0	0	0	0	0	0	0	0	0	0
12	Non Forest Land Plantation	0	0	0	0	0	0	0	0	0	0	0
13	Panchayat Land	Rohtak/ Maham/ Kalanour	Mokhra water works	Govt. Land	9/2012	0	6	0	1000 Jamoa 500 Papri	1500	28°52'57"N 28°52'54"N	76°25'47"E 76°25'47"E
		Rohtak/ Maham/ Kalanour	Mokhra water works	990	2/2013	0	3	0	100 Jamoa 200 Pilkhin 50 Arjun 400 Neem	750	28°56'19"N 28°56'19"N	76°23'1"E 76°23'51"E
14	Community Land	0	0	0	0	0	0	0	0	0	0	0
15	Institutional Land	0	0	0	0	0	0	0	0	0	0	0
16	Farm Land	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0
17	Private Land	0	0	0	0	0	0	0	0	0	0	0
18	Any other land	Rohtak/ Maham/ Kalanour	Mokhra Basana Road	0.5 KM L&R	2/2012 9/2012	0	6	0	400 Shisham, 400 Arjun, 400 Papri, 150 Neem, 150 Bakan	1500	28°56'19"N 28°56'19"N	76°23'1"E 76°23'51"E
	Total Non-Forest Land Plantation	0	0	0	0	0	15	0		3750		
	G. Total (Forest + Non-Forest Land Plantation)	0	0	0	0	0	15	0		3750		

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Sonepat District (Haryana) Under State CAMPA Scheme

Regional Centre
National Afforestation and Eco-development Board
(Ministry of Environment and Forests, Govt. of India)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan 173 230 (HP)

Monitoring & Evaluation of Works Carried out during 2012-13 & 2013-14 in Sonepat District (Haryana) under State CAMPA Scheme

P. Kaushal
Dinesh Sharma
Sarwan Kumar

Regional Centre
National Afforestation and Eco-Development Board
(Ministry of Environment and Forests, GoI)
Dr YS Parmar University of Horticulture and Forestry
Nauni, Solan (H.P.) 173 230

ACKNOWLEDGMENTS

The Regional Centre, National Afforestation and Eco-development Board, Ministry of Environment and Forests, Govt. of India. has carried "Monitoring & Evaluation of the Works under State CAMPA Scheme for the year 2012-13 & 2013-14 in Sonepat District (Haryana)". This report is the outcome of the sincere efforts of members of the research team who are associated with its preparation.

The Centre express thanks of Department of Forests, Govt. of Haryana for assigning the task.

We are thankful to the Divisional Forest Officer, Sonepat and his staff for providing necessary information and kind cooperation during the field visits.

The cooperation and valuable contribution made by the secretarial staff for typing this document is also acknowledged.

P Kaushal
Regional Director /Coordinator

CONTENTS

DISTRICT BACKGROUND

Location and Boundaries

The Sonepat district of Haryana lies between $28^0$48'30" and 29^0 17' 54" North latitude and 76^0 28' 30" and 77^0 13' 40" East longitude. It is bounded by Panipat district in north. To its north west and west is Jind district. To its south-west and south are the Rohtak district and the state of Delhi respectively. The Yamuna river marks the eastern boundary of the district and across the river lies Meerut district of Uttar Pradesh. Throughout the district lies the network of Roads, Canals, Drainage distributaries and Railway lines along which state owned strip forests are situated.

Geology (Rock and Soil)

The Sonepat district falls in the great Indo Gangetic Alluvial plain and the whole district is covered with Quaternary deposits. The area is conspicuously flat and has a master slope from north to south. The quaternary sediments of the area are composed of recent and fresh matter deposits of clay slit and sand, which are of loose to semi consolidated nature of recent or sub recent age. The geological classification of the Sediments depending upon relative deposition, occurrence, development of soil thickness, Oxidation etc. has been broadly made into two formation namely older Alluvial formation and Jamuna older Alluvial formation.

Topography

The Sonepat district occupies a part of Indo Gangetic alluvial tract. The alluvium was deposited in the quaternary period. So it is geologically young and so is the topographic expression developed in the Alluvial terrain. The Indo Gangetic alluvium is a major geological sedimentary basin and topographic division of India. The thickness of alluvial cover over the basement rock is not precisely known but, but it may be anywhere up to 2 km thick at many places. Geologically Indo Gangatic Alluvium is classified into *newer* alluvium or *Khadar* and older alluvium or *bhanger*. These basic divisions of the alluvium not only reflect the geomorphic process but also the characteristic topographies associated with each type of alluvium.

The part of the alluvium that has been extensively reworked by fluvial activity in recent is the *newer alluvium* or the Khadar. The topography of this surface is expressed by numerous buried channels, palaeochannels oxbow lakes, meander scrolls and point bares.

On the basis of geomorphic evaluation three geological environments and consequently related topographies have been recognized in the Sonepat district.

Climate

The climate of the Sonepat district is dry with intensely hot summer and a cold winter. Only during the three monsoon months i.e. July to September weather is comparatively milder due to penetration of moist air of oceanic origin in this district.

The year may be divided into four distinct seasons. The winter season starts by November and extends upto about the middle of March. This is followed by hot season, which continues upto June end when the South west monsoon arrives over the district. The south west monsoon remains active during July to September. The post monsoon months October and November constitutes a transition period from the monsoon to winter conditions.

January is the coldest month where daily temperature is about 21^0 C and mean daily minimum is about 7^0 C both day and night temperature fall down during November. In winter months there are during cold waves which affect the district due to western disturbance passing across north India, minimum temperature may sometime go down to the freezing point of water and frost may occur. From about the middle of March, temperature begins to rise rapidly. May and June are the hottest months. From April the hot westerly winds called *"Lu"* blow and heat is intense. In May and June maximum temperature may sometime reach about 47^0C with advance of South west monsoon by the end of June, day temperature drops while right temperature continue to be high. During south west monsoon the weather is stuffy and uncomfortable due to high humidity.

The air is dry during the greater part of the year. In the monsoon months the humidity is high about 70 percent. April and May are usually the driest months. Humidity in the afternoons remains less than 20 percent.

During the monsoon particularly in July and August the skies are heavily clouded. In the rest of the year, the skies are generally clear or lightly clouded. In January, February and March, the skies become cloudy and sometime overcast due to western disturbances.

Winds are generally light during the post monsoon and winter months. They strengthen a little during the summer and monsoon months. Winds are predominantly easterly or south easterly in or south-easterly in the monsoon season. They are mostly westerly or north-westerly during the morning and blow from directions between north and north-west during afternoons.

April to June is the period with the highest incidence of thunderstorms and dust storm. Violent squalls (andhi) often accompany such storm. While some of the thunderstorms, are dry, others are accompanied by heavy rain and occasionally hail. Rain during the monsoon months is often accompanied by thunder. Fogs, sometimes dense, occur in the winter month in the rear of the western disturbances.

Agency undertaken plantation in the district

Sonepat territorial forest division is the Nodal agency which carried out afforestation activities of CAMPA during 2012-13 and 2013-14.

The Community Forestry Project (CFP) division Panipat having range office at Sonepat also carried out afforestation work under CAMPA in the district. The Territorial Forest Division Sonepat carried out activities of CAMPA in three ranges, Sonepat, Gohana and Rai.

INFORMATION ABOUT THE CAMPA SCHEME / PROJECT

Ministry of Environment and Forests (MoEF), Govt. of India had issued guidelines on 2nd July 2009 for establishing CAMPAs in the States/UTs. The State Compensatory Afforestation Fund Management and Planning Authority, Haryana known as State CAMPA, Haryana was constituted in 2010 vide notification No. 5330-Ft-409/511 dated 18-1-2010 in accordance with the guidelines of the Ministry of Environment and Forests (MoEF), Govt. of India. The State CAMPA, Haryana receives funds from the Ad-hoc CAMPA, MoEF, GoI. The fund has two components namely Compensatory Afforestation and Net Present Value. Compensatory Afforestation fund is used for plantation while money for Net Present Value is used for activities relating to conservation of forests and wildlife, development of infrastructures in these sectors and other related works. The funds received from the Ad-hoc CAMPA have been utilized in various activities as per the annual plan of Operation duly approved by the Steering Committee chaired by Chief Secretary, Govt. of Haryana. The major activities include plantation; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvement; soil and water conservation, development of infrastructures; capacity building and other activities.

The conservation, development and other related activities are being carried out in all 21 districts of the state. These activities are carried out by four wings of the Forest Department viz. Territorial, Community Forestry, Wildlife and Development wings. Territorial wing has four circles, Community Forestry two, Wildlife two and Development wing two circles. There are 21 Territorial Divisions seven Community Forestry Divisions, four Wildlife Divisions and four Development Divisions. Thus there are 35 divisions who carried out various activities with CAMPA funds.

Major activities include plantations under different models; conservation, protection and management of wildlife and its habitat within and outside protected areas; research and tree improvements; soil and water conservation; development of infrastructures; capacity building and other activities.

Aims and Objectives

State CAMPA shall seed to promote :

- Conservation protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which includes :
    a. Provision of goods such as wood, non-timber forest products, fuel, fodder. water and provision of services such as grazing, tourism, wildlife protection and life support.
    b. Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes.
    c. Non-material benefits obtained from eco-systems, spiritual, recreational, aesthetic, inspiration, educational and symbiotic.
    d. Supporting such other services necessary for the production of eco-system services, biodiversity nutrient cycling and primary production.
- Research, training and capacity building

Problems to be addressed

The area under this district have nearly every type of soils but the maximum areas is under alkaline category. The major species planted in these areas are *Dalbergia sissoo, Acacia nilotica, Eucalyptus hybrid, Azadirachta indica, Albizia procera, Delonix regia, Cassia siames, Melia azadirach, Terminalia arjuna* etc. However, the distribution depends upon the edaphic factor, although other species are also present in small patches or in scattered form. The areas have failed to regenerate due to adverse soils having high content of salts and waterlogged area, excessive grazing and biotic pressure and inappropriate technique of plantations.

Grasses like *Saccharum spontancum* (Kans) are found in low lying areas such as streambeds and grow gregariously which suppress young plants. *Erianthus munja* (Kana, Munj) is common in sandy areas and has extensive root system and does not allow other species to establish in the rural areas. Poor people earn their livelihood by selling products of domestic animals, like milk, meat and wool. They keep large herds of cattle. It has resulted in a huge increase in grazing pressure on forest areas. Because no pasture land is available for grazing, therefore, grazing by cattle and browsing by sheep and goats is quite serious problem in the plantation sites.

The degree of damage depends upon weather conditions and incidence of grazing and browsing. All the economically important species like shisham and eucalyptus are highly susceptible to fire and the plantations are damaged more or less completely after break out of a single fire. Generally, it occurs in low lying area along cannal and road is detrimental to the establishment of tree crop. Some grasses like kana, dabh, patera etc flourish on water logged areas and suppress the young plants. Porcupine, rats and rabbits damaged the young plantation while digging their burrows and nibbling the roots of young plants.

In addition, ecological problems are coupled with various socio-economic problems of the inhabitants like lack of proper management to available natural resources, subsistence level of agriculture technology practiced under waterlogged areas, lack of irrigation facilities Small and fragmented land holding and lack of horticultural technology etc. The increase in human and cattle population has again led to destruction of vegetation in the forest trees. The project envisages seeking people participation at all level of project activities. The project which includes Afforestation, soil and water conservation measures etc are to be executed with active involvement of local people. Thus the project is based on an integrated approach for ecological and socio-economic development of the areas.

Planned Outputs and General Objectives of Management

The various components of the project which have been proposed to be carried out during the project period area as follows :

- People participation
- Microplanning
- Compensatory Afforestation and Net Present Value
- Natural regeneration
- Pasture development
- Plantations under different models
- Technology extension
- Conservation, protection and management of wildlife and its habitat
- Soil and water conservation
- Development of infrastructure, capacity building and other activities
- Monitoring and evaluation

The ever increasing human and cattle populations have an adverse effect on the environment. Now a day it is of paramount importance to restore the ecological balance and also to meet the fuel and fodder requirement of the local population. In an agricultural predominant state like Haryana it is difficult to increase the forest area. In such a scenario it is essential that the stress is laid on increasing the productivity of the available forest area. Keeping the above facts in view, the objectives of the management for this plan period is as under :

i. To conserve and extend the existing forest and vegetative cover in the district of Ambala for soil and moisture conservation and to preserve the natural biodiversity.

ii. To improve the growing stock by protection, regeneration and planning of local indigenous species.

iii. To conserve the forest habitats critical to biodiversity and protection of ecosystem.

iv. To protect the wildlife by providing them shelter and food.

v. To increase carbon sequestration by the forest fauna so as to mitigate the adverse effects of climate change.

vi. To turn the irregular forest into normal forest with all age gradation, so as to provide forest produce at sustained basis and make logging planning easier.

vii. To provide employment opportunities to the rural people living in the vicinity of these forests.

viii. To encourage the plantation and sustainable harvesting of NTFPs.

ix. To encourage people's participation, especially with involvement of women and weaker sections wherever possible in forest management as per National Forest Policy, 1988.

List of activities undertaken under CAMPA scheme for the year 2012-13

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	Yes
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Plantation of native species in Saraswati forest	No
vii.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
viii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	Yes
ix.	Buildings for frontline staff	Yes
x.	Training of frontline and ministerial staff	No
xi.	Capacity building and strengthening of village level forestry institution	No
xii.	Urban forestry plantation of tall plants in Urban areas	No
xiii.	Silt retention dam at Khol-hi-raittan	No
xiv.	Crate wire structure at Bir Shikargah	No
xv.	Digging of ponds in Sarswati conservation reserve forests	No
xvi.	Deepeining of ponds in Bhor Shaidan Crocodile breeding centre	No
xvii.	Silt retention structure in Amwali khol of Kalesar wildlife sanctuary	No
xviii.	Crate wire structure Bir sikargh WLS behind VCC	No
xix.	Protection centre in Nahar wildlife sanctuary	No
xx.	Pasture development in Nahar wildlife sanctuary	No
xxi.	Construction of WHS in Mohinder garh and Rewari	No
	Sukhna Catchment	
xxii.	Afforestation	No
xxiii.	Land treatment silt retention Dam	No
xxiv.	Wire crate structure	No

List of activities undertaken under CAMPA scheme for the year 2013-14

Sr No.	Component	Yes/ No
A	Compensatory afforestation	Yes
B	Proposal of works under NPV	Yes
i.	Conservation, protection and management of wildlife and its habitat	No
ii.	Research and seed development activities	No
iii.	Aided natural regeneration in natural forests to improve density of forests 200 plants per ha.	Yes
iv.	Plantation of tall plantation in linear forests 250 plants per RKM including brush wood round fence	Yes
v.	Plantation on ridges in depression areas in liner forests 500 plants per RKM	Yes
vi.	Land reclamation by plantation on farm lands (environmental services) 200 plants per ha.	Yes
vii.	Plantation of tree grooves (environmental services) 19/250 tall plants per tree grooves /RKM	Yes
viii.	Buildings for frontline staff	Yes
ix.	Plantation of native species in Jind bir	No
x.	Plantation of Chaal & Jhingen in Shiwalic hills	No
	Sukhna Catchment	
xi.	Afforestation	No
xii.	Planation of bhabar grass	No
xiii.	Land treatment silt retention Dam	No
xiv.	Construction of crate wire structure	No

Agencies undertaking plantations and other CAMPA works in the District

Sonepat Territorial Forest Division is the nodal agency, which carried out afforestation activity during 2012-13 and 2013-14 and Community Forestry Project (CFP) under take the Plantation work in the district of Sonepat range.

Number of species and plants planted in CAMPA during 2012-13

Sr. No.	Name of species	Total number of plants
1	*Holoptelia integrifolia*	14580
2	*Dalbergia sissoo*	5500
3	*Syzygin cum*	4000
4	*Eucalyptus spp.*	107195
5	*Ailamthus exculsa*	2544
6	*Terminalia arjuna*	4500
7	*Acacia nilotica*	9500
8	*Other*	8700
	Total	**156519**

Number of species and plants planted in CAMPA scheme during 2013-14 by Sonepat Forest Division

Sr. No.	Name of species	Total number of plants
1	*Eucalyptus spp.*	36000
2	*Acacia nilotica*	1500
	Total	**37500**

In Community Forestry Project (CFP) range Sonepat 14100 member of *Eucalyptus spp.* were planted in 70.10 ha of farm land during the year 2012-13. During 2013-14 2500 number of the plants of *Terminalia arjuna, Albigzia procerra* and *Azadarachta indica* etc. were planted by the Community Forestry Project Sonepat.

INVENTORY OF PLANATION

The plantations raised by the various agencies during 2012-13 and 2013-14 under CAMPA scheme in Sonepat district are as follows:

Plantation raised by Sonepat forest division under CAMPA scheme for the year 2012-13

Range block beat	Scheme	Component	Reach	RD/KM	Planation	Target RKM	No. of plant	Species
Gohana Moi Rukhi	NPV	Ridge	NH-71 A	50-62 km	Ridge	25	12500	Khumer 1500. Euc 3500, Papri 2000. Jamun 2000. Shisham. 1500. Arjun 2000
Gohana ., Gohana, Gohana	-do-	-do-	NH-71 A	33-40 Km	Ridge	55	27500	Khumer 1500. Eucalyptus 24000. Jammu 500. Shisham 1500
Gohana Gohana, Mudlana	-do-	-do-	NH-71 A	24-33 Km	Ridge	55	27500	Khumer 1500, Eucalyptus 24000. Jammu 500. Shisham 1500
Gohana Moi, Mahra	-do-	-do-	Gudda Pvt. Land	Section 4&5	Ridge	23	11500	Khumer 2000. Eucalyptus 2000, Papri 2000. Arjun 2000, Kikar, 2500, Jamun 1000
Gohana Moi, Rukhi	-do-	-do-	Bhainswan Khurd Pvt. Land	Section 4&5	Ridge	30	15000	Khumer. 2000. Eucalyptus 12000. Shisham 1000
	Total NPV					**188**	**94000**	
Rai Kharkhoda Sisana	CAMPA	TP	Sisana Minor	26-60 RD L&R	TP	12	3000	Papri 2500, Arjun 500
Rai Kharkhoda Jharoth	-do-	-do-	Jattola Minor		TP	7	1750	Papri 1750
	Total TP					**19**	**4750**	
Rai kharkhoda jharoth	CAMPA	Ridge	Bawana link road	0-10 Km	Ridge	18	9000	Eucalyptus 9000
Rai kharkhoda jharoth	-do-	-do-	Jattola minor	11-27 RD L&R	Ridge	10	5000	Eucalyptus 5000
Rai kharkhoda jharoth	-do-	-do-	Pia distry butary	18-38 RD	Ridge	15.39	7695	Eucalyptus 7695
Rai kharkhoda Sisana	-do-	-do-	Sisana minor	26-35 RD L/S	Ridge	5	2500	Eucalyptus 2500

Gohana bichpari ishapur kheri	-do-	-do-	Baroda minor	0-30 RD L&R	Ridge	20	10000	Eucalyptus 10000
Gohana bichpari bichpari	-do-	-do-	Butane distry butary	16-34 RD L&R	Ridge	10	5000	Eucalyptus 5000
Sonepat bhatgaon kakroi	-do-	-do-	CLC	220-238 RD L/S	Ridge	5	2500	Eucalyptus 2500
	Total					83.39	41695	
Rai bahalgarh khewra	CAMPA	Pits	Jamuna bandh	Bakipur to Delhi border	Pit	48.71	16074	Kikar 7000, Papri 6530, Alanthus 2544
	Total					**48.71**	**16074**	
	CAMPA Total					**151.1**	**62519**	
	Grand total Sonepat division					**339.1**	**156519**	

Plantation raised by Sonepat forest division under CAMPA scheme for the year 2013-14

Range block beat	Component	Ream Km/RD	Plantation	Target allotted RKM	No. of plant	Species
Sonepat dubheta khubru	CAMP Ridge	Delhi parller	Ridge	10	5000	Eucalyptus 5000
Rai kharkhoda nahra	-do-	Delhi branch RD 238 to 256 R/S	Ridge	10	5000	Eucalyptus clonal 5000
Rai bahalgarh jigdishpur	-do-	Nahri major RD 16 to tail	Ridge	10	5000	Eucalyptus clonal 3500 Kikar 1500
Rai kharkhoda kharkhoda	-do-	NCR rohna minor RD 14 to 18	Ridge	5	2500	Eucalyptus 2500
Gohana bichpari bichpari	-do-	Bichpari minor RD 0-35 L/S	Ridge	25	12500	Eucalyptus clonal 12500
Gohana kathura rindhana	-do-	Rindhana drian RD 0 to tail	Ridge	10	5000	Eucalyptus clonal 5000
Gohana bichpari bichpari	-do-	Butane Distry Butary RD 32 to 40 L/S	Ridge	5	2500	Eucalyptus clonal 2500
	Total Ridge			**75**	**37500**	

2013-14

Scheme	Component	Area	Plants	Species
CAMPA	Ridge	75 RKM	37500	Eucalyptus clonal
	Total	**75**	**37500**	

Community Forest Project 2013-14

Site	Location		Area RKM	Total plant	Species
Road	Badwasni to Bhagn road	0-3 L/R	2.5	625	Arjun, Kadam, Siris, Papri Neem, Jameo
	Rithal to Dhamar road	0-4 L/R	5.0	1250	Altisina, Chakrasia, Shisham, papri, Neem
	Naurna Khera to Janta Bitana road	0-2 L/R	2.5	625	Alestonia, Jamoa, Shisham
	Total		**10**	2500	

BUDGET DETAILS

The budget details of CAMPA scheme in Sonepat forest division for the year 2012-13 and 2013-14 are as under :

Budget details of the CAMPA scheme for the year 2012-2013

Budget sub head	Previous (Rs.)	Current (Rs.)	Total (Rs.)
Minor works			
Compensatory afforestation (151.05+ 20 RKM)	2402892	1807142	4210034
Machinery	0	0	0
Building	1804263	543437	2347700
Other	12900	19850	32750
Proposal of work under NPV			
Plantation of TP (0 RKM)	0	0	0
Ridge (188 RKM)	4289784	1773814	6063598
Total 17 minor work	**8509839**	**4144243**	**12654082**
18 Maint.			
CAMPA (CA) (56.35 RKM) yr. 2011-12	7703	233597	310600
NPV (Ridge) (10 RKM) yr. 2011-12	0	42000	42000
Tall plant (10 RKM) yr. 2011-12	27262	62738	90000
CAMPA (CA) (68.78 RKM) yr. 2010-11	30996	103604	134600
NPV (Ridge) (20 RKM) yr. 2010-11	0	40000	40000
Tall plant (10 RKM) yr. 2010-11	15456	544	16000
Total 18 Maint.	**150717**	**482483**	**633200**
Total scheme	**8660556**	**4626726**	**13287282**

Budget details of the CAMPA scheme for the year 2013-2014

Budget sub head	Organization grant (Rs.)	Previous (Rs.)	Current (Rs.)	Total (Rs.)
17 Minor works				
Compensatory afforestation 75 RKM	2442000	1108391	1333609	2442000
Machinery				
Building	100000	100000	0	100000
Other			0	
Proposal of work under NPV				
Raising of TP in 2013-14 for 14-15, @ 10/-	544020	544020	0	544020
Ridge (0 RKM)				
Total 17 minor work	**3086020**	**1208391**	**1877629**	**3086020**
18 Maint.				
CAMPA (CA) (TP 19.08 RKM yr. 2012-13 @ 9505/-	181355	90678	90677	181355
CAMPA (CA) (Pits 48.71 RKM yr. 2012-13 @ 3800/-	185098	92549	92549	185098
CAMPA (CA) (Ridge 103.26 RKM yr. 2012-13 @ 5135/-	530297	286530	243767	530297
NPV (Ridge) (188 RKM) yr. 2012-13	965380	761567	203813	965380
CAMPA (CA 36.35 RKM yr. 2011-12	72700	58175	14525	72700
CAMPA (CA 68.76 RKM yr. 2010-11	103170	68780	34390	103170
NPV (Ridge) (10 RKM) yr. 2011-12	20000	16600	3400	20000
Tall plant (10 RKM) yr. 2011-12	22000	9900	12100	22000
Total 18 Maint.	**2080000**	**1384779**	**695221**	**2080000**
Total scheme	**5166020**	**2593170**	**2572850**	**5166020**

SAMPLING METHODOLOGY

Ten per cent of the total area of the plantations under each component of CAMPA was sampled. Where the sufficient plantation areas were available, sampling units measuring 50 m x 20 m (1000 m^2) of unit size of 0.1 ha were laid out at random from one end to the other end of the plantation. In strip plantations, line samples of 100 m long were taken along roadside and railway side plantations. The samples taken were unbiased and random. In all these sampling units, all the live and dead plants were separately counted, recorded and survival percentage was calculated by applying the method i.e. living plants x 100 divided by total number of plants planted there in.

The basis of selection of sampling sites

Year	Agency	Land category	Scheme	Site details		Site selected for sampling			
				No of site	Plant planted	No. of sites	Plants there in	No. of sample taken	Plant sampled
2012-13	Territorial forest division Sonepat	Govt: land	NPV Ridge	5	94000	1	12500	25	1250
	-	-	CAMPA TP	3	20824	1	3000	12	300
	-	-	CAMPA Ridge	7	41695	3	15000	30	1500
	CFP Sonepat	Farmer land	Bio-drainage	7	14100	3	2720	38	272
2013-14	Territorial forest division Sonepat	Govt. land	CAMPA Ridge	7	37500	4	25000	50	2500
	CFP Sonepat	Govt. land	LTG	3	2500	2	1250	6	125
	Total			**32**	**210619**	**14**	**59470**	**161**	**5947**

\RESULTS (PLANTATION 2012-13)

The results showing the survival percentage of plantation carried out in Sonepat district during the year 2012-13 are given below : .

Number of sampling units and survival percentage in Sonepat forest division during 2012-13

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Baroda minor	CAMPA Ridge	Area No. of plant Major Species	20 RKM 10000 Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	80.00 68.00 78.00 74.00 70.00 56.00 86.00 62.00 64.00 76.00 82.00 66.00 64.00 82.00 86.00 82.00 70.00 56.00 42.00 68.00	71.10
Gohana NH 71-A	NPV Ridge	Area No. of plant Major Species	25 RKM 12500 Eucalyptus Papri Jamun Shisham	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	60.00 64.00 88.00 90.00 94.00 88.00 70.00 68.00 64.00 64.00 72.00 76.00 86.00 88.00 90.00 80.00 74.00 68.00	76.56

				19	64.00	
				20	76.00	
				21	78.00	
				22	82.00	
				23	88.00	
				24	70.00	
				25	62.00	
Sisna Minor RD-26-30 LR	CAMPA TP	Area No. of plant Major Species	12 RKM 3000 Papri Arjun	1 2 3 4 5 6 7 8 9 10 11 12	60.00 56.00 68.00 72.00 56.00 64.00 68.00 64.00 52.00 48.00 68.00 76.00	62.66
Sisna Minor RD-26-35 L/S	CAMPA Ridge	Area No. of plant Major Species	05 RKM 2500 Eucalyptus	1 2 3 4 5	68.00 56.00 88.00 78.00 64.00	70.80
CLC Kakrio	CAMPA Ridge	Area No. of plant Major Species	05 RKM 2500 Eucalyptus	1 2 3 4 5	76.00 66.00 82.00 80.00 72.00	75.20

Number of sampling units and survival percentage in Sonepat forest division during 2013-14

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Delhi paralled	CAMPA Ridge	Area No. of plant Major Species	10 RKM 5000 Eucalyptus	1 2 3 4 5 6 7 8 9 10	64.00 88.00 92.00 92.00 82.00 76.00 78.00 68.00 74.00 84.00	79.80
Bichpari minor	CAMPA Ridge	Area No. of plant Major Species	25 RKM 12500 Eucalyptus	1 2 3 4 5 6 7	86.00 92.00 90.00 76.00 84.00 88.00 86.00	86.00

				8	72.00	
				9	90.00	
				10	96.00	
				11	72.00	
				12	84.00	
				13	80.00	
				14	76.00	
				15	90.00	
				16	94.00	
				17	84.00	
				18	88.00	
				19	86.00	
				20	78.00	
				21	68.00	
				22	60.00	
				23	84.00	
				24	72.00	
				25	78.00	
Sonepat. major RD 16-raint	CAMPA Ridge	Area No. of plant Major Species	10 RKM 5000 Eucalyptus Kikar	1 2 3 4 5 6 7 8 9 10	86.00 78.00 92.00 84.00 68.00 72.00 88.00 96.00 70.00 68.00	80.20
Gohana butane, Dist RD 22 to 44	CAMPA Ridge	Area No. of plant Major Species	05 RKM 2500 Eucalyptus	1 2 3 4 5	88.00 76.00 92.00 80.00 82.00	83.60

Number of sampling unit and survival percentage in Community Forestry Project (CFP) range Sonepat during 2012-13.

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Lohari tibb	CAMPA Bio drainage	Area No. of plant Major Species	5.6 RKM 1120 Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14	75.76 90.90 84.85 84.85 98.48 100.00 96.96 69.69 84.85 96.96 72.72 93.94 81.81 90.90	84.09

Gangra farm land	Bio drainage	Area No. of plant Major Species	5 RKM 1000 Eucalyptus	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	96.96 72.72 81.81 100.00 90.90 80.80 100.00 81.81 83.33 78.79 100.00 96.96 98.48 87.87 93.94	89.72
Kakrio farm land	Bio drainage	Area No. of plant Major Species	3.25 RKM 600 Eucalyptus	1 2 3 4 5 6 7 8 9	84.85 98.48 72.72 100.00 80.80 81.81 100.00 100.00 96.96	90.60

Number of sampling unit and survival percentage in Community Forestry Project (CFP) range Sonepat during 2013-14.

Site	Scheme	Site details		Sample No	Survival (%)	Average (%)
Badwasmit Bharu road	CAMPA LTG	Area No. of plant Major Species	2.5RKM 625 Arjun, Siris Pepri	1 2 3	72.00 68.00 80.00	73.33
Naurna khera to Janta butan road	CAMPA LTG	Area No. of plant Major Species	2.5 RKM 625 Alestoria Jamun	1 2 3	60.00 80.00 76.00	72.00

ANALYSIS OF RESULTS

The analysis results of the survival rate study are being presented in this chapter

Overall survival rate for Sonepat forest division under different scheme during 2012-13

Range	Scheme	Site	Survival (%)	Overall (%)
Gohana	CAMPA ridge	Baroda minor	71.10	71.27
-do-	NPV ridge	NH 71	76.56	
Rai	CAMPA TP	Sisma minor	62.66	
-do-	CAMPA ridge	Sisma minor	70.82	
-do-	CAMPA ridge	CLC Kakrio	75.20	

Overall survival rate for Sonepat forest division under different scheme during 2013-14

Range	Scheme	Site	Survival (%)	Overall (%)
Sonepat	CAMPA ridge	Delhi Pankula	79.80	81.42
Gohana	CAMPA ridge	Bichpari minor	82.08	
Rai	CAMPA ridge	Nihari minor	80.20	
Gohana	CAMPA ridge	Batana minor	83.60	

Overall survival rate for Sonepat range under Community Forest Project during 2012-13

Range	Scheme	Site	Survival (%)	Overall (%)
Sonepat	Bio drainage	Lohaitibba	87.59	89.30
	-do-	Gangra farm land	89.72	
		Kakri farm land	90.60	

Overall survival rate for Sonepat range under Community Forest Project during 2013-14

Range	Scheme	Site	Survival (%)	Overall (%)
Sonepat	LTG	Badwasnit Bhanu road	73.33	72.66
	-do-	Naura Khera to Butan road	72.00	

Overall survival rate for Sonepat forest division

Sr. No.	Year	Scheme	Survival (%)
1	2012-13	CAMPA-Ridge	72.37
2		CAMPA-TP	62.66
3		NPV-Ridge	76.56
4	2013-14	CAMPA-Ridge	81.72

CONSTRUCTION OF BUILDING

In Sonepat district a boundary wall was constructed in Rai range. The boundary wall was constructed around the forest rest house at Pitampura. The boundary wall was constructed with the budget of Rs.15,38,200. The boundary wall around rest house was visited and physically verified.

A building with three room set was constructed above the divisional forest office in Sonepat from CAMPA fund costing amount of Rs. 8,09,500. This was also physically verified.

CHAPTER-IX

CONCLUSION AND SUGGESTIONS

Comment on survival rates

In Sonepat district the planation raised during 2012-13 by the territorial forest division Sonepat under CAMPA scheme recorded overall survival rate of 71.27 percent irrespective of the different component of the CAMPA scheme.

NH-71 site in Gohana range where plantation was raised under NPV ridge scheme of CAMPA recorded highest 76.56 percent of survival rate followed by sites of CLC Kakroi (75.20 percent) of Rai range and 71.10 percent of survival rate for Baroda Minor of Gohana range under CAMPA ridge scheme. The Sisna minor site of Rai range observed lowest 62.66 percent of survival rate when plantation was raised under CAMPA-TP scheme.

Year 2013-14 observed higher survival rate of the plantation. The overall survival rate of 81.42 percent was recorded irrespective of the different schemes for the Sonepat district.

Butane minor site of the Gohana range where plantation was raised under CAMPA ridge scheme recorded highest 83.60 percent of survival rate which was followed by the Bichpari minor site of the Gohana range having survival rate of 82.08 percent. The plantation raised in Delhi Parllel site of the Sonepat range of the district observed lowest 79.80 per cent of the survival rate. The overall survival for the year 2013-14 of the district is very good and the plantation has attained good height and diameter growth.

Survival rate was better for the year 2013-14 as compared to the survival rate observed for the year 2012-13.

In Community Forestry Project (CFP) range Sonepat the plantation raised in govt. land under LTG scheme during 2013-14, the site Badwasmin to Bhanu road observed survival rate of 73.33 percent which was followed by 72.00 percent survival rate for Naurna Khera to Butana road. The overall survival rate for the district of Sonepat of Plantation by Community Forestry Project was 72.66 per cent.

The survival rate of the plantation raised under bio drainage scheme of CAMPA in farm land have observed survival rate more than 87 percent. In farm land there is very good performance of the plantations as these areas are well protected and nourished by the farmers themselves.

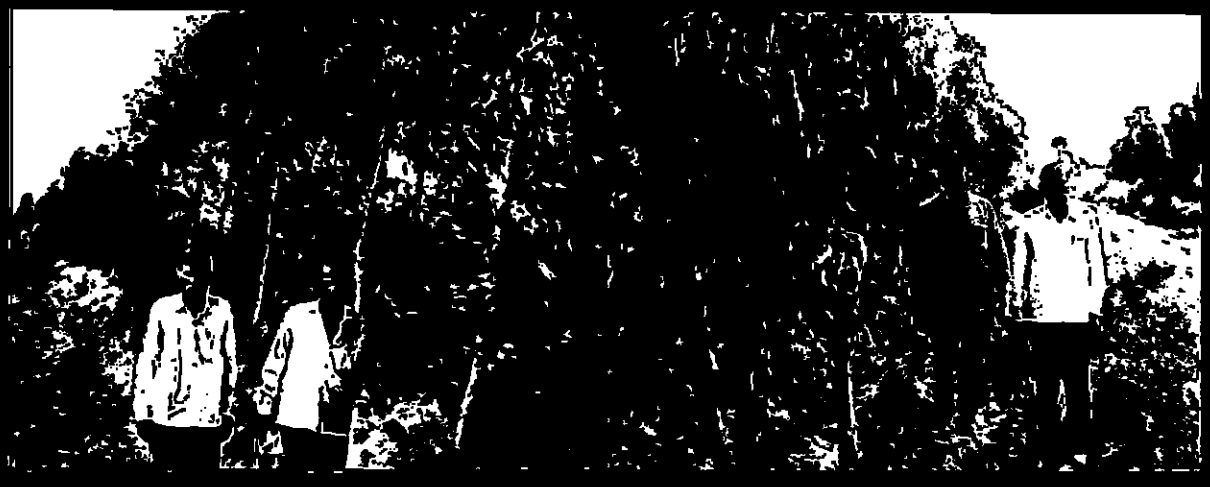
Choice of species and condition of planting stocks

Considering the edaphic, climatic and socio ecological conditions to the plantation areas, the choice of species is good which suit to the local conditions. But, it is not possible to judge the condition of planting stock.

Technical and administrative changes to improve survival

- Vigorous seedlings should be planted. Poorly grown seedlings should be culled and destroyed so that they could not be planted in any circumstances.
- Beating up should be done with original species
- Seed procurement, nursery raising and transplantation should be done timely and properly
- There should be uninterrupted fund flow
- Provision for more than four irrigation during summer
- Along roadside only tall plantation should be done
- Watch and ward after wheat harvest to prevent fire
- Ridge plantation should be encouraged for better establishment and survival rate
- Proper fencing and timely cultural operations
- Adequate field staff.

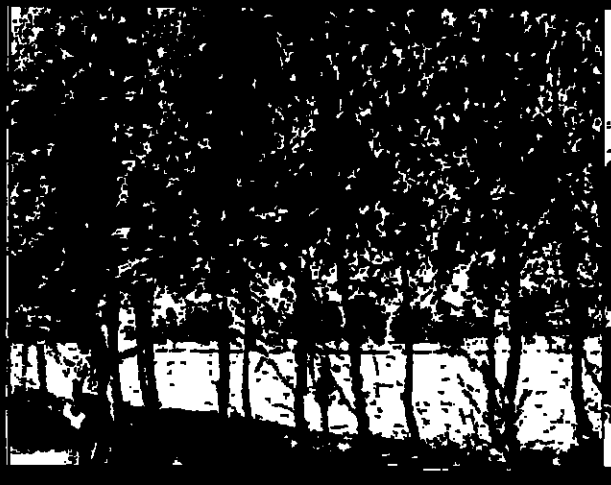
Ridge Plantation



NPV Ridge Plantation at NH-71-A

Minor Ridge Plantation

Community Plantation on Farm Land



Bio-drainage Community Plantation