



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

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### FOREWORD

There is large number of benefits of planting the trees, from health to environmental impact, to economics and even psychological effects. Planting and conserving/ managing trees helps in lowering the energy costs, reducing pollution, improving surroundings with green ambience and increasing the value of property. As green colour is a soothing colour, it helps to recover from strain quickly. Trees enhance the beauty and makes landscapes beautiful. Trees are very important part of the planet to provide beauty or shade. There are sundry perspectives of trees in human life such as social, communal, environmental and economic. There are many benefits of trees in human life. Trees offer everything, which is required by human such as air, food, house, cloth, energy and beauty.

Keeping the above facts in view, the Government of India and States Governments are running various plantation campaigns to mitigate the adverse impacts of climate change and deforestation due to implementation of various developmental projects. Many developmental and industrial projects such as erection of dams, mining, and construction of industries or roads require diversion of forest land. Any project proponent, government or private must apply for forest clearance from Ministry of Environment, Forests & Climate Change (MoEF & CC), Government of India, before the conversion of land take place. This proposal is to be submitted through the concerned Forest Department of the State Government. If clearance is given, then compensation for the lost forest land is also to be decided by the ministry and the regulators. Compensatory Afforestation Fund Management and Planning Authority (CAMPA) is one of the schemes, which aims at increasing forest cover in the country and is meant to promote afforestation and regeneration activities as a way of compensating for forest land diverted to non-forest uses. In this very context, Himachal Pradesh Forest Department (HPFD) has raised series of plantations in the State on annual basis.

As per the guidelines of CAMPA, which also talks about establishment of an independent system for concurrent monitoring and evaluation of the works implemented in the States utilizing the funds available, Himachal Pradesh Forest Department has assigned the task of Monitoring of CAMPA Plantation Raised in Himachal Pradesh to Himalayan Forest Research Institute, which is one of the nine Research Institutes under *Indian Council of Forestry Research & Education*, Dehra Dun – An Apex Body of the Ministry of Environment, Forests & Climate and is involved in taking up forestry research, education and extension activities at the National level.

Detailed monitoring was carried out by HFRI by using appropriate scientific methodologies. Before starting up of the work, the methodology developed by HFRI for monitoring was presented and discussed with the concerned authorities of Himachal Pradesh Forest Department, which was finalized accordingly. After carrying out extensive field visits to the plantation sites, data on various aspects like, height, collar diameter and GPS coordinates were recorded, data analyzed and Division-wise and State Level Report on evaluation were compiled for presenting to the Himachal Pradesh Forest Department.

**[Dr. Sandeep Sharma]**  
Director  
HFRI, Shimla



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### ACKNOWLEDGEMENT

The work of Monitoring & Evaluation of Plantations Raised under Himachal Pradesh State CAMPA was assigned by the Himachal Pradesh Forest Department (HPFD) to Himalayan Forest Research Institute, Shimla. First of all, we would like to thank the authorities of HPFD for showing faith in the technical capabilities of HFRI and assigning this very important task of monitoring & evaluation of plantations raised under H.P. State CAMPA. We are thankful to the officials of HPFD for providing all necessary logistic support and information concerning plantations. Our special thanks are also due to Sh. Ajay Srivastva, IFS, PCCF & HOFF, Himachal Pradesh; Sh. Rajesh Sharma, IFS, APCCF (CAMPA) and Mrs. Preeti Bhandari, IFS, DCF (CAMPA), HPFD for their support and guidance. Our sincere thanks are also due to Sh. A.S. Rawat, Director General, *Indian Council of Forestry Research & Education*, Dehra Dun for granting permission for taking up this assignment and guiding us during successful implementation of this project from time-to-time.

No doubt that HFRI, Shimla is capable of doing such works and has enough experience. This project required huge amount of work, precious time and dedication. Still, implementation would not have been possible if we did not have a support of many officers and officials of Himachal Pradesh Forest Department posted in various Forest Divisions. Especially, we are indebted to the Divisional Forest Officers and their staff for providing logistic support and valuable information regarding the plantations in a time-bound manner. Even during monitoring, some of the field officials of HPFD accompanied our teams to various plantation sites situated in far flung areas and provided great support to them. Therefore, we would like to extend our special and sincere gratitude to all of them. Needless to mention that without their support, the process of monitoring and evaluation of plantation would lack in quality of outcomes, and thus their support was essential.

As a Director of the Institute, I shall be failing in my duties if I do not place on record my sincere thanks to gigantic efforts of the entire dedicated team of HFRI, including field staff, technical staff, ministerial staff, who devoted their time and knowledge in the implementation of this project, worked as a cohesive team, and completed this task in a time-bound manner, in spite of difficult field and adverse climatic conditions. Nevertheless, I express my gratitude towards all my colleagues, who have not hesitated in taking up this work in hard and tough areas despite many adversities. I am also thankful to the families of my colleagues for their kind co-operation and encouragement, which helped in completion of this challenging task in a time-bound manner.

[Dr. Sandeep Sharma]

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## ABBREVIATIONS

Sl. No.	Abbreviation	Full Description
1.	C.A.	Compensatory Afforestation
2.	CAT	Catchment Area Treatment
3.	NPV	Net Present Value
4.	S & W C	Soil & Water Conservation
5.	%	Per cent
6.	Ha./ ha.	Hectare
7.	m	Meter
8.	cm	Centimeter
9.	mm	Millimeter
10.	gm/ g	Gram
11.	Km	kilometer
12.	Sq.m	Square meter
13.	i.e.	That is
14.	Nos.	Numbers
15.	Rs.	Rupees
16.	Sl. No.	Serial Number
17.	GPS	Geographical Positioning System
18.	sp./ spp.	Species
19.	N	North
20.	S	South
21.	E	East
22.	W	West
23.	NE	Northeast
24.	SW	Southwest
25.	SE	Southeast
26.	NW	Northwest



## EXECUTIVE SUMMARY

The assignment of monitoring and evaluation of the plantations conducted by Himachal Pradesh Forest Department during the years 2016-17, 2017-18 and 2018-19 under various schemes i.e. Catchment Area Treatment Plan, Compensatory Afforestation, Net Present Value and Soil & Water Conservation in 35 Forest Divisions and 05 Wildlife Divisions was carried out by Himalayan Forest Research Institute as per standard methodology. The primary objective of this assignment was to provide information of H.P. State CAMPA on the quality and impact of plantations done under various scheme of CAMPA. Himachal Pradesh Forest Department may utilize the output of monitoring & evaluation to evaluate the success and impact of the plantations done under CAMPA so far. The suggestions given in the state level as well as in division wise reports may also improve upon the activity and methodology to be adopted in future under CAMPA plantations. The main report of monitoring & evaluation contained the comprehensive information on state level having division wise summary. The forest division wise detail report of monitoring & evaluation was prepared separately for 35 Forest Divisions and 05 Wildlife Divisions.

In the state of Himachal Pradesh, total plantation area during 2016-17 under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV and Soil & Water Conservation was 1208.49 ha, 1182.0 ha, 1102.0 ha and 09 ha, respectively. Whereas, during 2017-18, area under various schemes i.e., CA, CAT PLAN and NPV was 1390.0 ha, 845.0 ha, 1005.0 ha, respectively. During the year, 2018-19 area under various schemes i.e., CA, CAT PLAN and NPV was 581.0 ha, 562.0 ha and 1338.0 ha, respectively. Under **Compensatory Afforestation**, area evaluated during 2016-17 and 2017-18 and 2018-19 was 775.19 ha, 745.44 ha and 466.80 ha, respectively. Whereas, under **CAT PLAN** area evaluated during 2016-17, 2017-18 and 2018-19 was 461 ha, 322.63 ha and 207.17 ha, respectively. Similarly, under **NPV** plantation area evaluated was 652 ha, 425.6 ha and 746.5 ha for these years, respectively. Under **Soil & Water Conservation** scheme the plantation area evaluated during 2016-17 was 09 ha (**Table-1**).



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**Table-1: Total Area (ha) Evaluated under Various Schemes in the State of Himachal Pradesh**

Schemes	2016-17			2017-18			2018-19		
	Total Area (ha)	Area taken for evaluation (ha)	Percentage of area covered in evaluation	Total Area (ha)	Area taken for evaluation (ha)	Percentage of area covered in evaluation	Total Area (ha)	Area taken for evaluation (ha)	Percentage of area covered in evaluation
<b>Compensatory Afforestation</b>	1208.49	775.19	64.14%	1390	745.44	53.62%	581.0	466.80	80.34%
<b>CAT PLAN</b>	1182	461	39.0%	845	322.63	38.18%	562	207.17	36.86%
<b>Net Present Value</b>	1102	652	59.16%	1005	425.6	42.34%	1338	746.5	55.75%
<b>Soil &amp; Water Conservation</b>	09	09	100%	-	-	-	-	-	-
<b>Total</b>	<b>3501.49</b>	<b>1897.19</b>	<b>54.18%</b>	<b>3240</b>	<b>1493.67</b>	<b>46.10%</b>	<b>2481</b>	<b>1420.47</b>	<b>57.25%</b>

Total number of plantation sites for the entire state during 2016-17 which were evaluated under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV plantation and Soil & Water Conservation was 103, 169, 82 and 02, respectively. Whereas, during 2017-18 total number of sites under various schemes i.e., Compensatory Afforestation, CAT PLAN and NPV was 112, 142 and 44, respectively. Similarly, during 2018-19 which was evaluated under the scheme Compensatory Afforestation, CAT PLAN, NPV was 59, 92 and 119, respectively. Under **Compensatory Afforestation**, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 71, 68 and 59, respectively. Whereas, under **CAT PLAN**, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 70, 60 and 39, respectively. Similarly, under **NPV** plantations numbers of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 48, 28 and 76, respectively. Under **Soil & Water Conservation** scheme, the number of plantation sites evaluated during 2016-17 was 02 (**Table-2**).





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**Table-2: Number of Sites Evaluated under Various Schemes in the State of Himachal Pradesh**

Scheme	2016-17			2017-18			2018-19		
	Total Sites	Number of Sites taken for evaluation	Percentage of Sites covered in evaluation	Total Sites	Number of Sites taken for evaluation	Percentage of Sites covered in evaluation	Total Sites	Number of Sites taken for evaluation	Percentage of Sites covered in evaluation
CA	103	71	68.93%	112	68	60.71%	59	48	81.35%
CAT PLAN	169	70	41.42%	142	60	42.25%	92	39	42.39%
NPV	82	48	58.53%	44	28	63.63%	119	76	63.86%
S&WC	02	02	100%	-	-	-	-	-	-
<b>Total</b>	<b>356</b>	<b>191</b>	<b>53.65%</b>	<b>298</b>	<b>156</b>	<b>52.34%</b>	<b>270</b>	<b>163</b>	<b>60.37%</b>

Stratified Multi-stage Random Sampling Methodology was used to carry out the studies separately year wise for plantations raised under Compensatory Afforestation, CAT Plan, NPV plantations and Soil & Water Conservation Plantations. The plantation sites were selected randomly by using simple random sampling with the help of Computer generating random table number and all the forest blocks were covered where plantations have been done. Sampling intensity of minimum 30% of plantation sites by number and 25% by total area of plantations of a particular year was adopted. However, during 2016-17 per cent of sites evaluated under the scheme CA, CAT PLAN, NPV and S&WC was 68.93%, 41.42%, 58.53% and 100%, respectively. Whereas, during 2017-18 per cent of sites evaluated under the scheme CA, CAT PLAN and NPV was 60.71%, 42.25% and 63.63%, respectively. Similarly, during 2018-19 per cent of sites evaluated under the scheme CA, CAT PLAN and NPV was 81.35%, 42.39% and 63.86%, respectively. On the basis of area during 2016-17 area evaluated under various schemes i.e., CA, CAT PLAN, NPV and S&WC was 64.14%, 39.0%, 59.16% and 100% respectively. Whereas, during 2017-18 area evaluated under various schemes i.e., CA, CAT PLAN and NPV was 53.62%, 38.18%, and 42.348%, respectively. Similarly, during 2018-19 area evaluated under various schemes i.e., CA, CAT PLAN and NPV was 80.34%, 36.86%, and 55.75%, respectively.



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In 5% of the plantations raised in various schemes, 100% physical verification with respect to number of plants planted and survival was also done. During 2016-17 total 59 sites under various schemes having area of 459.35 ha, during 2017-18 total 39 sites having area of 260.66 ha and during 2018-19 total 44 sites having area of 271.18 were evaluated through 100% physical verification (**Table-3**).

**Table-3: Area Covered for 100% for Physical verification and Survival Percentage**

Scheme	Total Sites	Total Area (ha)	Number of sites taken for 100% verification	Area of sites taken for 100% verification (ha)	Average Survival Per cent in sites taken for 100% Verification	Average Survival Per cent in sites Evaluated by Sampling
<b>2016-17</b>						
CA	103	1208.49	22	241.35	<b>32.70</b>	<b>46.06</b>
CAT PLAN	169	1182	21	133.00	<b>37.47</b>	<b>30.2</b>
NPV	82	1102	15	80.00	<b>37.88</b>	<b>36.41</b>
S&WC	02	09	1	5.00	<b>41.18</b>	<b>23.16</b>
<b>Total</b>	<b>356</b>	<b>3501.49</b>	<b>59</b>	<b>459.35</b>	--	--
<b>2017-18</b>						
CA	112	1390.0	18	88.66	<b>40.07</b>	<b>45.19</b>
CAT PLAN	142	845	14	91.00	<b>39.41</b>	<b>33.75</b>
NPV	44	1005	07	81.00	<b>38.33</b>	<b>32.92</b>
<b>Total</b>	<b>298</b>	<b>3240.0</b>	<b>39</b>	<b>260.66</b>	--	--
<b>2018-19</b>						
CA	59	581	18	126.18	<b>44.11</b>	<b>43.27</b>
CAT PLAN	92	562	15	43.00	<b>45.67</b>	<b>30.51</b>
NPV	119	1338	11	102.00	<b>35.11</b>	<b>45.68</b>
<b>Total</b>	<b>270</b>	<b>2481</b>	<b>44</b>	<b>271.18</b>	--	--

The sample plots of size 0.1 ha were laid out in the selected plantation site. Within the enumeration site, girth/ diameter (at breast/ collar height) were measured for all the plants. The sample plant within each girth/ diameter class was measured for height subject to a minimum of 10 plants under each species. GPS Coordinates of the study sites/ locations was also recorded for authentication of the study. The data collected from the field was statistically analyzed for descriptive statistics and other parameters



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by following standard methodology. Based on the plot data, plant growth (average height & diameter) and survival percentage was estimated for the plantations.

As per the ToR, selected plantation areas were examined for area accuracy with the help of GPS by way of traversing around the boundary of the plantations. The shape files of the sample plantations were also prepared for geo-reference parameters. The condition and quality of fencing erected for the plantation was assessed with respect to type of fence posts used and number of stands of the fencing etc.

Suitability of species selected for plantation viz.-a-viz. area selected for plantation and objectives of the plantation scheme was also assessed on the basis of documents supplied and visiting the plantation sites. The condition and quality of fencing erected for the plantation was assessed with respect to type of fence posts used and number of strands of the fencing etc. The views of the people living in the vicinity of the plantation were taken through personal interview in open ended pre-structured questionnaires in order to assess the impact of plantations on their quality of life and livelihoods. The survival percentage of plants in all the Forest Divisions as well as for the entire State was classified into following categories:

S. No.	Category	Survival Per cent
1.	Below Average	0-30
2.	Average	31-50
3.	Good	51-70
4.	Very Good	71-100

Weighted average survival percentage was also calculated for all the Forest Divisions and has been described for lower zone, higher zone and cumulatively for the entire State for every component of plantations for each year.

### **Survival and Growth Performance:**

#### **A]. Lower Altitude Areas:**

In the lower altitude areas i.e., Forest Divisions of Bilaspur, Hamirpur, Nahan and Solan Forest Circles, under the **Compensatory Afforestation (CA)** plantations raised during 2016-17, survival in 25.0%, 50.0% and 25.0% plantation sites was good, average and below average, respectively. During the year 2017-18, survival in 5.26%, 47.37%, 10.53% and 36.84% plantation sites was very good, good, average and below



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average, respectively. During 2018-19, survival in 66.67% and 33.33% plantation sites was average and below average, respectively. Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during the year 2016-17, survival in 100% plantation sites was average. During the year 2017-18, survival in 11.11%, 66.67% and 22.22% plantation sites was good, average and below average, respectively. During 2018-19, survival in 100% plantation sites was average.

Under the **NPV** plantations raised during the year 2016-17, survival in 22.22%, 22.22% and 55.56% plantation sites was good, average and below average, respectively. During the year 2017-18, survival in 14.29, 14.29%, 42.86% and 28.57% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 28.57% and 71.43% plantation sites was good and below average, respectively. Under the **Soil & Water Conservation (S & WC)** plantations raised during the year 2016-17, survival in one plantation site was below average. The above details are being given in the following (**Table-4**).

**Table-4: Details of Number of Sampled Sites under different survival categories in various schemes in Lower Altitude Areas of Himachal Pradesh**

PERCENTAGE OF SITES UNDER DIFFERENT SURVIVAL CATEGORY									
Year of Plantation	Total Sites Sampled	0-30%		31-50%		51-70%		71-100%	
		(Below Average)		(Average)		(Good)		(Very Good)	
		Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites
<b>A]. Compensatory Afforestation</b>									
2016-17	12	3	25.00%	6	50.00%	3	25.00%	-	NA
2017-18	19	7	36.84%	2	10.53%	9	47.37%	1	5.26%
2018-19	3	1	33.33%	2	66.67%	-		-	NA
<b>B]. CAT PLAN</b>									
2016-17	1	-	-	1	100%	-	-	-	NA
2017-18	9	2	22.22%	6	66.67%	1	11.11%	-	NA
2018-19	1	-	-	1	100%	-	-	-	NA
<b>C]. NPV</b>									
2016-17	9	5	55.56%	2	22.22%	2	22.22%		NA
2017-18	7	2	28.57%	3	42.86%	1	14.29%	1	14.29%
2018-19	7	5	71.43%	-	-	2	28.57%	-	NA
<b>D]. S&amp;WC</b>									
2016-17	1	1	100%	-	NA	-	NA	-	NA



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In the lower altitude areas, under **Compensatory Afforestation** plantations, weighted average survival per cent during the year 2016-17, 2017-18 and 2018-19 was 47.66%, 42.02% and 40.96%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 36.06%, 36.54% and 34.46%, respectively. In plantations raised during 2016-17, 2017-18 and 2018-19 under **NPV** the weighted average survival per cent was 25.29%, 41.51% and 34.76%, respectively. Whereas, under the scheme **S&WC**, during the period 2016-17 the weighted average survival per cent was 33.17% (**Table-5**).

**Table-5: Weighted average survival in sampled locations under various schemes in Lower Altitude Area**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	47.66	42.02	40.96
2.	CAT PLAN	36.06	36.54	34.46
3.	NPV	25.29	41.51	34.76
4.	Soil & Water Conservation	33.17	NA	NA

### **Plant Species Performed Better in Plantation Sites:**

The growth performance of the species viz., *Acacia auriculiformis*, *Acacia catechu*, *Acacia nilotica*, *Albizia lebbek*, *Azadirachta indica*, *Bauhinia variegata*, *Bombax ceiba*, *Cassia fistula*, *Cedrus dedara*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Diospyros sp.*, *Grevillea robusta*, *Grewia optiva*, *Jacaranda mimosifolia*, *Mangifera indica*, *Melia azedarach*, *Morus alba*, *Olea cuspidata*, *Phyllanthus emblica*, *Pinus roxburghii*, *Prosopis juliflora*, *Prunus cerasoides*, *Psidium guajava*, *Punica garanatum*, *Pyrus pashia*, *Quercus floribunda*, *Quercus oblongata*, *Syzygium cumini*, *Tectona grandis*, *Teminalia bellirica*, *Terminalia arjuna*, *Terminalia tomentosa*, *Thamnocalamus spathiflorus* and *Toona ciliata* was better in most of the plantation sites.



### **Plant Species Not Performed Well in Plantation Sites:**

The plant species viz., *Acacia catechu*, *Acacia nilotica*, *Aegle marmelos*, *Aesculus indica*, *Albizia lebbeck*, *Anogeissus latifolia*, *Azadirachta indica*, *Bambusa vulgaris*, *Bauhinia variegata*, *Bombax ceiba*, *Butea monosperma*, *Cassia glauca*, *Casia siamea*, *Cassia fistula*, *Cassia siamea*, *Cedrus deodara*, *Dalbergia sissoo*, *Delonix regia*, *Dendrocalamus strictus*, *Eryobotrya japonica*, *Ficus religiosa*, *Grevillea robusta*, *Grewia optiva*, *Leucaena leucocephala*, *Mangifera indica*, *Melia azedarach*, *Moringa oleifera*, *Morus alba*, *Olea glandulifera*, *Phyllanthus emblica*, *Pinus roxburghii*, *Pongamia pinnata*, *Salix sp.*, *Sapindus mukorossi*, *Syzigium cumini*, *Tecoma sp.*, *Tectona grandis*, *Terminalia bellerica*, *Terminalia arjuna*, *Terminalia chebula*, *Toona ciliata* and *Zizypus sp.* did not respond well in some of the plantation sites.

### **Reasons for Low Plant Survival Per cent:**

The low survival percentage in some of the sites was due to damage caused by wild & domestic animals and grazing. Drought, lack of irrigation facility and lack of local nursery for raising planting stock material, invasion of *Lantana camara* and other bush species and damage caused by fire. In some of the sites, survival percentage and growth performance of the plantation skewed because terrain and topography of the sites was not favourable for the growth of planted species.

**In the higher altitude areas i.e.** Forest Divisions of Chamba, Dharamshala, Kullu, Mandi, Rampur, Shimla, Wildlife Shimla (S), Wildlife Dharamshala (N) Circles and GHNP Shamshi under the **Compensatory Afforestation (CA)** plantations raised during the year 2016-17, survival in 16.22%, 10.81%, 43.24% and 29.73% plantations was very good, good, average and below average, respectively. During the year 2017-18, survival in 16.0%, 23.0%, 45.0%, and 16.0% plantation sites was very good, good, average and below average, respectively. During the year 2018-19, survival in 07.0%, 33.0%, 44.0% and 15.0%, plantation sites was very good, good, average and below average, respectively.

Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during the year 2016-17, survival in 10.0%, 48.0%, and 42.00% plantation sites was good, average and below average, respectively. During the year 2017-18, survival in 16.0%,



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38.0% and 46.0% plantation sites was good, average and below average, respectively. During the year 2018-19, survival in 13.04%, 47.83% and 39.13% plantation sites was good, average and below average, respectively.

Under the NPV plantations raised during the year 2016-17, survival in 08.33%, 16.67%, 50.0% and 25.0% plantation sites was very good, good, average and below average, respectively. During the year 2017-18, survival in 7.14%, 42.86% and 50.0% plantation sites was good, average and below average, respectively. During the year 2018-19, survival in 12.07%, 37.93%, 37.93% and 12.07% plantation sites was very good, good, average and below average, respectively. The above details are being given in the **Table-6**.

**Table-6: Details of number of sampled sites under different survival categories in various schemes in Higher Altitude Areas of Himachal Pradesh**

PERCENTAGE OF SITES UNDER DIFFERENT SURVIVAL CATEGORY									
Year of Plantation	Total Sites Sampled	0-30% (Below Average)		31-50% (Average)		51-70% (Good)		71-100% (Very Good)	
		Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites
<b>A]. Compensatory Afforestation</b>									
2016-17	<b>37</b>	11	29.73%	16	43.24%	4	10.81%	6	16.22%
2017-18	<b>31</b>	5	16.0%	14	45.0%	7	23.0%	5	16.0%
2018-19	<b>27</b>	4	15.0%	12	44.0%	9	33.0%	2	7.00%
<b>B]. CAT PLAN</b>									
2016-17	<b>48</b>	20	42.0%	23	48.0%	5	10.0%	NA	NA
2017-18	<b>37</b>	17	46.0%	14	38.0%	6	16.0%	NA	NA
2018-19	<b>23</b>	9	39.13%	11	47.83%	3	13.04%	NA	NA
<b>C]. NPV</b>									
2016-17	<b>24</b>	6	25.0%	12	50.0%	4	16.67%	2	8.33%
2017-18	<b>14</b>	7	50.0%	6	42.86%	1	07.14%	NA	NA
2018-19	<b>58</b>	7	12.07%	22	37.93%	22	37.93%	7	12.07%



## B]. Higher Altitude Areas:

In the higher altitude areas, under **Compensatory Afforestation** plantations, weighted average survival per cent during the year 2016-17, 2017-18 and 2018-19 was 35.63%, 46.33% and 43.03%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 32.75%, 34.23% and 34.21%, respectively. Plantations raised under the scheme **NPV**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 30.99%, 36.0% and 43.84%, respectively (**Table-7**).

**Table-7: Weighted average survival under various schemes in Higher Altitude Area**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	35.63	46.33	43.03
2.	CAT PLAN	32.75	34.23	34.21
3.	NPV Plantation	30.99	36.0	43.84

## Plant Species Performed Better in Plantation Sites:

The growth performance of the species viz., *Acacia catechu*, *Aesculus indica*, *Albizia lebeck*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Cinnamomum tamala*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Ficus racemosa*, *Grevillea robusta*, *Grewia optiva*, *Juglans regia*, *Melia azedarach*, *Morus abla*, *Olea cuspidata*, *Olea paniculata*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus mira*, *Psidium guajava*, *Punica granatum*, *Pyrus pashia*, *Quercus ilex*, *Quercus oblongata*, *Rhododendron arboreum*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Syzygium cumnii*, *Terminalia arjuna*, *Toona ciliata*, *Ulmus wallichiana* etc. was better in all the plantation sites.

The medicinal plants like *Aconitum heterophyllum*, *Angelica glauca*, *Arnebia benthami*, *Hedychium acuminatum*, *Picrorhiza kurroa*, *Polygonatum chirifolium*, *Rheum australe*, *Saussurea costus*, *Selinum vaginatum*, *Valeriana jatamansi*, *Viola serpens* etc. was better in some of the plantation sites.





### **Plant Species Not Performed Well in Plantation Sites:**

The planted species like, *Abies pindrow*, *Acacia catechu*, *Aesculus indica*, *Ailanthus altissima*, *Alnus nitida*, *Angelica glauca*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Diospyros kaki*, *Eucalyptus* sp., *Grevillea robusta*, *Grewia optiva*, *Hedychium spicatum*, *Hippophae rhamnoides*, *Juglans regia*, *Juniperus polycarpus*, *Leucaena leucocephala*, *Melia azedarach*, *Morus alba*, *Phyllanthus emblica*, *Picrorhiza kurroa*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus cornuta*, *Prunus domestica*, *Prunus mira*, *Psidium guajava*, *Punica granatum*, *Pterospermum acerifolium*, *Quercus ilex*, *Quercus oblongata*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Saussurea costus*, *Syzygium cumini*, *Taxus wallichiana*, *Tectona grandis*, *Terminalia bellirica* and *Terminalia chebula* etc. did not performed well in some of the plantation sites.

In the plantation sites where grasses were planted under the scheme improvement of alpine pasture, the biomass of grasses inside the plantation area was more than that of outside the plantation area.

### **Reasons for Low Plant Survival Per cent:**

The low survival percentage in a few sites was due to damage caused by wild animal, grazing, monkeys, snow, debris of road construction and fire incidences. Some of the plantation sites were fully burnt by forest fire having nil or very less survival. The less survival in some of the plantation sites was due to steep slope, wrong selection of sites, infestation of *Lantana camara* and bushes, heavy mortality of naked rooted plants etc.

At the State level, under the **Compensatory Afforestation (CA)** plantations raised during 2016-17, survival in 12.24%, 12.24%, 44.90% and 30.61% and plantation site was very good, good, average and below average, respectively. During 2017-18, survival in 12.0%, 30.0% , 34.00% and 24.0% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 06.67%, 26.67%, 50.0% and 16.67% plantation sites was very good, good, average and below average, respectively.



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Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during 2016-17, survival in 10.20%, 48.98% and 40.82% plantation sites was good, average and below average, respectively. During 2017-18, survival in 17.0%, 46.00% and 37.0% plantation sites was good, average and below average, respectively. During 2018-19, survival in 12.0%, 46.0% and 42.0% plantation sites was good, average and below average, respectively.

Under the **NPV** plantations raised during 2016-17, survival in 06.0%, 18.0%, 39.0% and 36.0% plantation sites was very good, good, average and below average respectively. During 2017-18, survival in 5.0%, 9.0%, 43.0 and 43.0% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 11.0%, 37.0%, 34.0% and 18.0% plantation sites was good, average and below average, respectively.

Under the **Soil & Water Conservation (S & WC)** plantations raised during 2016-17, survival in one plantation site was below average. The above details are being given in the **Table-8**.

**Table-8: Details of Number of Sampled Sites under Different Survival Categories in Various Schemes in the State of Himachal Pradesh**

PERCENTAGE OF SITES UNDER DIFFERENT SURVIVAL CATEGORY									
Year of Plantation	Total Sites Sampled	0-30% (Below Average)		31-50% (Average)		51-70% (Good)		71-100% (Very Good)	
		Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites	Number	Per cent of total sites
<b>A]. Compensatory Afforestation</b>									
2016-17	<b>49</b>	15	30.61%	22	44.90%	06	12.24%	06	12.24%
2017-18	<b>50</b>	12	24.00%	17	34.00	15	30.00%	06	12.00%
2018-19	<b>30</b>	05	16.67%	15	50.0%	08	26.67%	02	06.67%
<b>B]. CAT PLAN</b>									
2016-17	<b>49</b>	20	40.82%	24	48.98%	05	10.20%	NA	NA
2017-18	<b>46</b>	17	37.00%	21	46.0%	08	17.00%	NA	NA
2018-19	<b>24</b>	10	42.00%	11	46.0%	03	12.00%	NA	NA



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<b>CJ. NPV</b>									
2016-17	<b>33</b>	12	36.0%	13	39.0%	06	18.0%	02	6.00%
2017-18	<b>21</b>	09	43.0%	09	43.0%	02	09.0%	01	05.0%
2018-19	<b>65</b>	12	18.00%	22	34.0%	24	37.0%	07	11.0%
<b>DJ. Soil and Water Conservation</b>									
2016-17	<b>01</b>	01	100%	NA	NA	NA	NA	NA	NA

In the state level, weighted average survival per cent of the plantations raised under **Compensatory Afforestation** during the year 2016-17, 2017-18 and 2018-19 was 38.30%, 45.04% and 42.62%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 33.02%, 34.56% and 34.23%, respectively. The weighted average survival per cent for the plantations raised under **NPV** schemes for the year 2016-17, 2017-18 and 2018-19 was 28.54%, 38.0% and 40.81%, respectively. The plantations raised under **S & WC** schemes, weighted average survival per cent during the year 2016-17 was 33.17%, respectively (**Table-9**).

**Table-9: Weighted average survival under various schemes in Himachal Pradesh**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	38.30	45.04	42.62
2.	CAT PLAN	33.02	34.56	34.23
3.	NPV	28.54	38.0	40.81
4.	Soil & Water Conservation	33.17	NA	NA

While comparing the weighted average survival per cent among the various forest divisions of the state, maximum weighted average survival per cent of the plantations raised under Compensatory Afforestation during the year 2016-17, 2017-18 and 2018-19 was 75.22% (Nurpur Forest Division), 66.92% (Chamba Forest Division) and 54.04% (Joginder Nagar), respectively. Whereas, under CAT Plan, maximum weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 58.62% (Rampur Forest Division), 59.02% (Dalhousie Forest Division) and 57.56% (Rampur Forest Division), respectively.



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The maximum weighted average survival per cent for the plantations raised under NPV schemes for the year 2016-17, 2017-18 and 2018-19 was 47.47% (Una Forest Division) and 69.73% (Hamirpur Forest Division) and 61.64% (Nurpur Forest Division), respectively. The plantations raised under S & WC schemes, maximum weighted average survival per cent during the year 2016-17 was 33.17% in Kunihar Forest Division.

Selected plantation sites were examined for area accuracy with the help of GPS by way of traversing around the boundary of the plantation and area recorded for each plantation site is given in the **Monitoring Finding Chapter** of the Report. The summary of the area measured for area accuracy with variation is given in **Table-10**. During the year 2016-17 area recorded for all the schemes for 66 (50.0%) plantation sites was more than the area given in the record (199.44 ha i.e. 27.56%). Whereas, for 66 (50.0%) sites area was less than the area given in the plantation journals (101.22 ha i.e. 14.07%). Similarly, during the year 2017-18 area recorded for 74 (63.25%) plantation sites was more than the area given in the record (220.97 ha i.e. 26.68%). Whereas, for 43 (36.75%) sites area was less than the area given in the plantation journals (125.61 ha i.e. 31.07%). Whereas, during the year 2018-19 area recorded for 75 (63.03%) plantation sites was more than the area given in the record (236.94 ha i.e. 28.45%). Whereas, for 44 (36.97%) plantation sites area was less than the area given in the plantation journals (38.98 ha i.e. 12.32%). During the year 2016-17, 2017-18 and 2018-19 forest fire was reported in 21 and 26 and 23 plantation sites, respectively.

**Table-10: Depicting Area Measurements of Plantation Sites**

Year of Plantation and Scheme	Total Sites Sampled		Number of Sites Having Same or Excess Area			Number of Sites Having Less Area			Variation in Area	
	Number of Sites	Area (ha)	Nos.	Area as per Record	GPS Record	Nos.	Area as per Record	GPS Record	Excess Area (ha)	Less Area (ha)
<b>2016-17</b>										
CA	49	533.84	13	171.54	196.16	36	362.3	354.81	24.62 (14.35%)	7.49 (2.07%)
CAT PLAN	49	328	28	166	208.58	21	162.0	148.97	42.58 (25.65%)	13.03 (08.04%)
NPV	33	572	24	377	507.04	09	195.0	114.3	130.04 (34.49%)	80.7 (41.38%)
S&WC	01	04	01	04	6.2	NA	NA	NA	2.2 (55.0%)	NA
<b>TOTAL</b>	<b>132</b>	<b>1437.84</b>	<b>66</b>	<b>718.54</b>	<b>917.98</b>	<b>66</b>	<b>719.3</b>	<b>618.08</b>	<b>199.44 (27.56%)</b>	<b>101.22 (14.07%)</b>



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<b>2017-18</b>										
<b>CA</b>	50	656.78	33	484.04	606.39	17	172.74	141.27	122.35 (25.28%)	31.47 (18.22%)
<b>CAT PLAN</b>	46	231.63	28	150.63	187.31	18	81.0	70.47	36.68 (24.35%)	10.53 (13.0%)
<b>NPV</b>	21	344.6	13	193.60	255.54	8	151.0	67.39	61.94 (31.99%)	83.61 (55.37%)
<b>TOTAL</b>	<b>117</b>	<b>1233.01</b>	<b>74</b>	<b>828.27</b>	<b>1049.24</b>	<b>43</b>	<b>404.74</b>	<b>279.13</b>	<b>220.97 (26.68%)</b>	<b>125.61 (31.03%)</b>
<b>2018-19</b>										
<b>CA</b>	30	340.62	16	226.22	275.17	14	114.4	121.07	48.95 (21.64%)	6.67 (5.83%)
<b>CAT PLAN</b>	24	164.17	13	101.17	111.4	11	63.0	47.7	10.23 (10.11%)	16 (25.40%)
<b>NPV</b>	65	644.5	46	505.5	683.26	19	139.0	108.65	177.76 (35.17%)	30.35 (21.83%)
<b>TOTAL</b>	<b>119</b>	<b>1149.29</b>	<b>75</b>	<b>832.89</b>	<b>1069.83</b>	<b>44</b>	<b>316.4</b>	<b>277.42</b>	<b>236.94 (28.45%)</b>	<b>38.98 (12.32%)</b>

There are no fixed criteria for acceptance of variation in area measurement. Usually, while taking the areas for the plantation activities, the field functionaries of the forest department make use of the means and tools which may have many limitations and not being able to calculate the exact area under the verticality of the hills and mountains. For instance, measurement of distance from plant to plant or row to row is extrapolated for calculation of the entire plantation area of the forest land. During the monitoring and evaluation process, the plantation areas were measured with the help of the modern tools/ equipment e.g. Global Position System (GPS), which is based on the principle of the triangulation method of the area measurement and the areas, were measured along outside of the periphery of the plantation / fencing. More importantly, the terrain of the hills and the topography encompasses the slopes and deep gorges making it infeasible to fence the plantation areas entirely and some portion is evidently left out which accounts for the less area measurement by the GPS during the monitoring and the evaluation process. Apart from this, the undulating surfaces, steep slope and the rugged landscapes also accounts for the variation in the area.

The survival and growth performance of the plantation commensurate with the topography and site conditions in most of the sites. Mostly the sites selected for plantation was suitable for the species planted by the Department. In lower as well higher altitude, most of the plantation sites were well fenced however, in some sites fencing was damaged, burnt by fire or partially erected. Some of the plantation sites were not fenced because they were falling in the Wildlife Sanctuary area and also



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there was no provision of fencing under NPV scheme. The plantation journals of most of the plantation sites were properly maintained by the Forest Department.

### **Socioeconomic Impacts:**

The main objective of carrying out the socioeconomic survey was to assess the impact of the plantation for upliftment of the socioeconomic status of the residents of adjoining villages. Accordingly, socio-economic survey of nearby villages of the plantation sites was carried out. The people of the surveyed villages were of the opinion that plantation activities will benefit the general public in the times to come. The plantation will definitely result in meeting out the requirements of the fuel, fodder, timber and will also help in soil conservation, recharging the water resources and maintenance of environment in general. It was the general perception of the people that there must be some provision for aftercare of plants because it was generally seen that lots of plantation campaigns are being executed by the Government through various agencies but the results are not so encouraging keeping in view the survival percentage. In some of the Forest Divisions, people of adjoining villages are of the opinion that plantations activities and fencing of the area has reduced the grazing ground for the cattle. The people are also concerned about grazing areas inside the sanctuary and demanding de-notification of sanctuary so that their traditional right could be protected in nearby areas.

The analysis of the perceived impacts of plantations under CAMPA reveals that substantial upliftment of the socio-economic status of the community/ surrounding villages should be the main concern while executing the plantation activities. There is need to foresee the benefits of the plantation to the local people in term of diversified goods and services such as timber, fuel-wood, fodder, non-timber forest products, water, wildlife protection and potential to reduce the human wildlife conflict. Therefore, during selection of species for planting, the opinion of local people should be considered beforehand and fruit-bearing species should also be planted to tackle monkey and wild animals menace. More number of fodder and fuel wood species needs to be included in forest plantations those directly benefiting rural masses. The area having infestation of Lantana and other weeds should be eradicated from the bushes before carrying out the plantation and during the maintenance of the plantation. People were also benefited by grass production due to fencing of the



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plantation site. Local people should be given awareness training on various forestry and environment issues. There is a need to make the provision for after care of the plantation so that the main objectives of the plantation can be achieved.

It was the general perception of the people that during species selection for planting in fringe forests, the opinion of local population should be considered beforehand. The people were also concerned about survival in forest plantations and suggested intensive aftercare in plantation areas at least for three years for better results and more number of fodder and fuel wood species needs to be included in forest plantations for directly benefiting rural masses requiring those items for additional income generation. People's view should be taken in to consideration for selection of species. Forest department should convince people to participate in protection. Participatory approach of protection of plantation will increase chance of more survival of species planted.

### **Constraints:**

- ✓ The main constraint during and after plantation include forest fires, grazing and damage by wild animal. Accidental or intentional forest fires by local people during the month of summers results in irreparable damage especially to new plantations. People set on fire in the area with the intension to get new green grass for their cattle, goat and sheep. Grazing pressure of livestock also results in damage of plantation. Trampling and browsing damages seedling results into mortality and lower survival of plantation. Similarly, browsing by wild animals also damage the seedlings. The porcupine damages the seedlings of oak by cutting it at collar height. In many plantation area monkey has done lot of damage especially to the pine seedlings, they broken the top of the seedlings which hamper its height. Besides, other wild animal like Deer, Ghoral, Neelgai, Wild pigs, Rodents also damage and harm the planted seedlings.
- ✓ As per the statement of the concerned forest officials, major constrained encountered during plantation work is shortage of labour to carry out plantation, reluctance of people to spare area for plantation (at some site), unavailability of complete blank areas for afforestation, difficulties in carrying of planting material.



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- ✓ Sometimes, it has been also observed that fund for carrying out plantations is not received in time, because of these plantations are not carried out in proper time.
- ✓ The forest officials were also concerned about the lack of provision of aftercare and watch and ward.
- ✓ In the most of area, there is minimum cooperation of local peoples for protection of the plantation.
- ✓ The land which are generally available for plantations are mostly refractory sites and less fertile. The better and fertile areas are used either for growing the agriculture or the horticulture crops or have already been used for carrying out plantations in the past. The survival of plantation in such harsh sites is also a big challenge. Therefore, plantation in such sites has less survival rate.
- ✓ The climatic conditions prevailing during planting seasons are also responsible for lesser survival of the plantations. Almost all the plantations carried out by forest department is completely dependent on rainfall. The survival percentage is affected due to dry season, low rainfall and erratic pattern of the rainfall during monsoon and winter season.
- ✓ The landslides in some plantation areas also damaged the planted seedlings, which ultimately resulted in lesser survival rate of the planted species. In Kinnaur district it was observed that frost, avalanche of glaciers resulted in mortality of the seedlings in some of the plantations.
- ✓ In some plantation sites heavy infestation of *Lantana camara* and other bushes & weeds was a hindrance in carrying out the plantation activities and it also affects the growth and survival of the planted species. Lantana is regarded as one of the worst weeds because of its invasiveness, potential for spread and economic and environmental impacts. Lantana forms dense, impenetrable thickets that take over native forests and pastures. It competes for resources and reduces the productivity of, pastures and forestry plantations.
- ✓ The selection of site is first and important step to ensure the success of plantation. However, sometimes sites having very steep slopes, shallow soil depth, rocky sites and low moisture retention capacity are selected for carrying out the plantation activities. The adverse site conditions coupled with harsh climatic conditions are also responsible for lesser survival of the plantation.





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- ✓ The nurseries of species to be planted are located far away from the plantation sites. Many species such as Deodar are sensitive for shock. Therefore, transportation shock to seedlings also resulted in damage and lesser survival of planted species.
- ✓ In the higher altitude areas nomadic people keep their horses, cattle and sheep in the nearby area of the plantation. The movement of livestock by nomadic people through plantation areas has damaged some plantation sites.
- ✓ The selection of particular species for plantation is also important criterion for success of the plantation. Many factors such as species natural zone, aspect, slopes were not taken into consideration for planting a species. It was observed that in some areas deodar was planted in exposed site and below its natural zone of occurrence. Therefore, plantation of species in unsuitable sites resulted in lesser survival of the many species.
- ✓ In some of the areas, naked root plants did not respond well to the planted sites because some of the plantation sites were refractory, less fertile having shallow soil depth, low moisture retention capacity thereby causing the mortality of the plants.

### **Suggestions for Improvement:**

- ❖ The selection of suitable site is important and prerequisite for making any plantation a success. The efforts should be made to select sites with good site conditions. The selection of species for plantation in particular area is also very important. Therefore, species proposed for planting should commensurate with site conditions. The people have specific choice for species and they mostly interested to plant the species which meet out fodder, fuel-wood and small timber requirement. Hence, opinion of local people should be taken under consideration during selection of species for plantation. Besides, it is also suggested that species of economic importance like medicinal plant tree species and wild fruit tree species should be planted.
- ❖ The forest department may adopt the concept of planting the tall plants so that the plantations can be established in a lesser time and without much damage due to adverse conditions. The plantation of naked root stock should be avoided in stress sites.
- ❖ Plantations raised under CAMPA do not have provision of watch and ward. It becomes very difficult for concerned officials of forest department to look after



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the plantations regularly as they have to discharge other official duties from time to time. Without proper aftercare provisions plantations are being damaged by trespassers, grazers, fire, wild animals, etc. Therefore, to ensure success of the plantation, long term protection of plantation like provision for watch and ward at least for 4 to 5 years after plantation is required.

- ❖ In NPV plantation, there is no provision of barbed wire fencing; as a result plantation areas are prone to grazing pressure. Therefore, it is suggested that plantation areas should be fenced with barbed wire fencing.
- ❖ The many plantation sites are located far away from permanent nurseries of the forest department, which resulted in increased transportation cost and damage of planting materials. Therefore, temporary nursery should be established near the plantation site in order to avoid the transportation damage to the plants and also to reduce the transportation cost.
- ❖ Use of artificial inoculation of seedlings with suitable mycorrhizal fungi can further improve the establishment and growth parameters of seedlings. The seedlings tailored through artificial ecto-mycorrhizal inoculation are expected to grow faster and survive better after transplantation. Mycorrhizae play a significant role in plant nutrition, growth improvement, successful afforestation, reforestation, bio-control of pathogens and land reclamation programmes. Ectomycorrhiza (EM) occurs in trees belonging to the Pinaceae (Pine, Spruce), Fagaceae (Oak, Chestnut), Betulaceae (Alder and Birch), Salicaceae (Poplar and Willow), Myrtaceae (Eucalyptus). Some tree genera such as *Alnus*, *Eucalyptus*, *Cupressus*, *Juniperus*, *Ulmus* form both ectomycorrhizae and endomycorrhizae depending on soil conditions and tree's age. Nursery bags can be artificially inoculated with culture during seed sowing and it will reduce pressure to bring forest soil as mycorrhizal inoculum. The inoculated seedlings will have better growth, survival and establishment after transplantation. It will also help to reduce the nursery to field transplantation period, while raising the tall planting stock.
- ❖ The quality of planting material, which is being grown in the nursery should be improved. The healthy planting stock raised from superior genotypes should only be used for plantation. This will ensure that plantation can survive in the adverse conditions prevailing in the plantation sites and thereby help in achieving the better survival rate in the field.



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- ❖ There should be a provision of budget for preparation of site, which includes, removal of shrubs, bushes viz., *Lantana camara*, *Ageratina adenophora* and other invasive species before carrying out the plantation and in regular interval till establishment of plantations.
- ❖ To counteract the incidences of occurrence of forest fires in Chir-pine forests, broadleaved species need to be mixed with the species to act as natural barriers within the Chir-pine zone. Fire line should be created and maintained properly throughout the year. There should be separate provision for deployment of watch guards for the better management of fire occurrence and wild animals induced damage to plantation.
- ❖ Some of the plantation sites having steep slopes, shallow soil depth, drought conditions and low moisture retention capacity thereby resulted into lesser survival rate of planting seedlings of various tree species. In such sites, contour plantation should be carried out for better soil & water conservation and increasing the survival of plantation. The concept of bigger pit size with imported loamy soil should be introduced for better survival in harsh sites. The hardened/conditioned nursery stock need to be planted for better out planting success under un-favorable conditions. The need based construction of check dams in plantation sites for improving the site moisture regime and utilizing the water bodies for irrigation purposes during initial years of establishment of plantations will increase the survival rate.
- ❖ Local people also needs to be educated towards forestry programmes and about the benefits of the plantation for better coordination and thereby protecting plantations from domestic animals in far flung sites and also from fire incidences.
- ❖ In areas having more slopes, it is suggested that in future, for better results, development of contours, introduction of concept of bigger pits with tall planting stock or gunny bag raised seedling should be followed. Fire lines should be made in plantation areas well in advance of fire incidences period in fire prone areas. Fodder species should be included in plantation programmes as per people need and demand. Views of local should be considered in species as well as site selection before taking up plantation activities.
- ❖ In most of the plantation sites, fencing is damaged; hence repair of fencing is urgently required.



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- ❖ CAMPA grant should be released well in advance i.e. before planting season for ensuring timely completion of the field planting and maintenance operations.
- ❖ The utmost care shall be taken in selection of sites for carrying out the compensatory afforestation. The views of local residents shall be taken in selection of sites and species. The plantation areas where bush growth is vigorous, it is suggested that bushes especially around the plants should be removed to ensure fast growth of species planted.
- ❖ To ensure success of the plantation, long term protection of plantation is required. It is urgently required to introduce and follow the concept of social fencing.
- ❖ The forest department shall organize awareness programme with respect to fire and grazing control among local residents. People shall be sensitized about the importance of plantation, biodiversity and environment. The sense of ownership shall be inculcated in them. They shall be made realized that it is their own plantation. The efforts should be made to involve youth, *mahila mandals*, etc. in protection of plantation.
- ❖ It is also suggested that in harsh and drought prone sites mixing of FYM in pits during plantation and mulching before dry months should be done to get better results.
- ❖ The wherever possible, the provision of irrigation from nearby water source should be made to achieve good growth and better outcome.



## CHAPTER-1

### INTRODUCTION

#### 1.1 About the State:

**Himachal Pradesh** is a state in Northern India having geographical area of 55,673 km<sup>2</sup> and is bordered by Jammu & Kashmir on the north, Punjab on the west, Haryana on the south-west, Uttarakhand on the south-east and by the Tibet on the east. Himachal Pradesh is famous for its abundant natural beauty. The economy of Himachal Pradesh is growing fast and harnessing of immense Hydropower of state invariably adds to the economy. Abundance of perennial rivers enables Himachal to sell hydroelectricity to other states such as Delhi, Punjab and Rajasthan. The economy of the state is highly dependent on three sources: hydroelectric power, tourism, and agriculture. Himachal Pradesh is spread across valleys and 90% of the population lives in villages and towns. However, the state has achieved 100% hygiene and practically no single house is without a toilet. The villages are well connected to roads, public health centers and now with Lokmitra Kendra using high-speed broadband. Shimla district has maximum urban population of 25%. The hill stations of the state are among the most visited places in the country. The government has successfully imposed environmental protection and tourism development, meeting European standards, and it is the one of the state which forbids the use of polyethylene and tobacco products.

The forests of Himachal Pradesh are known for their grandeur and majesty is like a green pearl in the Himalayan crown. This life supporting systems are presently under great stress due to impact of modern civilization, economic development and growth in human and cattle population. According to National Forest Policy, 1988, at least two third i.e. 66% of the geographical area should be under forest in the hilly states like Himachal Pradesh. However, keeping in view that about 20% of the area is inaccessible and beyond the tree limit.



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The forests of the State have been classified on an ecological basis as laid down by Champion & Seth and can be broadly classified into Coniferous Forests and broad-leaved Forests. Distribution of various species follows fairly regular altitudinal stratification. The vegetation varies from Dry Scrub Forests at lower altitudes to Alpine Pastures at higher altitudes. In between these two extremes, distinct vegetational zones of Mixed Deciduous Forests, Bamboo, Chil, Oaks, Deodar, Kail, Fir and Spruce are found. The richness and diversity of our flora can be gauged from the fact that out of total 45,000 species found in the country as many as 3,295 species (7.32%) are reported in the State. More than 95% of the species are endemic to Himachal Pradesh and characteristic of Western Himalayan flora, while about 5% (150 species) are exotic, introduced over the last 150 years. As per latest State Forest Report of FSI, an area of 15,443 sq. km. is actual forest cover. This is constituted by 3163 sq. km. of very dense forests, 7100 sq. km. moderately dense and 5180 sq. km. with open forests (Table-1.1)

**Table-1.1: Geographical Distribution of Forest (As Per FSI 2021)**

Sl. No.	Particulars	Area (Km <sup>2</sup> )	Percentage of Geographical Area	Percentage of Forest Area
1.	Geographical Area	55673	100.00	----
2.	Forest area Legally Classified	37948	68.16	100.0
3.	Area under Tree Cover	15443	27.72	40.67
	i) Very Dense Forest	3163	5.59	8.20
	ii) Moderate Dense Forest	7100	12.80	18.78
	iii) Open Forest	5180	9.33	13.69



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The forest area under different categories as per legal classification is given in the Table-1.2:

**Table-1.2: Legal Classification of Forest Area of Himachal Pradesh**

Sl. No.	Category of Forests	Area (km <sup>2</sup> )	Percentage (%)
1.	Reserved Forests	1883	4.96
2.	Demarcated protected Forests	12852	33.87
3.	Un-demarcated Protected Forests	16035	42.25
4.	Others (managed by Forest Department)	7160	18.87
5.	Not managed by Forest Department (Municipal cantonment Forests etc.)	18	0.05
	<b>Total</b>	<b>37948</b>	<b>100.00</b>

At present the forests are not being looked as a source of revenue and sustained supply of raw material. Rather, the emphasis now is on protection and conservation of forests, environment and wild life. The removals from forests are, therefore, limited to removal of dead, diseased, decaying trees and salvage lots and removals for meeting the bonafide requirements of the local people. Total human population of the state is 7.32 million whereas, total livestock population is 5.75 million. The Per Capita Forest Cover in the state of Himachal Pradesh is 0.24 ha. The altitude wise area under different categories of forest is given in the **Table-1.3:**

**Table-1.3: Altitude wise Forest Cover of Himachal Pradesh (km<sup>2</sup>)**

Altitude Zone (m)	Very Dense Forest	Medium Dense Forest	Open Forest	Total
<b>0-500</b>	13	458	360	<b>831</b>
<b>500-1000</b>	220	1912	1589	<b>3721</b>
<b>1000-2000</b>	694	1679	1552	<b>3925</b>
<b>2000-3000</b>	1814	2225	1057	<b>5096</b>
<b>3000-4000</b>	372	848	625	<b>1845</b>
<b>&gt;4000</b>	-	4	12	<b>16</b>
<b>Total</b>	<b>3113</b>	<b>7126</b>	<b>5195</b>	<b>15434</b>



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

Himachal Pradesh is situated between 30° 22' 40" to 33° 12' 20" north latitudes and 75°45' 55" to 79°04'20" east longitudes. The altitude in the state ranges from 350 m to 6975 m above mean sea level. The different climatic zones of the state are as below:

### **1.1.1 Shivalik Hill Zone:**

The climate of this zone is sub Tropical, consists of foothills and valley area from 350 to 650 meters above mean sea level in the district of Una, Bilaspur, Hamirpur and parts of Sirmaur, Kangra, Solan and Chamba districts. It occupies about 35% of the geographical area and about 40% of the cultivated area of the State.

### **1.1.2 Mid Hill Zone:**

This zone extends from 651 m to 1,800 m above mean sea level and having mild temperate climate. It consists of Palampur and Kangra Tehsil of Kangra district, Rampur Tehsil of Shimla district and parts of Mandi, Solan, Kullu, Chamba, Bilaspur and Sirmaur district. It occupies about 32% of the total geographical area and about 37% of the cultivated area of the State.

### **1.1.3 High Hill Zone:**

It lies from 1,801 to 2,200 m above sea level with humid temperate climate and alpine pastures. This zone covers about 35% of the geographical areas and about 21% of the cultivated area of the State.

### **1.1.4 Cold Dry zone:**

It comprises of Lahaul-Spiti and Kinnaur Districts and Pangi Tehsil of Chamba District and lying about 2,200 m above mean sea level. It occupies about 8% of the geographical and 2% of the total cultivated area of the State.





## 1.2 Major Environmental Dimensions:

The fragile eco system of the Himalayas is surrounded with multiple environmental concerns. About one third area of the state is permanently under snow, glaciers and cold deserts, where tree growth is absent to minimal due to harsh condition. Soil erosion and land slips are the most common calamities experienced in the state. Land degradation is 2<sup>nd</sup> highest in India being 75% of the gross area of the state. The soil run off not only silts the rivers and nallahs but also deprives the agriculture lands from top layer fertile soil. The Forests are experiencing heavy biotic pressure and are vulnerable to degradation. The forests experience heavy grazing and fire detrimental to sustainability of vegetation and forest cover. Floods and cloud bursts are other natural calamities challenging the environment. It is in this context that the state requires a very careful handling of its resources maintain and upgrade its environmental dimensions with which climate of the plains are al linked.

## 1.3 Major Social Dimensions:

Agriculture is the backbone of the state economy followed by tourism and industry. Living in tough terrain and harsh climatic conditions are the major concerns of the citizen. Lack of in situ employment deprives the community of regular income throughout the year and hence the state is facing problems of both apparent as well as hidden unemployment. The situation strengthens biotic pressure on agriculture and forests. Forest resources particularly NTFPs are taken as supplementary income by the forest dwellers. Fodder, small minerals, fuel wood, construction sand, medicinal plants and herbs, aromatic grasses and plants are the major collections from the forests extending livelihood to a section of the society. The community has affiliation with forests in multiple ways.



## CHAPTER-2

### ABOUT THE ASSIGNMENT

#### 2.1 About the CAMPA:

With a cover of 23% of Geographical area of the country, forest in India comprise of a number of diverse forest types and reserved areas designated as National Parks and Wildlife Sanctuaries. In India, forest meet the livelihood needs of people living in and adjoining the forests in about 1, 73,000 villages. Forests also act as carbon sinks and regulators of water regime.

Many development and industrial projects such as erection of dams, mining, and construction of industries or roads require diversion of forest land. Any project proponent, government or private must apply for forest clearance from Ministry of Environment, Forests and Climate Change (MoEF&CC), before the conversion of land take place. This proposal is to be submitted through the concerned forest department of the state government. If clearance is given, then compensation for the lost forest land is also to be decided by the ministry and the regulators.

Due to certain discrepancies in the implementation of compensatory afforestation, some NGOs had approached The Hon'ble Supreme Court for relief. The Hon'ble Supreme Court on 10<sup>th</sup> July 2009 issued orders that there will be a Compensatory Afforestation Fund Management and Planning Authority (CAMPA) as National Advisory Council under the chairmanship of the Union Minister of Environment & Forests for monitoring, technical assistance and evaluation of compensatory afforestation activities.

##### 2.1.1 Objectives of CAMPA

Compensatory Afforestation Fund Management and Planning Authority (CAMPA) are meant to promote afforestation and regeneration activities as a way of compensating for forest land diverted to non-forest uses.



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National CAMPA Advisory Council has been established as per orders of The Hon'ble Supreme Court with the following mandate:

- Lay down broad guidelines for State CAMPA.
- Facilitate scientific, technological and other assistance that may be required by State CAMPA.
- Make recommendations to State CAMPA based on a review of their plans and programmes.
- Provide a mechanism to State CAMPA to resolve issues of an inter-state or Centre-State character.

### 2.2 State CAMPA

The Hon'ble Supreme Court also approved the guidelines prepared by the MoEF & CC for utilizing CAMPA funds by an agency to be constituted in the states and to be known as The State CAMPA.

Some of the important points in the guidelines are highlighted here:

- The State CAMPA would presently receive funds collected from user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, Net Present Value (NPV) and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980 and presently lying with the Adhoc CAMPA.
- The State CAMPA would administer the amount received from the Adhoc CAMPA and utilize the funds collected for undertaking compensatory afforestation, assisted natural regeneration, conservation and protection of forests, infrastructure development, wildlife conservation and protection and other related activities and for matters connected therewith or incidental thereto.
- State CAMPA would provide an integrated framework for utilizing multiple sources of funding and activities relating to protection and management of forests and wildlife. Its prime task would be regenerating natural forests and building up the institution engaged in this work in the State Forest



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Department including training of the forest officials of various levels with an emphasis on training of the staff at cutting edge level (forest range level).

In short, the Department would be modernized to protect and regenerate the forests and wildlife habitat.

The guidelines also talk about establishment of an independent system for concurrent monitoring and evaluation of the works implemented in the States utilizing the funds available.

### **2.3 About the Assignment:**

Himalayan Forest Research Institute (HFRI) having its office at Conifer Campus, Panthaghati, SHIMLA-171 013 (H.P.) submitted its proposal for monitoring of Plantation Raised under H.P. State CAMPA during the year 2016-17, 2017-18 and 2018-19 vide Director, HFRI letter No.3-1(12-CAMPA)/HFRI/2020/4526 dated 23.01.2020. Himachal Pradesh Forest Department (HPFD) considering the proposal submitted by the Institute and keeping in view the available scientific manpower and experience, assigned the task of monitoring of Plantation Raised under H.P. State CAMPA and assigned the above task to HFRI, Shimla vide its letter No. Ft. FFE-B-F (5) 1/2017 dated 16.03.2020. Accordingly, a Memorandum of Agreement was signed between both the parties on 30.03.2020.

### **2.4 Objective and Scope:**

#### **Objective:**

- The primary objective of this assignment is to provide information of H.P. State CAMPA on the quality and impact of plantations done under various scheme of CAMPA.

#### **Scope:**

- Physical verification and quality of plantation works done as per Annual Action Plan.
- Assessment of the impact of these plantation works.



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### **Time Frame:**

This assignment was completed and final report submitted in 24 months from the date of agreement.

### **Outputs:**

- (i) A comprehensive analytical monitoring report for each year giving division-wise summary. Though the population for study is entire state but the estimates are required for each Division. Therefore, division becomes sub-population,
- (ii) Various formats, reports, records filled in, collected and compiled during assignment,
- (iii) All records of consultation during the process.

### **Benefits to Client on Utilization of Consultancy Output:**

- The Client may utilize the project output to evaluate the success and impact of the plantations done under CAMPA so far.
- With the recommendations/suggestions, Himachal Pradesh Forest Department may also improve upon the activity and methodology to be adopted in future under CAMPA.

## **2.5 Process of Monitoring:**

The process of monitoring is the systematic collection of data from ongoing projects and programmes for improving the practices in future, external accountability and for taking informed decisions. The activity of monitoring is a recurrent task, which begins with the planning stage of a project. Monitoring helps in the documentation of processes and experiences to be used later in project decision making. Monitoring also helps in checking the progress against the plans. The data generated through monitoring is used in evaluation.

Evaluation is the assessment done systematically as well as objectively of the functioning of a completed as well as ongoing project. Evaluation helps in the appraisal of data that can help in creation of strategic decisions. It thereby helps



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in drawing conclusions about following aspects of intervention projects of intervention project:

(a) Relevance; (b) Effectiveness; (c) Impact & (d) Sustainability.

Monitoring and Evaluation is today an embedded constituent of any social programme or developmental project. For developmental project in the social sector, monitoring and evaluation provides a view about suitability and sustainability to the stakeholders. With the growth and development of the social sector, there are openings of numerous schemes run by a government sector and the non-government sector that require specialized knowledge of the monitoring and evaluation process.

The above facts and circumstances were kept in view while taking up the above assignment and consultants tried their level best to help the consulting organization by bringing factual position of the work before them.

### **2.6 About the Consultant Organization:**

*Indian Council of Forestry Research and Education (ICFRE)*, an apex body in the National Forestry Research System, has been undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating research, education and extension covering all aspects of forestry. The Council deals with the solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources. Topical research by the Council enhances public confidence in the ability of forest managers and researchers to successfully handle challenges related to natural resource management. The Council is operating through its regional research Institutes situated in various climatic zones of the country.

Himalayan Forest Research Institute (HFRI), Shimla, which is one of the regional research Institute of *Indian Council of Forestry Research and*



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*Education (ICFRE)*, which is an apex body under the Ministry of Forests, Environment & Climate Change, Government of India and is premier organization in the national forestry research system. The *ICFRE* has been undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating research, education and extension covering all aspects of forestry. HFRI was established as High Level Conifer Regeneration Research Centre during May 1977 for carrying out Research on problems associated with natural regeneration of Silver Fir and Spruce. The institute made its humble beginning from this Centre and at the time of re-organization of forestry research in *Indian Council of Forestry Research & Education (ICFRE)*, Dehradun, during 1998, Government of India appreciated the problems of temperate eco-system and decided to upgrade this Centre in to a full-fledged research institute.

The mandate of this Centre had also been enlarged to cater to forestry research needs pertaining to eco-rehabilitation of Cold Deserts of mined areas and regeneration of Coniferous and broadleaved forests, besides activities on management practices including insect-pests management in temperate forests and in alpine areas too. Popularization of agro-forestry and other related extension activities has also included in its mandate. This Centre has now been re-designated as Himalayan Forest Research Institute, Shimla and is a regional research institute of ICFRE with an area of responsibilities extending to the states of Himachal Pradesh and Jammu & Kashmir.

This Institute is being headed by a Director, a dedicated team of Scientists, one Deputy Conservator of Forests and supporting staff, the details of which is being given below:

### **Dr. Sandeep Sharma, Director**

Dr. Sandeep Sharma, Scientist-G (Silviculturist) & Group Coordinator Research

Dr. R.K. Verma, Scientist-G (Ecology & Biodiversity Conservation)

Dr. Jagdish Singh, Scientist-F (Non-Wood Forest Products)



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Dr. Ashwani Tapwal, Scientist-F (Pathologist)

Dr. Ranjeet Kumar, Scientist-E (Ecology & Biodiversity Conservation)

Dr. Pawan Kumar, Scientist-E (Entomologist)

Dr. Vaneet Jishtu, Scientist-E (Non-Wood Forest Products)

Dr. Swaran Lata, Scientist-D (Botanist)

Shri Pitamber Singh Negi, Scientist-D (Seed Technologist)

Dr. Balkrishan Tiwari, Scientist-B (Botanist)

Dr. Parveen Rawat, Scientist-B (Forestry)

To assist the above team of Officers and Scientists, there are Chief Technical Officers, Senior Technical Officer, Technical Officer, Technical Assistants, Technicians, Forest Range Officers, Deputy Rangers, Foresters and Forest Guards.

The Institute in the past was also involved in taking up the studies on Environment Impact Assessment (EIA) and preparation of Environment Management Plan (EMP) for various Hydroelectric Projects and preparation of CAT PLANS for various developmental projects. The Institute is also collaborating with some other sister organizations in the field where expertise is not available with this Institute, which is also a need of the hour.





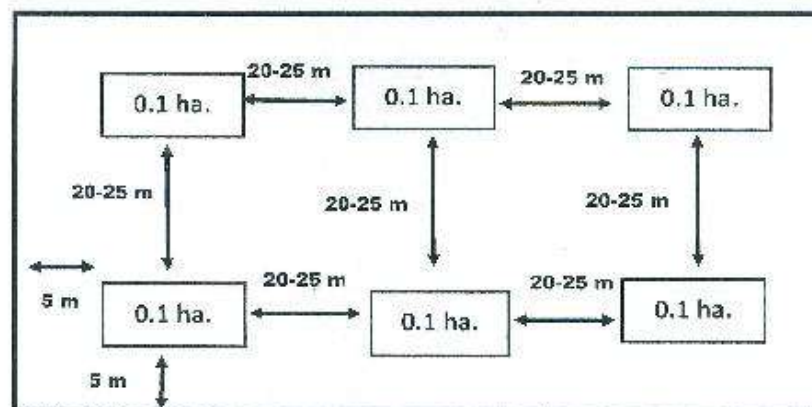
### CHAPTER-3

## METHODOLOGY, QUANTITATIVE AND QUALITATIVE ASPECT

### 3.1 Methodology:

The proposed study was carried out in different plantations raised from CAMPA Fund in various Forest Divisions of Himachal Pradesh. Stratified Multi-stage Random Sampling Methodology was used to carry out the studies separately for plantations raised under Compensatory Afforestation, CAT Plan, Net Present Value and Soil & Water Conservation Plantations. For the purposes of sampling, the whole state was divided into Circles, then Divisions, then Ranges and then Blocks. In a Block, we have number of beats/ plantations sites. The plantation sites were selected randomly. Sampling intensity was 30% of plantation sites by number and 25% by total area of plantations of a particular year was adopted.

The size of the plot was 0.1 ha. (33 X 30 m) and for the purpose of number of plots, first row of plantation (approximately 5 m) in all around the site was left, then plot of size 0.1 ha was laid after a distance of 20-25 m (Systematic Sampling). The sampling scheme for laying out the sample plots is being given in the Figure-1.



Entry Point

Figure-1: Typical Sampling Scheme for Laying out of sampling plots



### 3.2 Plot Size:

In European countries, plot size varies from 0.01 ha to 0.1 ha depending on the number of trees/ ha. For high density stands (young plantations), it is between 0.01 to 0.03 ha. For low density stands (old plantations), it is between 0.05 to 0.1 ha. In tropical forest inventories, the plot size is normally between 0.1 to 0.5 ha. If plot size is larger, variation i.e. C.V. will be smaller, since high density clump and open space will generally be in the same plot. For small size plots, some plot will be in high density clump while some will be in gaps and hence variation among plots will be greater.

In the present case, plot size of 0.1 ha has been taken as a whole. Sample plots were laid out in the selected plantation site. Within the enumeration site, girth/ diameter (at breast/ collar height) were measured for all the plants. The sample plant within each girth/ diameter class was measured for height subject to a minimum of 10 plants under each species.

- GPS Coordinates of the study sites/ locations was also recorded for authentication of the study.
- Data collected from the field was statistically analyzed for descriptive statistics and other parameters by following standard methodology. Based on the plot data, plant growth (average height & diameter) and survival percentage was estimated for the population.
- The survival percentage of various divisions according to scheme and year wise was classified in to various categories like Below Average (0-30%), Average (31-50%), Good (51-70%) and Very Good (71-100%).
- The weighted average survival was estimated for each division and for the state level for each year under various plantation schemes. The weighted average survival was calculated by the formula given below:



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

$$\text{Weighted Average Survival (\%)} = \frac{\text{Sum (Area X Survival \%)}}{\text{Total Area}}$$

- In the plantation sites where grasses were raised under Pasture Development scheme, dry biomass of the grasses in 1x1m area was estimated by destructive sampling and then compared with grass production outside the plantation area.

The format designed for the collection of field data is being annexed herewith as **Annexure-1A**.

### 3.3 Criteria:

The following criterion were also followed/ used for conducting physical verification and qualitative aspect of the study.

#### 3.3.1 Physical Verification:

- All the forest blocks were covered where plantations have been done.
- The sample plots were proportionally allocated from each division.
- Selected plantation areas were examined for area accuracy with the help of GPS by way of traversing around the boundary of the plantations. The shape files of the sample plantations were also prepared for geo-reference parameters.
- For each year plantations, separate samples were selected and report was generated for each year separately.
- In 5% of the plantations raised in various schemes, 100% physical verification with respect to number of plants planted and survival was also done.

### 3.4 Qualitative Aspect of the Study:

Suitability of species selected for plantation vis-à-vis area selected for plantation and objectives of the plantation scheme was also assessed on the basis of documents supplied and visiting the plantation sites. Quality of work with respect to spacing, pit size etc. was also monitored by physically visiting the plantation sites along with the information



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

provided in the documents. Assessment of regeneration/ rehabilitation status of degraded lands treated was also observed by visiting the particular plantation sites.

The condition and quality of fencing erected for the plantation was assessed with respect to type of fence posts used and number of strands of the fencing etc.

The views of the people living in the vicinity of the plantation were taken in order to assess the impact of plantations on their quality of life and livelihoods. This was done through personal interview for which open ended pre-structured questionnaires were developed. The format designed for the collection of information from the people around the plantation sites is being annexed herewith as **Annexure-1B**.

### 3.5 Details of the Plantation Sites and Evaluation:

In the state of Himachal Pradesh, total plantation area under various schemes i.e. Compensatory Afforestation, CAT Plan, NPV plantation and Soil & Water Conservation was 3179.0 ha, 2589.0 ha, 3445.0 ha and 09 ha, respectively. Under Compensatory Afforestation, total plantation area during 2016-17, 2017-18 and 2018-19 was 1208.49 ha, 1390.0 and 581.0 ha, respectively. Whereas, under CAT PLAN, plantation area during 2016-17, 2017-18 and 2018-19 was 1182.0, 845.0 and 562.0, respectively. Similarly, under NPV plantation area during 2016-17, 2017-18 and 2018-19 was 1102.0 ha, 1005 ha and 1338.0 ha, respectively. Under Soil & Water Conservation scheme the plantation area during 2016-17 was 09 ha (**Table 3.1**).

**Table-3.1: Total Area (ha) under Various Schemes in the State of Himachal Pradesh**

Year	CA	CAT PLAN	NPV	S & W C	Total
2016-17	1208.49	1182.0	1102.0	09	3501.49
2017-18	1390.0	845.0	1005.0	--	3240.00
2018-19	581.0	562.0	1338	--	2481.0
Total	3179.49	2589.0	3445.0	09.0	9222.49



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The area taken for evaluation under various schemes i.e. Compensatory Afforestation, CAT Plan, NPV plantation and Soil & Water Conservation was 1987.43 ha, 990.8 ha, 1824.1ha and 09 ha, respectively. Under Compensatory Afforestation, area evaluated during 2016-17, 2017-18 and 2018-19 was 775.19 ha, 745.44 ha and 466.80 ha, respectively. Whereas, under CAT PLAN, area evaluated during 2016-17, 2017-18 and 2018-19 was 461.0 ha, 322.63 and 207.17 ha, respectively. Similarly, under NPV plantation area evaluated was 652.0 ha, 425.6 and 746.5 ha for these years respectively. Under Soil & Water Conservation scheme the plantation area evaluated during 2016-17 was 09 ha, respectively (**Table-3.2**).

**Table-3.2: Total Area (ha) evaluated under Various Schemes in the State of Himachal Pradesh**

Year	CA	CAT PLAN	NPV	S & W C	Total
<b>2016-17</b>	775.19 (64.14%)	461.0 (39.0%)	652 (59.16%)	09 (100%)	<b>1897.19</b> <b>(54.18%)</b>
<b>2017-18</b>	745.44 (53.62%)	322.63 (38.18%)	425.6 (42.34%)	NA	<b>1493.67</b> <b>(46.10%)</b>
<b>2018-19</b>	466.80 (80.34%)	207.17 (36.86%)	746.5 (55.75%)	NA	<b>1420.47</b> <b>(57.25%)</b>
<b>Total</b>	<b>1987.43</b> <b>(62.5%)</b>	<b>990.8</b> <b>(38.27)</b>	<b>1824.1</b> <b>(52.95)</b>	<b>09</b> <b>(100%)</b>	<b>4811.33</b> <b>(52.16%)</b>

**Note:** Values in parentheses indicates per cent area evaluated

Total number of plantation sites under various schemes i.e. Compensatory Afforestation, CAT Plan, NPV plantation and Soil & Water Conservation was 274, 355, 245 and 02, respectively. Under Compensatory Afforestation, number of plantation sites during 2016-17, 2017-18 and 2018-19 was 103, 112 and 59, respectively. Whereas, under CAT PLAN, number of plantation sites during 2016-17, 2017-18 and 2018-19 was 169, 142 and 92, respectively. Similarly, under NPV number of plantation sites was 82, 44 and 119 for these years,



respectively. Under Soil & Water Conservation scheme the number of plantation sites during 2016-17 were 02 (**Table 3.3**).

**Table-3.3: Number of Sites under Various Schemes in the State of Himachal Pradesh**

Year	CA	CAT PLAN	NPV	S & W C	Total
2016-17	103	169	82	02	356
2017-18	112	142	44	-	298
2018-19	59	92	119	-	270
<b>Total</b>	<b>274</b>	<b>403</b>	<b>245</b>	<b>02</b>	<b>924</b>

Total number of plantation sites evaluated under various schemes i.e. Compensatory Afforestation, CAT Plan, NPV plantation and Soil & Water Conservation was 187, 169, 152 and 02, respectively. Under Compensatory Afforestation, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 71, 68 and 48, respectively. Whereas, under CAT PLAN, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 70, 60 and 39, respectively. Similarly, under NPV plantations the number of plantation sites evaluated were 48, 28 and 76 for these years, respectively. Under Soil & Water Conservation scheme, 02 number of plantation sites was evaluated during 2016-17 (**Table-3.4**).

**Table-3.4: Number of Sites Evaluated under Various Schemes in the State of Himachal Pradesh**

Year	CA	CAT PLAN	NPV	S & W C	Total
2016-17	71 (68.93%)	70 (41.42%)	48 (58.54%)	02 (100%)	191 (53.65%)
2017-18	68 (60.71%)	60 (42.25%)	28 (63.64%)	NA	156 (52.35%)
2018-19	48 (81.36%)	39 (42.39)	76 (63.87%)	NA	163 (60.37%)
<b>Total</b>	<b>187</b> <b>(68.25%)</b>	<b>169</b> <b>(47.61%)</b>	<b>152</b> <b>(62.04%)</b>	<b>02</b> <b>(100%)</b>	<b>510</b> <b>(55.19%)</b>

**Note:** Values in parentheses indicates per cent number of sites evaluated



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Against the stipulated sampling intensity of 30% of plantation sites by number and 25% by total area of plantations of a particular year, the actual evaluation work done varied from 41.42 % to 100% by number and 36.86% to 100% by area, respectively. This was due to the reason that plantations carried out in each block under various schemes for each year was evaluated.

As per the information supplied by the H.P. Forest Departments, the details of the plantations sites and on the basis of the standardized methodology, the plantations were evaluated, as given below.

### 3.6 BILASPUR CIRCLE:

In this Forest Circle, plantation sites of Bilaspur and Kunihar Forest Division were evaluated, the details whereof are being given below:

In Bilaspur Forest Division, there was one site having the total area 12.54 ha for the period 2016-17, under scheme Compensatory Afforestation and same site was taken for the evaluation. Whereas, there were three plantation sites having the total area 15.00 ha for the period 2016-17, under scheme Compensatory Afforestation. Out of three plantation sites, 01 site having the total area 5 ha was taken for the evaluation. The details of plantation sites are given **Table 3.5**.

There was one site having the total area 6.38 ha for the period 2017-18 under the scheme Compensatory Afforestation and same site was taken for the evaluation. There was one plantation site having the total area 0.558 ha for the period 2018-19, under the scheme Compensatory Afforestation and same site was taken for the evaluation. Whereas, one plantation site having the total area 20.0 ha for the period 2018-19, under the scheme NPV and same site was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given **Table 3.6**.

In Kunihar Forest Division, there were 05 sites having the total area of 35 ha for the period 2016-17 under the Compensatory Afforestation. Out



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of 05 sites, 04 sites covering the total area 30 ha were taken for the evaluation. Whereas, 07 sites having the total area 43 ha under the scheme CAT PLAN for the period 2016-17. Out of 07 sites, 03 sites having the total area 17 ha were taken for the evaluation and under the scheme NPV there were 02 sites having the total area 20 ha for the period 2016-17 and both plantation sites were taken for the evaluation. Similarly, under the scheme Soil and Water Conservation 02 sites having the total area 09 ha and same sites were taken for the evaluation and monitored as per the standard methodology. The details of plantation sites are given **Table 3.7**.

During 2017-18 there was 01 site having the total area of 0.7 ha under the Compensatory Afforestation and same was taken for the evaluation. Whereas, 08 sites having the total area 48 ha under the scheme CAT PLAN for the period 2017-18. Out of 08 sites, 03 sites having the total area 15 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given **Table 3.8**.

During 2018-19, there was 01 site having the total area of 7.68 ha under the scheme Compensatory Afforestation (CA) and same was taken for evaluation. Whereas, 05 sites having the total area 30 ha under the scheme CAT PLAN for the year 2018-19. Out of 05 sites, 02 sites covering the total area 10 ha was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given **Table 3.9**.

### **3.7 HAMIRPUR FOREST CIRCLE:**

In this forest circle, plantation sites of Dehra, Hamirpur and Una Forest Division were evaluated as given below:

In Dehra Forest Division, there were 05 sites having the total area 55 ha for the period 2017-18 under the scheme NPV. Out of 05 sites, 02 sites having the total area 20 has were taken for the evaluation and monitored





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as per standard methodology. The details of plantation sites are given **Table-3.10.**

During 2018-19, there was 01 site having the total area 5 ha under the scheme Net Present Value and same site was taken for evaluation and monitored as per standard methodology. The details of plantation sites are given **Table-3.11.**

In Hamirpur Forest Division, there was 07 site having the total area 40.0 ha for the period 2016-17 under the scheme Net Present Value. Out of 07 sites, 04 sites covering the total area 20 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.12.**

During 2017-18, there were 25 sites having the total area 107 ha under the CAT PLAN. Out of 25 sites, 09 sites covering the total area 35 ha were taken for the evaluation. Whereas, 04 sites having the total area 34 ha for the period 2017-18 under the scheme Net Present Value. Out of 04 sites, 03 sites covering the total area 29 ha for the period 2017-18 were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.13.**

During 2018-19, there was 01 site having the total area 10 ha under the scheme NPV and same site was taken of evaluation and monitored as per standard methodology. he details of plantation sites are given in **Table-3.14.**

In the Forest Division Una, there were 7 sites having the total area 60.99 ha for the period 2016-17 under the Compensatory Afforestation. Out of 07 sites, 03 sites covering the total area 19.04 ha were taken for the evaluation. Whereas, 04 sites having the total area 40 ha under the scheme NPV. All 04 sites were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.15.**



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**Table-3.5: Details of the plantation raised viz-a-viz monitoring and evaluations of Bilaspur Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation (Ha.)	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Bilaspur	Compensatory Afforestation	1	12.54	1 (100%)	12.54 (100%)	UF Cheli	2016-17	100%
		Net Present Value (NPV)	3	15.0	1 (33.33%)	5 (33.33%)	UF Dhanula		100%

**Table-3.6: Details of the plantation raised viz-a-viz monitoring and evaluations of Bilaspur Forest Division (2017-18 & 2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation (Ha.)	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Bilaspur	Compensatory Afforestation	1	6.38	1 (100%)	6.38 (100%)	UF Balh-Chalog	2017-18	100%
Bilaspur	Bilaspur	Compensatory Afforestation	1	0.558	1 (100%)	0.558 (100%)	DPF Bandla	2018-19	100%
		Net Present Value (NPV)	1	20.0	1 (100%)	20.0 (100%)	C-7 Bagra		100%



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**Table-3.7: Details of the plantation raised viz-a-viz monitoring and evaluations in Kunihar Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Kunihar	Compensatory Afforestation	05	35	04 (80%)	30 (85.71)	Kangri	2016-17	Sampling
							DPF-Kurmla		Sampling
							DPF Shron (Bawan)		Sampling
							Bajthana		100%
		CAT PLAN	07	43	03 (42.85%)	17 (39.53%)	D-1 Baga		Sampling
							UF-Kandhar		100%
							UF Saryali		100%
		NPV	02	20	02 (100%)	20 (100%)	DPF Saroan		100%
							DPF Jeoli Karoli		Sampling
		Soil and Water Conservation	02	09	02 (100%)	09 (100%)	UF Bhurjni		Sampling
UF Newri	100%								



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**Table-3.8: Details of the plantation raised viz-a-viz monitoring and evaluations in Kunihar Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Kunihar	Compensatory Afforestation	01	0.7	01 (100%)	0.7 (100%)	UPF Baddu	2017-18	Sampling
Bilaspur	Kunihar	CAT PLAN	08	48	03 (37.5%)	15 (31.25%)	UPF Bajrail		Sampling
							U-19 Sakor		Sakor
							UF Kangri		100%

**Table-3.9: Details of the plantation raised viz-a-viz monitoring and evaluations in Kunihar Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Kunihar	Compensatory Afforestation	01	7.68	01 (100%)	7.68 (100%)	DPF Ser Gharakru	2018-19	Sampling
		CAT PLAN	05	30	02 (40%)	10 (33.33%)	U-13 Kandhar		Sampling
							UF Paryab		100%



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**Table-3.10: Details of the plantation raised viz-a-viz monitoring and evaluations of Dehra Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Dehra	Net Present Value (NPV)	5	55	2 (100%)	20 (36.36%)	U4d Khariana C27	2017-18	Sampling
							UPF Beri C2		Sampling

**Table-3.11: Details of the plantation raised viz-a-viz monitoring and evaluations of Dehra Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Dehra	Net Present Value	1	5	1 (100%)	5 (100%)	U14D Kharian C16	2018-19	100%



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**Table-3.12:Details of the plantation raised viz-a-viz monitoring and evaluations of Hamirpur Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Hamirpur	Net Present Value	7	40.0	4 (57.14%)	20 (50.0%)	P 18 Bihroo C2	2016-17	Sampling
							P- 16 Dhar Sidh C3c		Sampling
							P14 Ralli C3b		100%
							U-377 Chabutra C3		Sampling



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**Table-3.13: Details of the plantation raised viz-a-viz monitoring and evaluations of Hamirpur Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Hamirpur	CAT PLAN	25	107	9 (36.0%)	35 (32.71%)	UPF Khaler	2017-18	Sampling
							UPF 316 Dhanpur		Sampling
							P-35 Rara Jori C-Palyal		Sampling
							UPF Plassi		Sampling
							UPF Tillu C6 near Tillu nala		100%
							P 24 Batran C1a and C1b		100%
							P27 Basaral C3b and C3c		Sampling
							P28 Bounti C1c		Sampling
							P23 Loharkar		Sampling
Hamirpur	Hamirpur	NPV	4	34	3 (75.0%)	29 (85.29%)	P14 Ralli C3a	2017-18	Sampling
							P55 Dhar Chabutra C2d		Sampling
							U322 Bhadiar		100%



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**Table-3.14: Details of the plantation raised viz-a-viz monitoring and evaluations of Hamirpur Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Hamirpur	NPV	1	10	1 (100%)	10 (100%)	U119 Chakmoh C2	2018-19	Sampling

**Table-3.15: Details of the plantation raised viz-a-viz monitoring and evaluations of Una Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Hamirpur	Una	Compensatory Afforestation	07	60.99	3 (42.85%)	19.04 (31.21%)	Badehra	2016-17	Sampling
							Tibbian		100%
							RF Lam		Sampling
		NPV	04	40	04 (100%)	40 (100%)	UPF Baduhi		Sampling
							UPF Bohana		Sampling
							UPF Ludher		100%
							UPF Sakoun		Sampling





### 3.8 NAHAN FOREST CIRCLE:

In this forest circle, plantation sites of Nahan, Paonta Sahib, Rajagarh and Renuka ji forest division were evaluated as given below:

In Nahan Forest Division, there were 06 numbers of sites having the total area of 110 ha for the period 2016-17 under the NPV. Out of 06 numbers of sites, 04 sites covering the area 75 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.16**.

During 2017-18, there were 13 numbers of sites having the total area of 262.67 ha under the scheme Compensatory Afforestation. Out of 13 numbers of sites, 07 sites covering the area 137.55 ha were taken for the evaluation. Whereas, 02 numbers of sites having the total area of 66.6 ha for the period 2017-18 under the scheme NPV. Both sites were taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table 3.17**.

During 2018-19, there was 01 number of site having the total area of 10 ha for the period 2018-19 under the scheme NPV and same were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-18**.

In Paonta Sahib Forest Division, there were 02 sites having the total area 45 ha for the period 2016-17 under the Compensatory Afforestation. Out of 02 sites, 01 site having the area 15 ha was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.19**.

During 2017-18, there were 19 plantation sites having the total area 284.6 ha under the Compensatory Afforestation. Out of 19 sites, 08 sites having the total area 101.6 were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table 3.20**.



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In Rajgarh Forest Division, there was 01 site having the total area 10 ha for the period 2016-17 under scheme Net Present Value and same site was taken for the evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.21**.

In Rajgarh Forest Division, there were 11 sites having the total area 118.88 ha for the period 2017-18 under the Compensatory Afforestation. Out of 11 sites, 06 sites having the total area 66 ha were taken for the evaluation. Whereas, 06 sites having the total area 58 ha under the scheme NPV for the period 2017-18. Out of 06 sites, 03 sites covering the total area 28 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.22**.

During 2018-19, there were 04 sites having the total area 29.55 ha for the period 2018-19 under the scheme Compensatory Afforestation. Out of 04 sites, 03 sites having the total area 20 ha were taken for the evaluation. Whereas, 08 sites having the total area 100 ha under the scheme NPV during 2018-19. Out of 08 sites, 04 sites covering the total area 30 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.23**.

In Renuka Ji Forest Division, there were 04 plantation sites having the total area 60 ha for the period 2018-19 under the NPV programme of GoI. All 04 sites were taken for the evaluation and monitored as per standard methodology. The details of the plantation sites are given in **Table-3.24**.

### 3.9 SOLAN FOREST CIRCLE:

In this forest circle, plantation sites of Solan and Nalagarh Forest Division were evaluated as given below:

In Solan Forest Division, there were 06 sites, having the total area 144.06 ha for the period 2016-17 under the Compensatory Afforestation. Out of 06 sites, 04 sites covering the area 107 ha were taken for the



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evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.25**.

During 2018-19, there was 01 site, having the total area 1.2 ha under the Compensatory Afforestation and same plantation site was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.26**.

In Nalagarh Forest Division, there were 04 sites, having the total area 108 ha for the period 2016-17 under the Compensatory Afforestation scheme. Out of 04 sites, 02 sites having the total area 48 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.27**.

During 2017-18, there were 01 site, having the total area 02 ha under the Compensatory Afforestation and same was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.28**.



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**Table-3.16: Details of the plantation raised viz-a-viz monitoring and evaluations in Nahan Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Nahan	NPV	06	110	04 (66.66%)	75 (68.18%)	RF Periwala C.3	2016-17	Sampling
							RF W. Bheron		Sampling
							RF Khairi C.2		100%
							RF Sangholi C.4		Sampling



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**Table-3.17: Details of the plantation raised viz-a-viz monitoring and evaluations in Nahan Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation (Ha.)	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Nahan	Compensatory Afforestation	13	262.67	07 (66.66%)	137.55 (68.18%)	RF Suketi C1 & 2	2017-18	Sampling
							RF Gumti Sambhalwa C.1 & C.2		Sampling
							RF Lai Devi C.3		100%
							RF Jamretwa C.6		Sampling
							Sunkar Khad River bed near RF Karondewali		Sampling
							RF Lohgarh C.29		Sampling
							RF Negiwala		Sampling
							NPV		02
							RF Tallon C4 & C5	100%	



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**Table-3.18: Details of the plantation raised viz-a-viz monitoring and evaluations in Nahan Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation (Ha.)	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Nahan	NPV	01	10	01 (100%)	10 (100%)	RF Tallon C7	2018-19	100%

**Table-3.19:Details of the plantation raised viz-a-viz monitoring and evaluations of Paonta Sahib Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Paonta	Compensatory Afforestation	02	45	01 (50%)	15 (33.33%)	RF Salatha C-3	2016-17	100%



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**Table-3.20: Details of the plantation raised viz-a-viz monitoring and evaluations of Paonta Sahib Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Paonta Sahib	Compensatory Afforestation	19	284.6	08 (42.10%)	111.6 (39.21%)	RF Majri C-7	2017-18	Sampling
							RF Guttanpur C-20		Sampling
							RF Sukhimelion C-2&3		Sampling
							RF Danda C-20		Sampling
							RF Amboya C-4		Sampling
							RF Kando Bharog C-2		Sampling
							RF Kansar C-2		Sampling
							RF Chachheti C-10		100%

**Table-3.21: Details of the plantation raised viz-a-viz monitoring and evaluations of Rajgarh Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Rajgarh	Net Present Value	01	10	01 (100%)	10 (100%)	UF-Chukhar Dhagyar	2016-17	100%



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**Table-3.22: Details of the plantation raised viz-a-viz monitoring and evaluations of Rajgarh Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Rajgarh	Compensatory Afforestation	11	118.88	06 (54.54%)	66 (55.18%)	MF Sandral	2017-18	100%
							RF-32 Gadhol		Sampling
							PF-Donga Saini		Sampling
							RF-Katoga		Sampling
							RF-21 Dalmun Deothi		Sampling
							UF-Kila Kalanch C-5		Sampling
		NPV	6	58	3 (50%)	28 (48.27%)	RF-Banar C2-b		Sampling
							UF Ghirar Sandrol C2		100%
							RF 53 Jayanti Dhar C2b		Sampling





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**Table-3.23: Details of the plantation raised viz-a-viz monitoring and evaluations of Rajgarh Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Rajgarh	Compensatory Afforestation	04	29.55	03 (54.54%)	20 (55.18%)	UF Mahlog C2	2018-19	Sampling
							RF-Sawana		Sampling
							RF-Hiun (C2a and C2b)		100%
		NPV	08	100	04 (50.0%)	30 (30.0%)	PF Kairy C4		Sampling
							UF Barachakli-C5		Sampling
							PF Gaithal C4		100%
							RF Ghinni C1 & C2		Sampling



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**Table-3.24: Details of the plantation raised viz-a-viz monitoring and evaluations in Renuka Ji Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Renuka Ji	NPV	04	60	04 (100%)	60 (100%)	RF-Charighatti	2018-19	Sampling
							RF-Gatlog		100%
							RF-Kathar		Sampling
							RF-Sataun C-4		Sampling



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**Table 3.25: Details of the plantation raised vis-à-vis monitoring and evaluations of Solan Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Nahan	Solan	Compensatory Afforestation	06	144.06	04 (66.66%)	107 (74.27%)	Bagh-Kharki	2016-17	Sampling
							D-230 Jangeshu C <sub>1</sub> and C <sub>2</sub>		Sampling
							D-214 Gulzar, C-1 and 2		Sampling
							D-214-Gulzar-C-3		Sampling

**Table-3.26: Details of the plantation raised vis-à-vis monitoring and evaluations of Solan Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
1	2	3	4	5	6	7	8	9	10
Nahan	Solan	Compensatory Afforestation	01	1.2	01 (100%)	1.2 (100%)	D-233 Datar-C-III	2018-19	100%



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**Table-3.27: Details of the plantation raised viz-a-viz monitoring and evaluations in Nalagarh Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Solan	Nalagarh	Compensatory Afforestation	04	108	02 (50%)	48 (44.44)	Khol-D/pur C-5	2016-17	Sampling
							Khol-D/pur C-3		100%

**Table-3.28: Details of the plantation raised viz-a-viz monitoring and evaluations in Nalagarh Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Bilaspur	Nalagarh	Compensatory Afforestation	01	02	01 (100%)	02 (100%)	Khol-D/pur	2017-18	100%



### 3.10 MANDI FOREST CIRCLE:

In this forest circle, plantation sites of Mandi, Karsog, Suket, Joginder Nagar and Nachan forest division were evaluated as given below:

In Mandi Forest Division, there were 03 sites having the total area 90 ha for the period 2016-17 under the Compensatory Afforestation. Out of 03 sites, 01 site having the total area 30 ha were taken for the evaluation and under the scheme Net Present Value (NPV) there was 01 plantation site having the total area 10 ha and same site was taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.29**.

During 2017-18, there were 03 sites having the total area 30 ha under the scheme Net Present Value (NPV). All sites were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.30**.

During 2018-19, there were 11 sites having the total area 55 ha for the period 2018-19 under the scheme NPV. Out of 11 sites, 06 sites covering the total area 27 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.31**.

In Karsog Forest Division, there were 07 sites having the total area 50 ha for the period 2016-17 under the Compensatory Afforestation. Out of 07 sites, 03 sites having the total area 15 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.32**.

During 2017-18, there were 07 sites having the total area 73.82 ha under the Compensatory Afforestation. Out of 07 sites, 04 sites having the total area 43.82 were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.33**.

During 2018-19, there were 05 sites having the total area 125 ha under the scheme Net Present Value (NPV) and all the 05 sites were taken for the



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evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.34**.

In Suket Forest Division, there was 01 plantation site having the total area 7.06 ha for the period 2016-17 under the scheme Compensatory. Same site was taken for the evaluation. Whereas, 02 plantation sites having total area 15 ha under the scheme NPV. Out of 02 sites, 01 site covering the total area 5 ha for the period 2016-17 was taken for the evaluation and monitored as per standard methodology. The details of the plantation sites are given in **Table-3.35**.

During 2018-19, there were 02 plantation sites having the total area 23.31 ha for the period 2018-19 under the scheme Compensatory Afforestation. Both sites were taken for evaluation. Whereas, 04 sites covering the area 32 ha under the scheme NPV. Both sites were taken for the evaluation and monitored as per standard methodology. The details of the plantation sites are given in **Table-3.36**.

In Joginder Nagar Forest Division, there were 03 sites having the total area 25 ha for the period 2016-17 under the Compensatory Afforestation (CA). All the sites were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.37**.

During 2017-18, there were 05 sites having the total area 54 ha under the scheme Net present Value (NPV). Out of 05 sites, 04 sites having the total area 44 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.38**.

During 2018-19, there were 06 sites having the total area 27 ha under the Net present Value (NPV). All the sites were taken for the evaluation. Whereas, there were 01 site having the area 4.5 ha under the scheme Compensatory Afforestation for the period 2018-19 and site was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.39**.



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In Nachan Forest Division, there were 13 sites having the total area 138 ha for the period 2017-18 under the scheme NPV. Out of which 05 sites were taken for the evaluation covering the area of 42 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.40**.

During 2018-19, there were 20 sites having the total area 233 ha under the scheme NPV. Out of which 07 sites were taken for the evaluation covering the area of 75 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.41**.



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**Table-3.29: Details of the plantation raised viz-a-viz monitoring and evaluations in Mandi Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Mandi	Compensatory Afforestation	03	90	01 (33.33%)	30 33.33%)	Saira Nala	2016-17	Sampling
		NPV	01	10	01 (100%)	10 (100%)	Chalahar	2016-17	100%

**Table-3.30:Details of the plantation raised viz-a-viz monitoring and evaluations in Mandi Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Mandi	NPV	03	30	03 (100%)	30 (100%)	Chippnu	2017-18	100%
							Mehni		Sampling
							Gandharb		Sampling





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**Table-3.31: Details of the plantation raised viz-a-viz monitoring and evaluations in Mandi Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Mandi	NPV	11	55	06 (54.54%)	27 (49.09%)	Kangani	2018-19	Sampling
							Kunda Nal		Sampling
							Brehal		Sampling
							Bikaner		Sampling
							Jung Dhar		100%
							Baglu		Sampling



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**Table-3.32: Details of the plantation raised viz-a-viz monitoring and evaluations in Karsog Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Karsog	Compensatory Afforestation	07	50	03 (42.85%)	15 (30.0%)	D-213 Niharinal	2016-17	100%
							D-79 Mohru		Sampling
							D-80 Kanda		Sampling

**Table-3.33: Details of the plantation raised viz-a-viz monitoring and evaluations in Karsog Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Karsog	Compensatory Afforestation	07	73.82	04 (57.14%)	43.82 (59.36%)	D-239 Darohal	2017-18	Sampling
							D-256 Jagol		Sampling
							D-199 Dhanyara		100%
							D-72 Restadhar		Sampling



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**Table-3.34: Details of the plantation raised viz-a-viz monitoring and evaluations in Karsog Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Karsog	NPV	05	125	05 (100%)	125 (100%)	D-252 Naganal	2018-19	Sampling
							D-214 Jhunjhan (I & II)		100%
							D-199 Dhanyara		Sampling
							D-79 Moharu C-1		Sampling
							D-80 Lochar		Sampling



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**Table-3.35: Details of the plantation raised viz-a-viz monitoring and evaluations in Suket Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Suket	Compensatory Afforestation	01	7.06	01 (100%)	7.06 (100%)	DPF Salyane	2016-17	Sampling
Mandi	Suket	NPV	02	15	01 (50.0%)	05 (33.33%)	DPF Jodhnu		100%

**Table-3.36: Details of the plantation raised viz-a-viz monitoring and evaluations in Suket Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Suket	Compensatory Afforestation	02	23.31	02 (100%)	23.31 (100%)	Narehli	2018-19	Sampling
							Jader		100%
		Net Present Value	02	32	02 (100%)	32 (100%)	Tarehari		Sampling
							Jamdwar		Sampling



**Table-3.37: Details of the plantation raised viz-a-viz monitoring and evaluations in Joginder Nagar Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Joginder Nagar	Compensatory Afforestation	03	25	03 (100%)	25 (100%)	Karlon Machan	2016-17	Sampling
							UPF Graman		Sampling
							Bhadyar		100%

**Table-3.38: Details of the plantation raised viz-a-viz monitoring and evaluations in Joginder Nagar Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Joginder Nagar	NPV	05	54	04 (80%)	44 (81.48%)	Chakki Nala	2017-18	Sampling
							Draman-1		100%
							Majhakar		Sampling
							Risa Khad		Sampling



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**Table-3.39: Details of the plantation raised viz-a-viz monitoring and evaluations in Joginder Nagar Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Joginder Nagar	NPV	6	27	6 (100%)	27 (100%)	Chab Bhararu	2018-19	Sampling
							Dart Bagla		100%
							DPF Ghatta		Sampling
							DPF Gulana		Sampling
							DPF Dodar		Sampling
							Darku Kathaili		Sampling
Mandi	Joginder Nagar	Compensatory Afforestation	01	4.5	01 (100%)	4.5 (100%)	Murradhar		Sampling



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**Table-3.40: Details of the plantation raised viz-a-viz monitoring and evaluations in Nachan Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Nachan	NPV	13	138	5 (7) (38.46%)	43 (31.15%)	Jassan 2nd	2017-18	Sampling
							Satyagi-1 & Satyagi-2		Sampling
							Janjohi C3a		Sampling
							OD 491 Tawa-1 & OD 491 Tawa-2		Sampling
									Sampling
							Bakhali ND 325		100%



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**Table-3.41: Details of the plantation raised viz-a-viz monitoring and evaluations in Nachan Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Mandi	Nachan	NPV	20	233	07 (33.33%)	75 (32.18)	Pathri	2018-19	Sampling
							ND 461-Babag C-II		Sampling
							OD 499 Janjohi C1		Sampling
							ND 505 Bahlidhar C3f		100%
							OD 336-Saroa		Sampling
							OD 159 Fanjar C4		Sampling
							Bhella		Sampling





### 3.11 SHIMLA FOREST CIRCLE:

In this forest circle, plantation sites of Shimla, Rohru, Chopal and Theog Forest Division were evaluated as given below:

In Shimla Forest Division, there were 05 sites having the total area 38.5 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 05 plantation sites, 02 sites having the total area 18.0 ha were taken for the evaluation. Whereas, there was 02 plantation sites having the total area 200 ha under the scheme Net Present Value (NPV) and both were taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.42**.

During 2017-18, there were 02 sites having the total area 20.02 under the Compensatory Afforestation and both plantation sites were taken for the evaluation. Whereas, 03 sites having the total area 120 ha under the scheme Net Present Value. All 03 plantation sites were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.43**.

During 2018-19, there was 01 site having the total area 10.0 ha under the scheme Compensatory Afforestation and same site were taken for the evaluation. Whereas, 05 sites having the total area 40.0 ha under the scheme Net Present Value. Out of 05 sites, 02 sites covering the total area 15 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.44**.

In Rohru Forest Division, there were 04 sites having the total area 30.0 ha for the period 2016-17 under the CAT PLAN, Out of 04 sites, 02 sites were taken for the evaluation covering the area of 10.0 ha. Whereas, 05 sites having the total area 57.0 ha for the period 2016-17 under the Compensatory Afforestation, all sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.45**.



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During 2017-18, there were 04 sites having the total area 29.0 ha under the CAT PLAN, Out of 04 sites, 02 sites were taken for the evaluation covering the area of 15.0 ha. Whereas 10 sites having the total area 142.47 ha for the period 2017-18 under the Compensatory Afforestation, Out of 10 sites, 07 sites were taken for the evaluation covering the area 101.62 ha as per standard methodology. The details of plantation sites are given in **Table-3.46**.

During 2018-19, there were 02 sites having the total area 32.04 ha under the Compensatory Afforestation, both sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.47**.

In Chopal Forest Division, there were 11 sites having the total area 82.5 ha for the period 2016-17 under the Compensatory Afforestation, Out of 11 sites, 10 sites were taken for the evaluation covering the area of 77.5 ha. The details of plantation sites are given in **Table-3.48**.

In Theog Forest Division, there were 02 plantation sites having the total area 17.29 during the year 2016-2017 under the scheme Compensatory Afforestation and the same sites were taken for evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.49**.

During 2017-18, there were 02 plantation sites having the total area 13.01 under the scheme Compensatory Afforestation and the same sites were taken for evaluation and monitored as per standard methodology. The details of plantation site are given in **Table-3.50**.



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**Table-3.42: Details of the plantation raised viz-a-viz monitoring and evaluations in Shimla Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Shimla	Compensatory Afforestation	05	38.5	02 (40.0%)	18.0 (46.75%)	U-268 Jhandi (Chikkhar)	2016-17	Sampling
							U-277 Kattain Majhar		100%
		NPV	02	200.0	02 (100%)	200 (100%)	Lunsu Mungna Plantation through ETF		Sampling
							U-47 Jajhed Plantation through ETF		Sampling



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**Table-3.43: Details of the plantation raised viz-a-viz monitoring and evaluations in Shimla Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Shimla	Compensatory Afforestation	02	20.02	02 (100%)	20.02 (100%)	U-36 Mandorghat	2017-18	100%
							U-22 Palag		Sampling
		NPV	03	120	03 (100%)	120 (100%)	UPF Jhakri Sarmana		100%
							UPF Dhedog		Sampling
							U-47 Jhajed		Sampling



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**Table-3.44: Details of the plantation raised viz-a-viz monitoring and evaluations in Shimla Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (Ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Shimla	Compensatory Afforestation	01	10.0	01 (100%)	10.0 (100%)	U-494 Okharoo Madya	2018-19	100%
		NPV	05	40.0	02 (40%)	15 (37.5%)	U-268 Jhandi		Sampling
							U-578 Jud Judlu		100%



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**Table-3.45: Details of the plantation raised viz-a-viz monitoring and evaluations in Rohru Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Rohru	CAT PLAN	4	30.0	2 (50%)	10.0 (33.33%)	Shalgi Thach	2016-17	Sampling
							Sungri		100%
Shimla	Rohru	Compensatory Afforestation	5	57.0	5 (100%)	57.0 (100%)	UPF-Jabbal		Sampling
							Jakha-D		Sampling
							UPF Kuthara		Sampling
							UPF Shirolu		Sampling
							UPF Malog I <sup>st</sup>	100%	



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**Table-3.46: Details of the plantation raised viz-a-viz monitoring and evaluations in Rohru Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Rohru	CAT PLAN	4	29.0	2 (50%)	15.0 (51.72%)	Bagi	2017-18	100%
							UPF Khalargi		Sampling
Shimla	Rohru	Compensatory Afforestation	10	142.47	7 (70%)	101.62 (71.32%)	UPF Koti		Sampling
							UPF- Janglikh		Sampling
							Khabal		Sampling
							UPF- Dhara		Sampling
							UPF- Atgaon		Sampling
							Jakha-C		Sampling
							UPF Niltithach		Sampling



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**Table-3.47: Details of the plantation raised viz-a-viz monitoring and evaluations in Rohru Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Rohru	Compensatory Afforestation	2	32.04	2 (100%)	32.04 (100%)	UPF-Raigad	2018-19	Sampling
							UPF Kashkandi		100%





**Table-3.48: Details of the plantation raised viz-a-viz monitoring and evaluations in Chopal Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Chopal	Compensatory Afforestation	11	82.5	10 (90.90%)	77.5 (93.93%)	Thana UPF	2016-17	100%
							Minus UPF		Sampling
							Malnoon DPF		Sampling
							Shilla C-3		Sampling
							Kharti Nalla		Sampling
							Kajau		Sampling
							Kashah UPF		Sampling
							Badlog UPF		Sampling
							Kahu C9		Sampling
							Kiarla UPF		Sampling



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**Table-3.49: Details of the plantation raised viz-a-viz monitoring and evaluations in Theog Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Theog	Compensatory Afforestation	2	17.29	2 (100%)	17.29 (100%)	U-318 Riyog	2016-17	100%
							U-362 Deothi (Cheog)		Sampling

**Table-3.50: Details of the plantation raised viz-a-viz monitoring and evaluations in Theog Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Shimla	Theog	Compensatory Afforestation	2	13.01	2 (100%)	13.01 (100%)	U-299 Aloti	2017-18	100%
							U-490 Chanodhar		Sampling



### 3.12 CHAMBA FOREST CIRCLE:

In this forest circle, plantation sites of Bharmour, Chamba, Churah and Dalhousie forest division were evaluated as given below:

In Chamba Forest Division, there were 06 sites having the total area 50.0 ha for the period 2016-17 under the scheme CAT PLAN. Out of 06 sites, 03 sites covering the total area 20 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.51**.

During 2017-18, there were 02 sites having the total area 12 ha under the scheme Compensatory Afforestation. Both sites were taken for evaluation. Whereas, 01 plantation site having the total area 10 ha for the year 2017-18 under the scheme CAT PLAN were taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table3.52**.

During 2018-19, there were 07 number of sites having the total area 32 ha under the scheme NPV. Out of 07 sites, 04 sites covering the total area 17 ha were taken for evaluation. Whereas, 04 number of sites having the total area 35 ha under the scheme CAT PLAN for the year 2018-19. Out of 04 sites, 02 sites covering the total area 15 ha were taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.53**.

In Dalhousie Forest Division, there were 02 sites having the total area 35.6 ha for the period 2016-17, under the Compensatory Afforestation, both sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.54**.

During 2017-18, there were 02 sites having the total area 40 ha under the scheme NPV. Same sites were taken for the evaluation. Whereas, 04 sites having the total area 59 ha for the period 2017-18 under the scheme CAT PLAN. Out of 04 sites, 02 sites having the total area 24 ha



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were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.55**.

During 2018-19, there was 01 site having the total area 8.22 ha under the Compensatory Afforestation, and same was taken for the evaluation. Similarly, 01 site having the total area 5 ha for the period 2018-19 under the scheme NPV, and same site was taken for the evaluation. Whereas, 03 sites having the total area 9 ha for the period 2018-19 under the scheme CAT PLAN, out of 03 plantation sites, 02 sites covering the area 04 ha were taken for the monitoring and evaluation as per standard methodology. The details of plantation sites are given in **Table-3.56**.

In Bharmour Forest Division, there were 53 sites having the total area 460 ha for the period 2016-17 under the scheme CAT PLAN. Out of 53 sites, 22 sites having the total area 169 ha were taken for the evaluation. Whereas, 03 sites having the total area 15.8 ha under the scheme Compensatory Afforestation. All 03 sites were taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.57**.

During 2017-18, there were 41 sites having the total area 292 ha under the scheme CAT PLAN. Out of 41 sites, 13 sites having the total area 88 ha were taken for the evaluation. Whereas, 01 site having the total area 4.5 ha under the scheme Compensatory Afforestation and same was taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.58**.

During 2018-19, there were 40 sites having the total area 258 ha under the scheme CAT PLAN. Out of 40 sites, 13 sites having the total area 71 ha were taken for the evaluation. Whereas, 01 site having the total area 05 ha under the scheme Compensatory Afforestation and same was taken for evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.59**.

In Churah Forest Division, there were 07 sites having the total area 72 ha for the period 2016-17 under the NPV-Scheme. Out of 07 plantation



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sites, 03 sites having the total area 17 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.60**.

During 2018-19, there were 06 sites having the total area 62 ha for the period 2018-19 under the NPV-Scheme. Out of 06 plantation sites, 03 sites having the total area 30 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.61**.



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**Table-3.51: Details of the plantation raised viz-a-viz monitoring and evaluations in Chamba Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Chamba	CAT PLAN	06	50.0	03 (50%)	20 (40.0%)	Shuklu	2016-17	100%
							Bhangori		Sampling
							Khareu		Sampling

**Table-3.52: Details of the plantation raised viz-a-viz monitoring and evaluations in Chamba Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Chamba	Compensatory Afforestation	02	12	02 (100%)	12 (100%)	Sulah	2017-18	Sampling
							Karian DPF		100%
Chamba	Chamba	CAT PLAN	01	10	01 (100%)	10 (100%)	Msrot		



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**Table-3.53: Details of the plantation raised viz-a-viz monitoring and evaluations in Chamba Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Chamba	NPV	07	32	04 (57.14%)	17 (53.12%)	Dugli DPF	2018-19	Sampling
							Draman DPF		100%
							Bhania DPF		Sampling
							Meh DPF		Sampling
Chamba	Chamba	CAT PLAN	04	35	02 (50.0%)	15 (42.85%)	Dalotu	2018-19	100%
							Topi		Sampling



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**Table-3.54: Details of the plantation raised viz-a-viz monitoring and evaluations in Dalhousie Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Dalhousie	Compensatory Afforestation	02	35.6	02 (100%)	35.6 (100%)	Sundla	2016-17	Sampling
							Gandhiyar		100 %

**Table-3.55: Details of the plantation raised viz-a-viz monitoring and evaluations in Dalhousie Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Dalhousie	CAT PLAN	04	59	02 (50%)	24 (40.67%)	Jhanjroo	2017-18	100 %
							Chafru Sipiyan da		Sampling
Chamba	Dalhousie	NPV	02	40	02 (100%)	40 (100%)	DPF Mandhour Nag		Sampling
							(i) DPF Hutta Choura I		Sampling
							(ii) DPF Hutta Choura II	Sampling	





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**Table-3.56: Details of the plantation raised viz-a-viz monitoring and evaluations in Dalhousie Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Dalhousie	CAT PLAN	03	09	02 (66.66%)	04 (44.44%)	Godra	2018-19	Sampling
							Gumrahar		100%
		Compensatory Afforestation	01	8.22	01 (100%)	8.22 (100%)	Manmassi		100 %
		NPV	01	05	01 (100%)	05 (100%)	Kaimbly		100 %



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**Table-3.57: Details of the plantation raised viz-a-viz monitoring and evaluations in Bharmour Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Bharmour	CAT PLAN	53	460	22 (41.50%)	169 (36.79%)	Hilling RF Part	2016-17	Sampling
							Bharari DPF		100%
							Digu		100%
							Siya		Sampling
							Kalrani		Sampling
							Palani		Sampling
							Damari Dhar		Sampling
							Riyali Dhar		Sampling
							Khandyala Dhar		Sampling
							Dali kuttla		Sampling
							Khiyogdi		100%
							Phat		Sampling



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Chamba	Bharmour	CAT PLAN					Mando		Sampling
							Topi Goth		Sampling
							Kanjralla Dhar		Sampling
							Moru		100%
							Drobi		Sampling
							Jutta Dhar		Sampling
							Sarod Dhar		Sampling
							Guwar-II		Sampling
							Kuthed DPF-II		100%
							Oie Nala DPF		Sampling
Chamba	Bharmour	Compensatory Afforestation	3	15.8	3 (100%)	15.8 (100%)	Sutkar	2016-17	100%
							Chakratha		Sampling
							Rahela		Sampling



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**Table-3.58: Details of the plantation raised viz-a-viz monitoring and evaluations in Bharmour Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Bharmour	CAT PLAN	41	292	13 (31.70%)	88 (30.13%)	Sureshi DPF	2017-18	Sampling
							Sindhi DPF		Sampling
							Sua DPF		100%
							Banoi		Sampling
							Lunighar		Sampling
							Basanda		100%
							Chanjoti		Sampling
							Toni Mata Mandir		Sampling
							Farku		Sampling
							Thalla		Sampling
							Bero		Sampling
							Kuir DPF		100%
Chamba	Bharmour	CAT PLAN					Seri DPF	2017-18	100%
Chamba	Bharmour	Compensatory Afforestation	01	4.5	01 (100%)	4.5 (100%)	Naini Nalla	2017-18	100%



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**Table-3.59: Details of the plantation raised viz-a-viz monitoring and evaluations in Bharmour Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Bharmour	CAT PLAN	40	258	13 (32.50%)	71 (27.51%)	Bajoli DPF	2018-19	Sampling
							Khol		100%
							Dugh		100%
							Guwad		Sampling
							Chobu		Sampling
							Gudagar		Sampling
							Charangadi		Sampling
							Changuie Peda		Sampling
							Goth		Sampling
							Baldi		Sampling
							Majharan		100%
							Jabal		100%
							Kelang Marhi		100%
Chamba	Bharmour	Compensatory Afforestation	01	05	01 (100%)	05 (100%)	Sulia	2018-19	100%



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**Table-3.60: Details of the plantation raised viz-a-viz monitoring and evaluations in Churah Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Churah	NPV	07	72	3 (42.85%)	17 (23.61%)	Matodu	2016-17	Sampling
							Badhel DPF		100%
							Parchi DPF		Sampling

**Table-3.61: Details of the plantation raised viz-a-viz monitoring and evaluations in Churah Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Chamba	Churah	NPV	06	62	03 (50%)	30 (48.38%)	Bhalei DPF	2018-19	Sampling
							Badyundi		100%
							Sarain DPF		Sampling



### 3.13 DHARAMSHALA FOREST CIRCLE:

In this forest circle, plantation sites of Dharamshala, Nurpur and Palampur forest division were evaluated as given below:

In Dharamshala Forest Division, there was one site having the total area 15.62 ha for the period 2016-17 under the Compensatory Afforestation and site was taken for the evaluation as per standard methodology. The details of plantation sites are given **Table-3.62**.

During 2017-18, there was one site having the total area 04 ha under the scheme NPV and same site was taken for the evaluation as per standard methodology. The details of plantation sites are given **Table-3.63**.

During 2018-19, there was one site having the total area 2.0 ha under the scheme Compensatory Afforestation and same site was taken for the evaluation as per standard methodology. The details of plantation sites are given **Table-3.64**.

In Nurpur Forest Division, there were 33 sites having the total area 305 ha for the period 2016-17 under the scheme NET PRESENT Value. Out of 33 plantation sites, 17 sites having the total area 155 ha were taken for evaluation. Whereas, 02 sites having the total area 5.87 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 02 plantation sites, both were taken for the evaluation and monitored as per standard Methodology. The details of plantation sites are given in **Table-3.65**.

During 2017-18, there was only 01 site having the total area 7.31 ha under the scheme Compensatory Afforestation and same was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.66**.

During 2018-19, there were 25 sites having the total area 260 ha under the scheme NPV. Out of 25 sites, 18 sites having the total area 187.5 ha



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were taken for the evaluation and monitored as per standard methodology. The details of the plantation sites are given in **Table-3.67**.

In Palampur Forest Division, there were 14 sites having the total area 72 ha for the period 2018-19 under the NPV. Out of 14 sites, 9 sites covering the area of 41 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given **Table-3.68**.





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**Table-3.62: Details of the plantation raised viz-a-viz monitoring and evaluations in Dharamshala Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Dharamshala	Compensatory Afforestation	01	15.62	01 (100%)	15.62 (100%)	P40K CB Kareri 17	2016-17	100%

**Table-3.63:Details of the plantation raised viz-a-viz monitoring and evaluations in Dharamshala Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Dharamshala	Net Present Value	01	04	01 (100%)	04 (100%)	CFS Sarah P-2	2017-18	100%

**Table-3.64: Details of the plantation raised viz-a-viz monitoring and evaluations in Dharamshala Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation (ha)	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Dharamshala	Compensatory Afforestation	01	02	01 (100%)	02 (100%)	P.40 K CB Kareri	2018-19	Sampling



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**Table-3.65: Details of the plantation raised viz-a-viz monitoring and evaluations in Nurpur Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Nurpur	Net Present Value	33	305	17 (51.51%)	155 (50.81)	U 96 Sakri	2016-17	100%
							UP 129 Dini C3		100%
							DP ChakbanHarsar		Sampling
							R 16 N Bindraban C 2 & C 3		Sampling
							U 50 Kothiwanda C 2		Sampling
							R4N Batuhi C-4		Sampling
							P-47-Anuhi C-2		Sampling
							U-52 Soldha C-8		Sampling
							U-84 Dole C-1		Sampling
							UP-165 Nangal C-21		Sampling
							U-25 Anoh C-9		Sampling
							UPF- 115 Bhehri C-31		Sampling



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							CFS-Lodhwan U-69	2016-17	Sampling
							CFS- Dhontol U-1		Sampling
							UP114 Madholi C-8		Sampling
							CFS Deothi u-5		Sampling
							UP-142, Palakhi C-4		Sampling
Dharamshala	Nurpur	Compensatory Afforestation	02	5.87	02 (100%)	5.87 (100%)	Tikka Raja KhassaKhasra No. 2712 & 2938/2887/2713	2016-17	100%
							U 70 Bari		Sampling

**Table-3.66: Details of the plantation raised viz-a-viz monitoring and evaluations in Nurpur Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Nurpur	Compensatory Afforestation	01	7.31	1 (100%)	7.31 (100%)	UP 3 Kukher Khawara C 6	2017-18	100%



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**Table-3.67: Details of the plantation raised viz-a-viz monitoring and evaluations in Nurpur Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Nurpur	Net Present Value	25	260	18 (72.0%)	187.5 (72.11)	UP 78 Sidhpurghar C3	2018-19	Sampling
							UP 130 Bagroli C 4		Sampling
							P6N Harsar Nana C3b		100%
							R1N Tattal C3c		Sampling
							R7N Jhakhar C2		Sampling
							UP 9 Aund 12		Sampling
							U 47 Banoli C 8		Sampling
							P-2N- Devi Da Ban		Sampling
							P-47 Anuhi C-3		Sampling
							U-52 Soldha C-4		Sampling
							U-84 Dole C-21		Sampling
							UP-165 Nangal C-10		Sampling
							UP-142 Plakhi C-4		100%



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Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Nurpur	Net Present Value					UP41 Aghar C-1	2018-19	Sampling
							P24N Sugarnal C-1c		Sampling
							CFS Ghandran C-4&5		Sampling
							UP 92 Dharwal C-7		Sampling
							U40 Kartah C-3		Sampling



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**Table-3.68: Details of the plantation raised viz-a-viz monitoring and evaluations of Palampur Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Dharamshala	Palampur	NPV	14	72.0	09 (64.28%)	41.0 (56.94%)	U 8 P Kandi C2	2018-19	Sampling
							P61 P Badsar		Sampling
							P 24 P Ghenta C1b		Sampling
							UP 49 J Alampur C21B		Sampling
							U 46 B Jhikli Beth C3		Sampling
							Banmaffi Lanod		Sampling
							UP 38 B Chobin C4		Sampling
							CFs Maniara		100%
							P-12 B Panjalla C1 A		Sampling



### 3.14 RAMPUR FOREST DIVISION:

In this Forest Circle, plantation sites of Rampur, Kotgarh, Kinnaur and Ani forest division were evaluated as given below:

In Rampur Forest Division, there were 09 sites having the total area 37 ha for the period 2016-17 under the scheme Net Present Value. Out of 09 sites, 05 sites having the total area 28 ha were taken for the evaluation. Whereas, 07 sites having the total area 35 ha under the scheme CAT PLAN, Out of 07 sites, 03 sites covering the total area 15 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.69**.

During 2017-18, there were 04 sites having the total area 21.87 ha under the Compensatory Afforestation, out of 04 sites, 03 sites covering the total area 11.79 ha were taken for the evaluation. Whereas, 06 plantation sites having the total area 35 ha under the scheme CAT PLAN. Out of 06 sites, 03 sites having the total area 15 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.70**.

During 2018-19, there were 06 sites having the total area 24.34 ha under the Compensatory Afforestation, Out of 06 sites, 04 sites having the total area 15.62 ha were taken for the evaluation. Whereas, 05 sites having the total area 30 ha under the scheme CAT PLAN. Out of 05 sites, 02 sites having the total area 10 ha were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.71**.

In Kotgarh Forest Division, there was one site having the total area of 10 ha for the period 2016-17 under the Compensatory Afforestation and same was taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.72**.

During 2017-18, there was one site having the total area of 0.5 ha for the period 2017-18 under the Compensatory Afforestation and same was



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taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.73**.

During 2018-19, there was one site having the total area of 2.5 ha under the Compensatory Afforestation and same was taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.74**.

In Kinnaur Forest Division, there were 44 sites having the total area 202 ha for the period 2016-17 under the CAT PLAN, Out of 44 sites, 14 sites were taken for the evaluation covering the area of 62 ha. Whereas 11 sites having the total area 115 ha for the period 2016-17 under the Compensatory Afforestation, Out of 11 sites, 05 sites were taken for the evaluation covering the area 55 ha as per standard methodology. The details of plantation sites are given in **Table-3.75**.

During 2017-18, there were 19 sites having the total area 86 ha under the CAT PLAN, Out of 19 sites, 10 sites were taken for the evaluation covering the area of 36 ha. Whereas, 17 sites having the total area 87.12 ha for the period 2017-18 under the Compensatory Afforestation, Out of 17 sites, 08 sites covering the area 45 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.76**.

During 2018-19, there were 12 sites having the total area 67 ha under the CAT PLAN, Out of 12 sites, 04 sites were taken for the evaluation covering the area of 21 ha. Whereas, 19 sites having the total area 110 ha for the period 2018-19 under the Compensatory Afforestation, Out of 19 sites, 12 sites were taken for the evaluation covering the area 65 ha as per standard methodology. The details of plantation sites are given in **Table-3.77**.

In Ani Forest Division, there were 10 sites having the total area 95.77 ha for the period 2016-17 under the Compensatory Afforestation, Out of 10 sites, 08 sites were taken for the evaluation covering the area of 85.77 ha. The details of plantation sites are given in **Table-3.78**.





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During 2017-18, there were 11 sites having the total area 111.96 ha under the Compensatory Afforestation, Out of 11 sites, 06 sites were taken for the evaluation covering the area of 34.39 ha. The details of plantation sites are given in **Table-3.79**.

During 2018-19, there were 02 sites having the total area 10.76 ha under the Compensatory Afforestation and both plantation sites were taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.80**.



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**Table-3.69: Details of the plantation raised viz-a-viz monitoring and evaluations in Rampur Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Rampur	NPV	09	37.0	5 (55.55%)	28 (75.67%)	UF-Kaleda	2016-17	Sampling
							UF-Doi		Sampling
							Rampur		100%
							Dutt nagar		Sampling
							UF- Badhal (Bai- Bagh)		Sampling
		CAT PLAN	07	35	03 (42.85%)	15 (42.85%)	C-202 Sadali Gad	100%	
							UF-14 Karai	100%	
							C-213 b Manjkalaya	Sampling	



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**Table-3.70: Details of the plantation raised viz-a-viz monitoring and evaluations in Rampur Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Rampur	Compensatory Afforestation	04	21.87	3 (75.0%)	11.79 (53.90%)	UF-Shandal	2017-18	Sampling
							UF-Shahdhar		Sampling
							C-122 Bai-Bahli (Part-II)		100%
		CAT PLAN	06	35	03 (50.0%)	15 (42.85%)	Thala		Sampling
							Janthal		Sampling
							C-201 Barcha		Sampling



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**Table-3.71: Details of the plantation raised viz-a-viz monitoring and evaluations in Rampur Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Rampur	Compensatory Afforestation	06	24.34	04 (66.66%)	15.62 (64.17%)	UF-Shandal	2018-19	100%
							UF-Badhal		Sampling
							UF- Chadali		Sampling
							C-122 Bai-Bahli (Part- II)		Sampling
		CAT PLAN	05	30	02 (40.0%)	10 (33.33%)	UF- Chandi		Sampling
							Kupri		100%



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**Table-3.72: Details of the plantation raised viz-a-viz monitoring and evaluations in Kotgarh Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kotgarh	Compensatory Afforestation	1	10	1 (100%)	10 (100%)	UPF Banahardhar	2016-17	100%

**Table-3.73: Details of the plantation raised viz-a-viz monitoring and evaluations in Kotgarh Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kotgarh	Compensatory Afforestation	1	0.5	1 (100%)	0.5 (100%)	UPF Kanda C-149	2017-18	100%

**Table-3.74: Details of the plantation raised viz-a-viz monitoring and evaluations in Kotgarh Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kotgarh	Compensatory Afforestation	1	2.5	1 (100%)	2.5 (100%)	DPF Kepu CN-35	2018-19	100%



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**Table-3.75: Details of the plantation raised viz-a-viz monitoring and evaluations in Kinnaur Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kinnaur	CAT PLAN	44	202	14 (33.33%)	62 (30.69%)	C-239	2016-17	Sampling
							C-240(a) II		100%
							C-234		Sampling
							UF-Janakpuri		Sampling
							C-216		Sampling
							UF Asrang		Sampling
							C-187		Sampling
							C-188		100%
							C-71b		Sampling
							C-82		Sampling
							UF-Yalling		Sampling
							UF- Kandar		Sampling
							C-167 Ralli		100%
							UF Sangla		Sampling



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Rampur	Kinnaur	Compensatory Afforestation	11	115	5 (45.45%)	55 (47.82%)	UF Jangi	2016-17	Sampling
							UF Shurting		Sampling
							UF- B/Nagar		Sampling
							C-166 Wadang		100%
							UF-160 Mastrang		Sampling

**Table-3.76: Details of the plantation raised viz-a-viz monitoring and evaluations in Kinnaur Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kinnaur	CAT PLAN	19	86	10 (52.63%)	36 (47.67%)	C-241	2017-18	Sampling
							UF-Kutano		Sampling
							C-186		Sampling
							C-182c		100%
							UF- Wangtoo		Sampling



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							Teska		Sampling
							C-71b		Sampling
							UF-46		Sampling
							UF Chispan		Sampling
							NC-4 (NC-1)		Sampling
Rampur	Kinnaur	Compensatory Afforestation	17	87.12	8 (52.94%)	45 (51.65)	NC-4	2017-18	Sampling
							UF-Gharsu		Sampling
							UPF-26- Nathpa		100%
							UF-Ramni		Sampling
							C-239		Sampling
							C-190 (C-186)		100%
							UF Wangtoo		Sampling
							C-141 Kanai		Sampling
							UF Hurba		Sampling





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**Table-3.77: Details of the plantation raised viz-a-viz monitoring and evaluations in Kinnaur Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Kinnaur	CAT PLAN	12	67	4 (33.33%)	21 (31.34)	C-241	2018-19	Sampling
							UF-Rangly		Sampling
							Lalanti Kanda		Sampling
							C-173		100%
Rampur	Kinnaur	Compensatory Afforestation	19	110	12 (63.15%)	65 (59.09%)	UF Jangi	2018-19	Sampling
							C-197		Sampling
							UF Dubling		Sampling
							NC-14 Kaksthal		100%
							C-82		Sampling
							C-239		Sampling
							UF-Kakshtal		Sampling
							C-29		Sampling



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							NC-5		Sampling
							C- 68c		Sampling
							UF-160 Chhitkul		Sampling
							C-48 Brua		Sampling



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**Table-3.78: Details of the plantation raised viz-a-viz monitoring and evaluations in Ani Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Ani	Compensatory Afforestation	10	95.77	8 (80%)	85.77 (89.55%)	Shorladhar	2016-17	Sampling
							Prakot shill-1		100%
							Shadidhar		Sampling
							Nagerh		Sampling
							1/10 Bashad		Sampling
							UPF-Dagaini		Sampling
							Kathanda		Sampling
							Bai		Sampling



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**Table-3.79: Details of the plantation raised viz-a-viz monitoring and evaluations in Ani Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Ani	Compensatory Afforestation	11	111.96	6 (54.54%)	34.39 (30.71%)	UPF-Brow	2017-18	Sampling
							UPF Jaun		100%
							UPF Khaneri		Sampling
							UPF Rishta		Sampling
							Shadidhar (11.65)		Sampling
							Tharvi		Sampling

**Table-3.80: Details of the plantation raised viz-a-viz monitoring and evaluations in Ani Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Rampur	Ani	Compensatory Afforestation	02	10.76	02 (100%)	10.76 (100%)	Prakot shill-II	2018-19	100%
							Gudheldhar		Sampling



### 3.15 KULLU FOREST CIRCLE:

In this forest circle, plantation sites of Kullu, Seraj, Lahaul and Parvati forest division were evaluated as given below:

In Kullu Forest Division, there were 02 sites having the total area 10 ha for the period 2016-17 under the scheme NPV, Out of 02 sites, 01 site were taken for the evaluation covering the area of 4 ha. Whereas, 03 sites having the total area 40 ha for the period 2016-17 under the CAT PLAN, Out of 03 plantation sites, 02 sites covering the area 30 ha were taken for the evaluation and similarly, there were 02 sites having the total area 20.0 ha for the period 2016-17 under the Compensatory Afforestation, both 02 sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.81**.

During 2017-18, there was 01 site having the total area 05 ha under the scheme NPV, same site was taken for the evaluation. Whereas 01 site having the total area 10 ha for the period 2017-18 under the CAT PLAN and same was taken for the evaluation and similarly, there were 02 sites having the total area 50.58 ha for the period 2017-18 under the Compensatory Afforestation, Out of 02 sites, 01 site covering the area of 15.52 ha were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.82**.

During 2018-19, there were 05 sites having the total area 82.12 ha under the Compensatory Afforestation. Out of 05 sites, 04 sites covering the area of 41.12 ha were taken for the evaluation Whereas, 01 site having the total area 4 ha for the period 2018-19 under the CAT PLAN and same was taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.83**.

In Seraj Forest Division, there were 07 sites having the total area 40 ha for the period 2016-17 under the CAT PLAN, Out of 07 sites, 03 sites were taken for the evaluation covering the area of 20 ha. Whereas 03 sites having the total area 100 ha for the period 2016-17 under NPV, Out of 03 sites, 02 sites covering the area of 63.0 ha were taken for the



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evaluation as per standard methodology. The details of plantation sites are given in **Table-3.84**.

During 2017-18, there were 05 sites having the total area 22 ha under the CAT PLAN, Out of 05 sites, 02 sites were taken for the evaluation covering the area of 10 ha. Whereas 02 sites having the total area 30.65 ha for the period 2017-18 under Compensatory Afforestation, both sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.85**.

During 2018-19, there were 03 sites having the total area 15 ha under the CAT PLAN, Out of 03 sites, 01 site were taken for the evaluation covering the area of 6 ha. Whereas, 01 site having the total area 30 ha for the period 2018-19 under the NPV and same were taken for the evaluation and similarly, there were 03 sites having the total area 26.45 ha for the period 2018-19 under the Compensatory Afforestation, and same sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.86**.

In Lahaul Forest Division, there were 05 sites having the total area 155 ha for the period 2018-19 under the Compensatory Afforestation. All 05 sites were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-3.87**.

In Parvati Forest Division, there were 04 sites having the total area 34 ha for the period 2016-17 under the scheme CAT PLAN. Out of 04 sites, 03 sites having the total area 24 ha were taken for the evaluation. Whereas, under the scheme Compensatory Afforestation, there was only 01 site for the period 2016-17 having the total area 9.1 ha and same was taken for evaluation and monitored as per the standard methodology. The details of plantation sites are given in **Table-3.88**.

During 2017-18, there were 04 sites having the total area 27 ha under the scheme CAT PLAN. Out of 04 sites, 03 sites having the total area 15 ha were taken for the evaluation. Whereas, under the scheme Compensatory Afforestation, there was only 01 site for the period 2017-



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18 having the total area 47.5 ha and same was taken for evaluation and monitored as per the standard methodology. The details of plantation sites are given in **Table-3.89**.

During 2018-19, there were 03 sites having the total area 20.85 ha under the Compensatory Afforestation. All 03 sites were taken for the evaluation and monitored as per the standard methodology. The details of plantation sites are given in **Table 3.90**.



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**Table-3.81: Details of the plantation raised viz-a-viz monitoring and evaluations in Kullu Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	NPV	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Kullu	NPV	2	10	1 (500%)	4 (40%)	2/42 Hamshushill	2016-17	100%
		CAT PLAN	3	40	2 (66.66%)	30 (75.0%)	BG-III Shethally Nallah		100%
							2/17 Hamta Gahar C-I-a		Sampling
		Compensatory Afforestation	2	20	2 (100%)	20 (100%)	2/10 Patalsu-C-II-a		Sampling
							Beas Bihal		100%





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**Table-3.82: Details of the plantation raised viz-a-viz monitoring and evaluations in Kullu Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Kullu	NPV	1	5	1 (100%)	5 (100%)	BG-III Thana Pande	2017-18	100%
Kullu	Kullu	CAT PLAN	1	10	1 (100%)	10 (100%)	2/17 Hamta C-I-c		100%
Kullu	Kullu	Compensatory Afforestation	2	50.58	1 (50%)	15.12 (29.89%)	2/10 Patalsu-C-II-b		Sampling



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**Table-3.83: Details of the plantation raised viz-a-viz monitoring and evaluations in Kullu Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Kullu	Compensatory Afforestation	5	82.12	4 (80%)	41.12 (50.07%)	H-III Kukri Pichhe	2018-19	100%
							BG-III-Bhujnu Matiyani		Sampling
							2/10 Patalsu-C-V		Sampling
							2/10 Patalsu-C-II-b		Sampling
Kullu	Kullu	CAT PLAN	1	4	1 (100%)	4 (100%)	2/17 Hamta C-I-c		100%



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**Table-3.84: Details of the plantation raised viz-a-viz monitoring and evaluations in Seraj Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Seraj	CAT PLAN	7	40.0	3 (42.85%)	20 (50%)	Chharon	2016-17	Sampling
							Chilyala		100%
							Bakerdhar		Sampling
	Seraj	NPV	3	100	2 (66.66%)	63.0 (63.0%)	Thawari Parashi		100%
							Dhaman		Sampling



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**Table-3.85: Details of the plantation raised viz-a-viz monitoring and evaluations in Seraj Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Seraj	CAT PLAN	5	22	2 (40.0%)	10 (45.45%)	Tindadhar	2017-18	Sampling
							Faglyphat		100%
		Compensatory Afforestation	2	30.65	2 (100%)	30.65 (100%)	Dalashani		Sampling
							Bhekhalidhar-III		100%
							Banganala		Sampling

**Table-3.86: Details of the plantation raised viz-a-viz monitoring and evaluations in Seraj Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Seraj	CAT PLAN	3	15	1 (33.33%)	6 (40%)	Kartahphat	2018-19	100%
							NPV		1
		Compensatory Afforestation	3	26.45	3 (100%)	26.45 (100%)	Kutla (Bhekhalidhar-II)		100%
							Lahauldhar		Sampling
							Sarchi aage (Bhekhalidhar-I)		100%



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**Table-3.87: Details of the plantation raised viz-a-viz monitoring and evaluations in Lahaul Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Lahaul	Compensatory Afforestation	5	155	5 (100%)	155 (100%)	UPF Patseo	2018-19	100%
							RF Uргуim-R9		100%
							DPF Gharel		Sampling
							DPF-Khanzar main		Sampling
							UPF-Lindoor		Sampling



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**Table-3.88: Details of the plantation raised viz-a-viz monitoring and evaluations in Parvati Forest Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Parvati	CAT PLAN	04	34	03 (75.0%)	24 (70.58%)	Malana Pichhe	2016-17	100%
							Bhandang		Sampling
							Sharage		Sampling
		Compensatory Afforestation	01	9.1	01 (100%)	9.1 (100.0%)	Tundaban	2016-17	100%

**Table-3.89: Details of the plantation raised viz-a-viz monitoring and evaluations in Parvati Forest Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Parvati	CAT PLAN	04	27	03 (75.0%)	15 (55.55%)	Ushko	2017-18	Sampling
							Bhandang		100%
							Shadithach		Sampling
		Compensatory Afforestation	01	47.5	01 (100%)	47.5 (100%)	1/20 Cherithach C, Ila	2017-18	Sampling



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**Table-3.90: Details of the plantation raised viz-a-viz monitoring and evaluations in Parvati Forest Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
Kullu	Parvati	Compensatory Afforestation	03	20.85	03 (100%)	20.85 (100%)	Maharaja III UPF (Jawalage)	2018-19	Sampling
							1/33 Shahita DPF		Sampling
							Trehandhar Kot Kandi-III		100%



### 3.16 GREAT HIMALAYAN NATIONAL PARK, SHAMSHI:

In GHNP Wildlife Division, there were 20 sites having the total area 143 ha for the period 2016-17 under the CAT PLAN, Out of 20 sites, 08 sites were taken for the evaluation covering the area of 49 ha. Whereas 2 sites having the total area 20 ha for the period 2016-17 under the Compensatory Afforestation, out of 02 sites, 01 site was taken for the evaluation covering the area 10 ha as per standard methodology. The details of plantation sites are given in **Table-3.91**.

During 2017-18, there were 15 sites having the total area 76 ha under the CAT PLAN, Out of 15 sites, 05 sites were taken for the evaluation covering the area of 23.63 ha as per standard methodology. The details of plantation sites are given in **Table-3.92**.

During 2018-19, there were 16 sites having the total area 101 ha under the CAT PLAN, Out of 16 sites, 10 sites were taken for the evaluation covering the area of 60.17 ha as per standard methodology. The details of plantation sites are given in **Table-3.93**.

### 3.17 WILDLIFE CIRCLE SHIMLA (S):

In this circle, plantation sites of Wildlife Shimla and Wildlife Sarahan Wildlife and Spiti Divisions were evaluated as given below:

In Shimla Wildlife Division, there were 03 sites having the total area 60 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 03 sites, 02 sites covering the total area 40 ha were taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 02 sites having the total area 65 ha under the scheme Compensatory Afforestation. Out of 02 sites, 01 site covering the total area 30 ha were taken for the evaluation and monitored as per standard methodology. During 2018-19, there was 01 site having the total area 25 ha under the scheme Compensatory Afforestation and same site was taken for the evaluation and monitored





as per standard methodology. The details of plantation sites are given in **Table-3.94.**

In Sarahan Wildlife Division, there were 07 sites having the total area 41 ha for the period 2016-17 under the CAT PLAN, out 07 sites 03 sites having the total area of 15 ha were taken for evaluations as per standard methodology. The details of plantation sites are given **Table-3.95.**

During 2017-18, there were 05 sites having the total area 19 ha under the CAT PLAN, out 05 sites 04 sites having the total area of 16 ha were taken for evaluations as per standard methodology. The details of plantation sites are given **Table-3.96.** During 2018-19, there were 03 sites having the total area 09 ha under the CAT PLAN, out 03 sites 02 sites having the total area of 06 ha were taken for evaluations as per standard methodology. The details of plantation sites are given **Table-3.97.**

In Wildlife Division Spiti, there were 02 sites having the total area 35.0 ha for the period 2016-17 under the Compensatory Afforestation. Out of 02 sites, 01 site covering the total area 10 ha was taken for the evaluation and monitored as per standard methodology. The details of plantation sites are given in **Table-3.98.**

### **3.18 WILDLIFE CIRCLE DHARAMSHALA:**

In this circle, plantation sites of Chamba Wildlife Division were evaluated as given below:

In Chamba Wildlife Division, there were 07 sites having the total area 55 ha for the period 2016-17 under the CAT PLAN, out 07 sites 03 sites having the total area of 20 ha were taken for evaluations as per standard methodology. During 2017-18, there were 04 sites having the total area 20 ha for the period 2017-18 under the CAT PLAN, out 04 sites 02 sites having the total area of 10 ha were taken for evaluations as per standard methodology. The details of plantation sites are given **Table-3.99.**



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**Table-3.91: Details of the plantation raised viz-a-viz monitoring and evaluations in GHNP Wildlife Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
GHNP Shamshi	GHNP Shamshi	CAT PLAN	20	143	8 (40%)	49 (34.26%)	Ropa	2016-17	Sampling
							Pradhshirdhar -II		Sampling
							Tispur		100%
							Kathiban (Chhiladhar) (Repalced for Motadala)		Sampling
							Buga Dhar(Chogad)		Sampling
							Ratna		Sampling
							Sharanghad		Sampling
							Larogi		Sampling
GHNP Shamshi	GHNP Shamshi	Compensatory Afforestation	2	20	1 (50%)	10 (50%)	Mail	100%	



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**Table-3.92: Details of the plantation raised viz-a-viz monitoring and evaluations in GHNP Wildlife Division (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
GHNP Shamshi	GHNP Shamshi	CAT PLAN	15	76	5 (33.33%)	23.63 (31.09%)	Madrachi	2017-18	Sampling
							Kunder (Replaced for Bhungdhar 3.0 Ha.)		Sampling
							Chanu Nala		Sampling
							Jognidhar		100%
							Murda		Sampling



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**Table-3.93:Details of the plantation raised viz-a-viz monitoring and evaluations in GHNP Wildlife Division (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
GHNP Shamshi	GHNP Wildlife Division	CAT PLAN	16	101	10 (62.5%)	60.17 (59.57%)	Ratna- I	2018-19	Sampling
							Ratna- II		Sampling
							Pradhshirdhar - I		Sampling
							Shakti		Sampling
							Tung - III UPF (Chogad)		Sampling
							Thali Age		Sampling
							Ean thach and jammu thach		Sampling
							Niharni		Sampling
							Niharni 2nd		Sampling
							Khanorani		100%



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**Table-3.94: Details of the plantation raised viz-a-viz monitoring and evaluations in Shimla Wildlife Division (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
SHIMLA	Shimla Wildlife	Compensatory Afforestation	03	60	02 (66.66%)	40 (66.66%)	D-11 Majathal	2016-17	100%
							D-12 Harsang Baghal		Sampling
SHIMLA	Shimla Wildlife	Compensatory Afforestation	02	65	01 (50%)	30 (46.15%)	D-13 Harsang Bhagal	2017-18	100%
SHIMLA Wildlife	Shimla Wildlife	Compensatory Afforestation	01	25	01 (100%)	25 (100%)	D-12 Harsang C1	2018-19	100%



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**Table-3.95: Details of the plantation raised viz-a-viz monitoring and evaluations in Wildlife Division Sarahan (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
WL Shimla	Wildlife Sarahan	CAT PLAN	07	41	3 (42.85%)	15 (36.58%)	C-96 Dudarang	2016-2017	100%
							UF-27 Sargangdhar		Sampling
							Sarangasha Kanda		Sampling

**Table-3.96: Details of the plantation raised viz-a-viz monitoring and evaluations in Wildlife Division Sarahan (2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
WL Shimla	WL Sarahan	CAT PLAN	05	19	4 (80.0%)	16 (684.21%)	C-185(b) Khaidhar	2017-18	Sampling
							Sokeny UF-16		Sampling
							C-94 (a) Sukutang		100%
							Dumti Kanda (Mujlang)		Sampling



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**Table-3.97: Details of the plantation raised viz-a-viz monitoring and evaluations in Wildlife Division Sarahan (2018-19)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
WL Shimla	WL Sarahan	CAT PLAN	03	09	2 (66.66%)	06 (66.66%)	UF-3 Jayamanch	2018-19	Sampling
							Namshajang Kanda		100%

**Table-3.98: Details of the plantation raised viz-a-viz monitoring and evaluations in Wildlife Division Spiti (2016-17)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
SHIMLA	Wildlife Division Spiti	Compensatory Afforestation	02	35	01 (50%)	10 (28.57%)	Lari- Pharka	2016-17	100%



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**Table-3.99:Details of the plantation raised viz-a-viz monitoring and evaluations in Wildlife Division Chamba (2016-17 & 2017-18)**

Name of the Forest Circle	Name of the Forest Division	Name of Sector under which plantation done	Number of Plantation Sites	Total Area of Plantation Sites in the Division (ha.)	Number of Plantations Selected for Evaluation	Area Covered for Evaluation	Name of Plantation Area	Year of Plantation	Evaluation by Sampling/ 100%
WL Dharamshala	WL Chamba	CAT PLAN	7	55	3 (42.85%)	20 (36.36%)	Tandeidhar-I	2016-17	Sampling
							Thanari DPF		100%
							Deosa DPF		Sampling
		CAT PLAN	4	20	2 (50%)	10 (50%)	Tandeidhar-II	2017-18	100%
							Chalathu		Sampling





## CHAPTER-4

### MONITORING FINDINGS

The evaluation of the plantations carried out by Himachal Pradesh Forest Department during the years 2016-17, 2017-18 and 2018-19 under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV plantations and Soil & Water Conservation in 40 forest and wildlife divisions was conducted by Himalayan Forest Research Institute as per standard methodology. Total number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV Plantation and Soil & Water Conservation was 187, 169, 152 and 02, respectively. Under Compensatory Afforestation number of plantation sites evaluated during the year 2016-17, 2017-18 and 2018-19 was 71, 68 and 48, respectively. Whereas, under CAT PLAN, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 70, 60 and 39, respectively. Similarly, under NPV plantations number of plantation sites evaluated were 48, 28 and 76 for these years, respectively. Under Soil & Water Conservation scheme, 02 number of plantation sites during 2016-17 was evaluated.

In the State level, under the **Compensatory Afforestation (CA)** plantations raised during 2016-17, survival in 35.21%, 39.44%, 15.49% and 09.86% plantation sites was below average, average, good and very good, respectively. During 2017-18, survival in 20.59%, 39.71%, 30.88% and 08.82% plantation sites was below average, average, good and very good, respectively. Similarly, during 2018-19, survival in 14.58%, 47.92%, 29.17% and 08.33% plantation sites was below average, average, good and very good, respectively.

Under the **CAT PLAN** plantations raised during 2016-17, survival in 40.0%, 44.29% and 15.71%, plantation sites was below average, average and good, respectively. During 2017-18, survival in 35.0%, 50.0% and 15.0% plantation sites was below average, average and good, respectively. Similarly, during 2018-19, survival in





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28.21%, 46.15%, and 25.64% plantation sites was below average, average and good, respectively.

Under the **NPV** plantations raised during 2016-17, survival in 33.33%, 43.75%, 16.67% and 06.25% plantation sites was below average, average, good and very good, respectively. During 2017-18, survival in 39.29%, 39.29%, 17.86% and 03.56% plantation sites was below average, average, good and very good, respectively. Similarly, during 2018-19, survival in 21.05%, 35.53%, 32.89% and 10.53% plantation sites was below average, average, good and very good, respectively.

Under the **Soil & Water Conservation (S & WC)** plantations raised during 2016-17, survival in 50.0% and 50.0% plantation sites was below average and average, respectively. The above details are being given in the following **Table-4.1**.

**Table-4.1: Details of Survival under various schemes in the State of Himachal Pradesh**

Sl. No.	Year of Plantation	Percentage of sites under different survival category				Total Sites Sampled
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>COMPENSATORY AFFORESTATION</b>					
<b>1</b>	2016-17	35.21%	39.44%	15.49%	09.86%	<b>71</b>
<b>2</b>	2017-18	20.59%	39.71%	30.88%	08.82%	<b>68</b>
<b>3</b>	2018-19	14.58%	47.92%	29.17%	08.33%	<b>48</b>
<b>B].</b>	<b>CAT PLAN</b>					
<b>1</b>	2016-17	40.00%	44.29%	15.71%	NA	<b>70</b>
<b>2</b>	2017-18	35.00%	50.00%	15.00%	NA	<b>60</b>
<b>3</b>	2018-19	28.21%	46.15%	25.64%	NA	<b>39</b>
<b>C].</b>	<b>NPV</b>					
<b>1</b>	2016-17	33.33%	43.75%	16.67%	06.25%	<b>48</b>
<b>2</b>	2017-18	39.29%	39.29%	17.86%	03.56%	<b>28</b>
<b>3</b>	2018-19	21.05%	35.53%	32.89%	10.53%	<b>76</b>
<b>D].</b>	<b>SOIL &amp; WATER CONSERVATION</b>					
<b>1</b>	2016-17	50.00%	50.00%	NA	NA	<b>02</b>

In the state level, weighted average survival per cent of the plantations raised under **Compensatory Afforestation** during the year 2016-17, 2017-18 and 2018-19 was





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38.30%, 45.04% and 42.62%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 33.02%, 34.56% and 34.23%, respectively. The weighted average survival per cent for the plantations raised under **Net Present Value** scheme for the year 2016-17, 2017-18 and 2018-19 was 28.54%, 38.0% and 40.81%, respectively. The plantations raised under S & W C scheme, weighted average survival per cent during the year 2016-17 was 33.17% (**Table 4.2**).

**Table-4.2: Weighted Average Survival under various schemes in Himachal Pradesh**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	38.30	45.04	42.62
2.	CAT PLAN	33.02	34.56	34.23
3.	Net Present Value	28.54	38.0	40.81
4.	Soil & Water Conservation	33.17	NA	NA

### THE DETAILS OF THE EVALUATION OF THE PLANTATIONS FOR THE EACH DIVISION ARE GIVEN AS FOLLOWS:

#### 4.1 BILASPUR FOREST CIRCLE:

In this forest circle, plantation sites of Bilaspur and Kunihar forest division were evaluated as given below:

##### 4.1.1 Bilaspur Forest Division:

In Bilaspur Forest Division, there was one site having the total area 12.54 ha for the period 2016-17, under scheme Compensatory Afforestation and same site was taken for the evaluation. Whereas, three were three plantation sites having the total area 15.00 ha for the period 2016-17, under scheme Compensatory Afforestation. Out of three plantation sites, 01 site having the total area 5 ha was taken for the evaluation and monitored as per standard methodology. During, 2017-18 there was one site having the total area 6.38 ha under the scheme Compensatory Afforestation and same site was taken for the





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evaluation and monitored as per standard methodology. During 2018-19, there was one plantation site having the total area 0.558 ha under the scheme Compensatory Afforestation and same site was taken for the evaluation. Whereas, one plantation site having the total area 20.0 ha for the period 2018-19, under the scheme NPV and same site was taken for the evaluation and monitored as per standard methodology. The details of the evaluation of the plantation sites are given in **Table-4.3**.

Under the Compensatory Afforestation plantations evaluated during the year 2016-17, survival of one site (100%) plantation was average. Similarly, during 2017-18 & 2018-19, Survival of each site was also observed average. Whereas, under the scheme NPV plantation evaluated during the year 2016-17 & 2018-19, survival of each site (100%) also recorded average. The detail of survival in various sites is given in **Table-4.4**.

**Table-4.4: Details of Survival in various sites of Bilaspur Forest Division**

S. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>AJ.</b>	<b>COMPENSATORY AFFORESTATION</b>					
<b>1.</b>	2016-17	-	100%	-	-	<b>01</b>
<b>2.</b>	2017-18	-	100%	-	-	<b>01</b>
<b>3.</b>	2018-19	-	100%	-	-	<b>01</b>
<b>BJ.</b>	<b>NET PRESENT VALUE (NPV)</b>					
<b>1.</b>	2016-17	-	100%	-	-	<b>01</b>
<b>2.</b>	2018-19	-	100%	-	-	<b>01</b>
<b>G. Total (A+B)</b>		-	-	-	-	<b>05</b>

The weighted average survival per cent for the plantations carried out under the scheme Compensatory Afforestation during the year 2016-17, 2017-18 and





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2018-19 was 31.16%, 40.60 and 38.08% respectively. Whereas, under the scheme NPV, during the year 2016-17 & 2018-19 weighted average was 26.12% and 37.17%, respectively. The detail of survival of plant species in various years is given in **Table-4.5:**

**Table-4.5: Weighted Average Survival of various years in Bilaspur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	01	31.16
2.	2017-18	01	40.60
3.	2018-19	01	38.08
<b>B].</b>	<b>NPV</b>		
1.	2016-17	01	26.12
2.	2018-19	01	37.17
	<b>Total</b>	<b>05</b>	

The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegata*, *Dendrocalamus strictus*, *Pinus roxburghii*, *Phyllanthus emblica*, *Punica granatum* and *Tectona grandis* etc. was better in most of the plantation sites whereas, the species viz., *Albizia lebbeck*, *Cassia fistula*, *Dalbergia sissoo*, *Melia azedarach*, *Pongamia pinnata*, *Sapindus mukorossi*, *Syzygium cumini*, *Terminalia arjuna* and *Terminalia bellirica* did not respond well in some of the plantation sites. The low survival percentage in some of the site was due to damage caused by fire, wild animal and grazing by stray animal. All the plantation sites were well fenced except one which was not fenced.





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**Table-4.3: Division-wise Details of the Plantation Sites including GPS Coordinates of Bilaspur Forest Division (2016-17)**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	UF- Cheli	Compensatory Afforestation	2016-17	Baner	Swarghat	Swarghat	12.54	16.70	742	31°15'38.7"N , 76°43'42.3"E	31.16	Grazing pressure and forest fire generally occur in summer months.
2.	UF Dhanula	Net Present Value	2016-17	Dhani	Malot	Kalol	5	3.71+3.5 5=7.26	576	31°16'41.9"N 76°37'39.3"E SW	26.12	Grazing and carriage problem
3.	UF Balh-Chalog	Compensatory Afforestation	2017-18	Amrottan	Malhot	Kalol	6.38	7.689	662	31°16'19.6"N 76°41'00.9"W	40.60	Damage due to stray animals
4.	DPF Bandla	Compensatory Afforestation	2018-19	Lakhanpur	Sadar	Sadar	0.558	0.9628	1067	31°17'58.6"N 76°47'12.7.4"E NW	38.08	-
5.	C- 7 Bagra	Net Present Value	2018-19	Samoh	Samoh	Jhandutta	20	27.35	645	31°23'07.6"N 76°40'43.3"E SE	37.17	-





#### 4.1.2 Kunihar Forest Division:

In Kunihar Forest Division, there were 05 sites having the total area of 35 ha for the period 2016-17 under the Compensatory Afforestation. Out of 05 sites, 04 sites covering the total area 30 ha were taken for the evaluation. However, 07 sites having the total area 43 ha under the scheme CAT PLAN for the period 2016-17. Out of 07 sites, 03 sites having the total area 17 ha were taken for the evaluation and under the scheme NPV there were 02 sites having the total area 20 ha for the period 2016-17 and both plantation sites were taken for the evaluation. Similarly, under the scheme Soil and Water Conservation 02 sites having the total area 09 ha and same sites were taken for the evaluation. During 2017-18, there was 01 site having the total area of 0.7 ha under the Compensatory Afforestation and same was taken for the evaluation. Whereas, 08 sites having the total area 48 ha under the scheme CAT PLAN for the period 2017-18. Out of 08 sites, 03 sites having the total area 15 ha were taken for the evaluation. During 2018-19, there was 01 site having the total area of 7.68 ha under the scheme Compensatory Afforestation (CA) and same was taken for evaluation. Whereas, 05 sites having the total area 30 ha under the scheme CAT PLAN for the year 2018-19. Out of 05 sites, 02 sites covering the total area 10 ha was taken for the evaluation and monitored as per standard methodology. The details of the evaluation of plantation sites are given in **Table-4.6.**

Under the **Compensatory Afforestation**, for the plantations raised during 2016-17, survival of 25.0%, 25.0% and 50.0% plantations was below average, average and good, respectively and during 2017-18 survival of 100% plantations was below average, whereas, during 2018-19 survival of 100% plantation was recorded average.

Under the **CAT PLAN**, for the plantations raised during 2016-17, survival of 100% plantation was average. The plantations evaluated during the year 2017-18, survival of 33.33% and 66.663% plantations was below average and





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average, respectively. During 2018-19, survival of 100% plantation was recorded average. Under the **Net Present Value (NPV)**, for the plantations raised during 2016-17, survival of 100% plantation was below average. Plantation raised under the scheme **Soil & Water Conservation** during the year 2016-17, survival of 50.0% and 50.0% plantation was below average and average, respectively. The detail of survival in various sites is given in **Table-4.7**.

**Table-4.7: Details of Survival in various sites of Kunihar Forest Division**

S. No.	Year of Plantation	Survival Category				Total
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>COMPENSATORY AFFORESTATION</b>					
1.	2016-17	25.0%	25.0%	50.0%	--	<b>04</b>
2.	2017-18	100%	-	--	--	<b>01</b>
3.	2018-19	--	100%	--	--	<b>01</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	-	100%	-	-	<b>03</b>
2.	2017-18	33.33%	66.66%	-	-	<b>03</b>
3.	2018-19	-	100%	-	-	<b>03</b>
<b>C].</b>	<b>NET PRESENT VALUE (NPV)</b>					
1.	2016-17	100%	-	-	-	<b>02</b>
<b>D].</b>	<b>SOIL &amp; WATER CONSERVATION</b>					
1.	2016-17	50.0%	50.0%	-	-	<b>02</b>

The weighted average survival per cent for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 45.9%, 38.70% and 47.38%, respectively. Whereas, plantations raised under the CAT PLAN during the year 2016-17, 2017-18 and 2018-19, weighted average survival was 36.06%, 38.47% and 34.46%,







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respectively. Plantation raised under the scheme Net Present value during the year 2016-17, survival was 22.36% and under the scheme Soil & Water Conservation, weighted average survival was 33.17% for the period 2016-17. The detail of survival of plant species in various years is given in **Table-4.8**.

**Table-4.8: Weighted Average Survival of various years in Kunihar Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A]. COMPENSATORY AFFORESTATION</b>			
1.	2016-17	04	45.39
2.	2017-18	01	38.70
3.	2018-19	01	47.38
<b>B]. CAT PLAN</b>			
1.	2016-17	03	36.06
2.	2017-18	03	38.47
3.	2018-19	02	34.46
<b>C]. NET PRESENT VALUE (NPV)</b>			
1.	2016-17	02	22.36
<b>D]. SOIL &amp; WATER CONSERVATION</b>			
1.	2016-17	02	33.17
<b>TOTAL</b>		<b>18</b>	

The growth performance of the species viz., *Acacia catechu*, *Dendrocalamus strictus*, *Bauhinia variegata*, *Cedrus dedara*, *Grevillea robusta*, *Mangifera indica*, *Melia azedarach*, *Olea glandulifera*, *Phyllanthus emblica*, *Pinus roxburghii*, *Punica granatum*, *Quercus oblongata*, *Syzyium cumini* and *Terminalia arjuna* etc. was better in all the plantation sites. However, in some sites plantation of the species like *Albizia lebbeck*, *Bambusa vulgaris*, *Butea monosperma*, *Cedrus deodara*, *Dalbergia sissoo*, *Ficus religiosa*, *Grewia optiva*, *Morus alba*, *Pongamia pinnata*, *Prunus cerasoides*, *Punica granatum*, *Pyrus pashia*, *Robinia pseudoacacia*, *Salix sp.*, *Sapindus mukorossi*, *Tectona grandis*, *Terminalia bellerica*, *Terminalia chebula* and *Toona ciliata* did not





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respond well to the sites. The low survival percentage in some of the site was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.6: Division-wise Details of the Plantation Sites including GPS Coordinates of Kunihar Forest Division**

Sr. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Kangri	CA	2016-17	Chandi	Danoghat	Darlaghat	5	5.4	1643	31°16'35.0"N 76°57'15.9"E Northern	49.27	-
2.	DPF-Kurmla	CA	2016-17	Sai	Jainagar	Arki	10	9.5	901	31°08'29.76"N 76°51'50.29"E SW	63.89	Grazing pressure and forest fire generally occur in summer months.
3.	DPF Shron (Bawan)	CA	2016-17	Shron	Arki	Arki	10	8+2=10	1266	31°08'38.4"N 76°57'08.9"E SW	22.06	Damage due to stray animals
4.	Bajthana	CA	2016-17	Chandi	Kunihar	Kunihar	5	6.2	976	31°02'49.2"N 76°52'51.0"E NW	51.18	Damage due to stray animals
5.	D-1 Baga	CAT PLAN	2016-17	Baga	Kandhar	Darlaghat	7	10.5	895	31°20'27.7"N 76°52'20.7"E SW	30.90	-
6.	UF-Kandhar	CAT PLAN	2016-17	Kandhar	Kandhar	Darlaghat	5	7	1322	31°20'06.7"N 76°55'30.1"E NW	31.5	-





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7.	UF Saryali	CAT PLAN	2016-17	Chandi	Danoghat	Darlaghat	5	6.0	1553	31°16'10.5"N 76°59'26.1"E Southern	47.85	-
8.	DPF Saroan	NPV	2016-17	Saroan	Arki	Arki	10	16.6	959	31°08'16.4"N 76°56'29.1"E NW	19.12	Grazing pressure and carriage is difficult
9	DPF Jeoli Karoli	NPV	2016-17	Baijhatti	Jainagar	Arki	10	8.3	1150	31°08'17.3"N 76°53'15.4"E NW	25.60	Engagement of labour is difficult and grazing pressure
10.	UF Bhurjni	S& WC Plan	2016-17	Dhundand	Darlaghat	Darla	4	6.2	986	31°15'39.59"N 76°53'37.89"E WE	23.16	Carriage, wildlife and grazing problem
11.	UF Newri	S& WC Plan	2016-17	Chandi	Danoghat	Darla	5	5.8	1484	31°15'57.6"N 76°58'08.4"E NE	41.18	Carriage, wildlife and grazing problem
12.	UPF Baddu	Compensatory Afforestation	2017-18	Goela	Chandi	Kunihar	0.7	1.5	945	31°02'42.8"N 76°52'25.4"E SW	38.70	Grazing and carriage problem
13.	UPF Bajrail	CAT PLAN	2017-18	Kandhar	Kandhar	Darlaghat	5	4.6	1421	31°21'52.4"N 76°54'59.1"E SW	23.76	-
14.	U-19 Sakor	CAT PLAN	2017-18	Labrath	Kandhar	Darlaghat	5	5.7	855	31°19'15.6"N 76°56'42.0"E Eastern	42.54	-
15.	UF Kangri	CAT PLAN	2017-18	Chandi	Danoghat	Darlaghat	5	5.7	1670	31°16'30.1"N 76°57'20.8"E NE	49.12	-





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16.	DPF Ser Gharakru	Compensatory Afforestation	2018-19	Danoghat	Danoghat	Darlaghat	7.68	9.2	1500	31°12'38.2"N 76°58'18.4"E NE	47.38	-
17.	U-13 Kandhar	CAT PLAN	2018-19	Kandhar	Kandhar	Darlaghat	5	5	1243	31°20'21.8"N 76°55'18.1"E NW	34.90	-
18.	UF Paryab	CAT PLAN	2018-19	Chandi	Danoghat	Darlaghat	5	5.9	1876	31°17'05.1"N 76°57'46.6"E Western	34.01	-





## 4.2 HAMIRPUR FOREST CIRCLE:

In this forest circle, plantation sites of Dehra, Hamirpur and Nurpur Forest Division were evaluated as given below:

### 4.2.1 Dehra Forest Division:

In Dehra Forest Division, there were 05 sites having the total area 55 ha for the period 2017-18 under the scheme NPV. Out of 05 sites, 02 sites having the total area 20 has were taken for the evaluation and monitored as per standard methodology. During 2018-19, there was 01 sites having the total area 5 ha under the scheme Net Present Value and same site was taken for evaluation and monitored as per standard methodology. The detail of evaluation of plantation sites is given in **Table-4.9**.

02 Plantation sites evaluated during the year 2017-18 under the scheme Net Present Value, survival in 50.0% and 50.0% was below average and average, respectively. One Plantation evaluated during the year 2018-19 under the scheme NPV. Survival in this site was average. The detail of survival in various sites is given in **Table-4.10**:

**Table-4.10: Details of Survival in various sites of Dehra Forest Division**

S. No	Year of Plantation	Survival Category				Total
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	NPV					
1.	2017-18	50.0%	50.0%	-	-	02
2.	2018-19	-	100%	-	-	01

The weighted average survival for plantations evaluated during the year 2017-18 and 2018-19 under the scheme NPV was 22.65% and 34.64%, respectively. The detail of survival of plant species in various years is given in **Table-4.11**:





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**Table-4.11: Weighted Average Survival of various years in Dehra Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A].	<b>NET PRESENT VALUE</b>		
1.	2017-18	02	22.65
2.	2018-19	01	34.64
	<b>TOTAL</b>	<b>03</b>	

The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegata*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Melia azedarach*, *Phyllanthus emblica*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* was better in the plantation sites. Species like *Melia azedarach*, *Sapindus mukorossi*, *Syzygium cumini*, *Terminalia arjuna*, *Terminalia bellirica* and *Toona ciliata* was not performed in some of the plantation sites. The low survival percentage in some of the site was due to fire incidences, drought conditions, lack of irrigation facility and damage caused by wild animals and grazing.





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**Table-4.9: Division-wise Details of the Plantation Sites including GPS Coordinates of Dehra Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	U4d Khariana C27	NPV	2017-18	Dola	Lagru	Khundian	10	7.7	807	31°55'52.42"N 76°22'59.15"E W	14.42	--
2.	UPF Beri C2	NPV	2017-18	Kanpur	Dada- Siba	Dadasiba	10	16.4	545	31°51'21.93"N 75°59'6.10"E N to NW	30.88	--
3.	U14D Kharian C16	NPV	2018-19	Kharian	Dehra	Dehra	5	5.7	475	31°57'33.70"N 76°10'3.63"E W	34.64	--







#### 4.2.2 Hamirpur Forest Division:

In Hamirpur Forest Division, there were 07 sites having the total area 40.0 ha for the period 2016-17 under the scheme Net Present Value. Out of 07 sites, 04 sites covering the total area 20 ha were taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 25 sites having the total area 107 ha under the CAT PLAN. Out of 25 sites, 09 sites covering the total area 35 ha were taken for the evaluation. Whereas, 04 sites having the total area 34 ha for the period 2017-18 under the scheme Net Present Value. Out of 04 sites, 03 sites covering the total area 29 ha for the period 2017-18 were taken for the evaluation and monitored as per standard methodology. During 2018-19, there was 01 site having the total area 10 ha under the scheme NPV and same site was taken of evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.12.**

Out of 09 Plantations evaluated during the year 2017-18 under the scheme Compensatory Afforestation, survival in 22.22%, 66.66% and 11.11% plantation sites was below average, average and good, respectively. 04 plantation sites was evaluated Under the scheme Net Present Value during the year 2016-17, survival in 75.0% and 25.0% plantation sites were below average and good, respectively. During 2017-18, survival in 03 sites 33.33%, 33.33% and 33.33% plantation site was average, good and very good, respectively and during 2018-19 survival was observed in 01 site (100%) was below average. The detail of survival in various sites is given in **Table-4.13:**





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**Table-4.13: Details of Survival in various sites of Hamirpur Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A]. CAT PLAN</b>						
1.	2017-18	22.22%	66.66%	11.11%	-	<b>09</b>
<b>B]. NPV</b>						
1.	2016-17	75.0%	-	25.0%	-	<b>04</b>
2.	2017-18	-	33.33%	33.33%	33.33%	<b>03</b>
3.	2018-19	100%	-	-	-	<b>01</b>

The weighted average survival for plantations evaluated during the year 2017-18 under the scheme CAT PLAN was 34.60%. Under the scheme NPV, during 2016-17, 2017-18 and 2018-19 weighted average was 26.91%, 69.73% and 22.17%, respectively. The detail of survival of plant species in various years is given in **Table-4.14:**

**Table-4.14: Weighted Average Survival of various years in Hamirpur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A]. CAT PLAN</b>			
1	2017-18	09	34.60
<b>B]. Net Present Value</b>			
1.	2016-17	04	26.91
2.	2017-18	03	69.73
3.	2018-19	01	22.17
<b>Total</b>		<b>17</b>	





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The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegata*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Grevillea robusta*, *Melia azedarach*, *Phyllanthus emblica*, *Pinus roxburghii*, *Syzygium cumini*, *Tectona grandis*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* was better in some of the plantation sites. Species like *Azadirachta indica*, *Dendrocalamus strictus*, *Cassia fistula*, *Cassia siamea*, *Delonix regia*, *Eryobotrya japonica*, *Populus ciliata*, *Psidium guajava*, *Punica granatum*, *Sapindus mukorossi*, , *Terminalia chebula* and *Toona ciliata* was not performed in some of the plantation site. The low survival percentage in some of the site was due to fire incidences, droght conditions, lack of irrigation facility and damage caused by wild animals and grazing as there is no fencing in the area.





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**Table-4.12: Division-wise Details of the Plantation Sites including GPS Coordinates of Hamirpur Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	P 18 Bihroo C2	NPV	2016-17	Bihroo	Chakmoh	Bijhari	5	8.1	779	31°29'37.32"N 76°32'57.62"E E to S	14.28	-
2.	P- 16 Dhar Sidh C3c	NPV	2016-17	Dharsidh	Chakmoh	Bijhari	5	4.2	739	31°27'40.25"N 76°32'21.22"E Eastern	28.32	-
3.	P14 Ralli C3b	NPV	2016-17	Ralli	Loharli	Bijhari	5	6.9	692	31°27'10.06"N 76°34'43.85"E E to N	12.16	-
4.	U-377 Chabutra C3	NPV	2016-17	Chabutra	Hamirpur	Hamirpur	5	5.6	770	31°45'51.37"N 76°29'29.32"E Eastern	52.88	-
5.	UPF Khaler	CAT PLAN	2017-18	Chathiar	Nadaun	Nadaun	2	2.63	615	31°45'19.5"N 76°26'24.4"E NE	41.25	Moderate slope
6.	UPF 316 Dhanpur	CAT PLAN	2017-18	Dhanpur	Nadaun	Nadaun	5	5.20	531	31°46'08.2"N 76°24'41.6"E NE	43.45	Moderate slope





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7.	P-35 Rara Jori C-Palyal	CAT PLAN	2017-18	Dhanpur	Nadaun	Nadaun	3	2.70	581	31°46'03.7"N 76°25'47.9"E NE	38.0	Moderate and gentle slope
8.	UPF Plassi	CAT PLAN	2017-18	Chathiar	Nadaun	Nadaun	6	6	575	31°44'37.63"N 76°25'47.9"E Northern	33	Rocky and gentle slope
9.	UPF Tillu C6 near Tillu nala	CAT PLAN	2017-18	Tillu	Nadaun	Nadaun	3	3.35	565	31°46'32.3"N 76°26'32.26"E NE	41.73	Moderate slope
10	P 24 Batran C1a and C1b	CAT PLAN	2017-18	Batran	Kangoo	Nadaun	3	4.01	591	31°42'17.8"N 76°23'02.5"E SE	--	Fire burnt site with moderate slope
11	P27 Basaral C3b and C3c	CAT PLAN	2017-18	Batran	Kangoo	Nadaun	4	4.02	560	31°42'10.2"N 76°21'38.9"E SE	--	Fire burnt site with moderate slope
12	P28 Bounti C1c	CAT PLAN	2017-18	Batran	Kangoo	Nadaun	3	3.76	579	31°43'23.7"N 76°22'01.5"E SE	41.0	Dry site with moderate slope
13	P23 Loharkar	CAT PLAN	2017-18	Dangri	Kangoo	Nadaun	6	6.70	606	31°42'47.55"N 76°24'57.64"E	58.50	Moderate slope
14	P14 Ralli C3a	NPV	2017-18	Ralli	Loharli	Bijhari	22	26.3	710	31°27'42.43"N 76°34'31.73"E N	76.09	--
15	P55 Dhar Chabutra C2d	NPV	2017-18	Chabutra	Hamirpur	Chabutra	5	5.2	847	31°45'45.10"N 76°28'38.24"E NE	56.02	--





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16	U322 Bhadiar	NPV	2017-18	Jeehan	Nadaun	Nadaun	2	2.70	600	31°47'08.2"N 76°25'26.9"E Western	34.0	Moderate slope
17	U119 Chakmoh C2	NPV	2018-19	Dharsidh	Chakmoh	Bijhari	10	12.2	712	31°27'47.54"N 76°32'16.51"E E to N	22.17	--





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### 4.2.3 Una Forest Division:

In the Forest Division Una, there were 7 sites having the total area 60.99 ha for the period 2016-17 under the Compensatory Afforestation. Out of 07 sites, 03 sites covering the total area 19.04 ha were taken for the evaluation. Whereas, 04 sites having the total area 40 ha under the scheme NPV. All 04 sites were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.15**.

Out of 03 plantations evaluated during the year 2016-17 under the scheme **Compensatory Afforestation**, survival in 100% plantation was average. Whereas, under the scheme **NPV**, survival in 50.0% and 50.0% plantation was average and good, respectively. The detail of survival in various sites is given in **Table-4.16**:

**Table-4.16: Details of Survival in various sites of Una Forest Division**

S. No.	Year of Plantation	Survival Category				Total
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	<b>COMPENSATORY AFFORESTATION</b>					
1.	2016-17	-	100%	-	-	<b>03</b>
B].	<b>NPV</b>					
1.	2016-17	-	50.0%	50%	-	<b>04</b>

The weighted average survival for plantation evaluated during the year 2016-17 under the scheme **Compensatory Afforestation** was 44.86%. Whereas, weighted average survival for plantation evaluated during the year 2016-17 under the scheme **NPV** was 47.57%. The detail of survival of plant species in various years is given in **Table-4.17**.





**Table-4.17: Weighted Average Survival in various years of Una  
Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	03	<b>44.86</b>
<b>B].</b>	<b>NPV</b>		
1.	2016-17	04	<b>47.57</b>
	<b>TOTAL</b>	<b>07</b>	

The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegate*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Phyllanthus emblica*, *Pongamia piñata*, *Punica granatum*, *Syzygium cumini*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* was better in some of the plantation sites. Species like *Acacia nilotica*, *Azadirachta indica*, *Bombax ceiba*, *Casia glauca*, *Casia siamea*, *Cassia fistula*, *Leucaena leucocephala*, *Mangifera indica*, *Melia azedarach*, *Moringa oleifera*, *Pongamia pinñata*, *Syzygium cumini*, *Terminalia bellirica* and *Terminalia chebula* etc. did not performed well in some of the plantation sites. The low survival percentage in some of the sites was due to fire incidences, drought conditions, lack of irrigation facility and damage caused by wild and domestic animals.





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**Table-4.15: Division-wise Details of the Plantation Sites including GPS Coordinates Una Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Badehra	Compensatory Afforestation	2016-17	Badehra	Pandoga	Una	5.03	5.9	583	31°25'02.8"N 076°10'00.9"E NW	48.14	Carriage of material and damage by the wild animals
2.	Tibbian	Compensatory Afforestation	2016-17	Tibbian	Kungrath	Una	5.01	6.2	1724	31°45'48.1"N 77°21'23.8"E N	43.89	Damage to the plantation by the wild animals
3.	RF Lam	Compensatory Afforestation	2016-17	Takka	Una	Una	9	9.2	499	31°32'49.6"N 076°16'29.6"E N	43.57	Damage to the plantation by the wild animals
4.	UPF Baduhi	NPV	2016-17	Chowki	Talmahera	Ramgarh	10.0	10.6	516	31°36'50.2"N 076°12'35.0"E N	41.24	Damage to the plantation by the wild animals
5.	UPF Bohana	NPV	2016-17	Bandhanel	Talmahera	Ramgarh	10.0	10.8	670	31°37'34.6"N 076°18'19.1"E plain	51.32	Damage to the plantation due to wild animals
6.	UPF Ludher	NPV	2016-17	Moh Manyar	Thana Kalan	Ramgarh	10.0	10.4	527	31°32'27.1"N 076°17'55.7"E Eastern	56.40	Damage to the plantation due to wild animals





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7.	UPF Sakoun	NPV	2016-17	Kariara	Thana- Kalan	Ramgarh	10.0	17.7	505	31°33'09.9"N 076°19'17.9"E plain	41.32	Damage to the plantation due to wild animals
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### 4.3. NAHAN FOREST CIRCLE:

In this Forest Circle, plantation sites of Nahan, Paonta Sahib, Rajgarh and Renuka Ji Forest Division were evaluated as given below:

#### 4.3.1 Nahan Forest Division:

In Nahan Forest Division, there were 06 numbers of sites having the total area of 110 ha for the period 2016-17 under the NPV. Out of 06 numbers of sites, 04 sites covering the area 75 ha were taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 13 numbers of sites having the total area of 262.67 ha under the scheme Compensatory Afforestation. Out of 13 numbers of sites, 07 sites covering the area 137.55 ha were taken for the evaluation. Whereas, 02 numbers of sites having the total area of 66.6 ha for the period 2017-18 under the scheme NPV. Both sites were taken for evaluation and monitored as per standard methodology. During 2018-19, there was 01 number of sites having the total area of 10 ha under the scheme NPV and same were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.18**.

Under the scheme **Compensatory Afforestation during 2017-18**, survival of 28.57%, 57.14% and 14.29% plantations Sites was average, good and very good, respectively. Whereas, under the scheme **NPV during 2016-17**, survival of 50.50% and 50.0% plantation sites was below average and good, respectively. During 2017-18 survival of 50.0% and 50.0% plantations was average and good, respectively and during 2018-19 one site (100%) was evaluated and plantation site was recorded good. The detail of survival in various sites is given in **Table-4.19**:





**Table-4.19: Details of Survival in various sites of Nahar Forest Division**

S. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>AJ.</b>	<b>COMPENSATORY AFFORESTATION</b>					
<b>1.</b>	2017-18	-	28.57%	57.14%	14.29%	<b>07</b>
<b>BJ.</b>	<b>NET PRESENT VALUE</b>					
<b>1.</b>	2016-17	50%	50%	-	-	<b>04</b>
<b>2.</b>	2017-18	-	50.0%	50.0%	-	<b>02</b>
<b>3.</b>	2018-19	-	-	100%	-	<b>01</b>

The weighted average survival for the plantation evaluated during the year 2017-18 under the scheme Compensatory Afforestation was 53.35%. Under the scheme NPV, during the year 2016-17, 2017-18 and 2018-19 weighted average survival for the plantation was 28.76%, 48.35% and 55.60%, respectively (Table-4.20).

**Table-4.20: Weighted Average Survival of various years in Nahar Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>AJ.</b>	<b>COMPENSATORY AFFORESTATION</b>		
<b>1.</b>	2017-18	07	<b>53.35</b>
<b>BJ.</b>	<b>NPV</b>		
<b>1.</b>	2016-17	04	<b>28.76</b>
<b>2.</b>	2017-18	02	<b>48.35</b>
<b>3.</b>	2018-19	01	<b>55.60</b>
	<b>TOTAL</b>	<b>14</b>	

The growth performance of the species viz., *Acacia auriculiformis*, *Acacia catechu*, *Azadirachta indica*, *Dendrocalamus strictus*, *Bauhinia variegata*, *Bombax ceiba*, *Cassia fistula*, *Dalbergia sissoo*, *Mangifera indica*, *Melia azedarach*, *Morus alba*, *Phyllanthus emblica*, *Psidium guajava*, *Punica granatum*, *Sapindus mukurosii*, *Syzygium cumini*,





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*Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula*, *Terminalia tomentosa* and *Toona ciliata* were better in all the plantation sites. Species like *Acacia nilotica* and *Ficus religiosa* did not performed in a few sites. The low survival percentage in some of the site was due to drought conditions, lack of irrigation facility and damage caused by wild animals and grazing pressure. Most of the plantation site having the bush fencing and in some sites there was no fencing.





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**Table-4.18: Division-wise Details of the Plantation Sites including GPS Coordinates of Nahan Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude & Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	RF Periwala C.3	NPV	2016-17	Periwala	Nahan	Nahan	30	30.8	497	30°32'18.3"N 77°17'40.9"E SW	23.53	Intense grazing pressure
2.	RF W. Bheron	NPV	2016-17	W. Bheron	Bheron	Kolar	15	20	507	30°29'00.80"N 77°18'08.0"E E	35.14	Grazing pressure
3.	RF Khairi C.2	NPV	2016-17	Khairi	Bikrambag	Nahan	5	6.7	389	30°29'37.1"N 77°13'49.9"E NE	41.39	Grazing pressure
4.	RF Sangholi C.4	NPV	2016-17	Sangholi	Kotli	Kotli	25	32.2	421	30°27'44.7"N 77°17'04.3"E S to SE	28.67	Dry Conditions
5.	RF Suketi C1 & 2	CA	2017-18	Suketi	Bikrambag	Nahan	14.75	20.3	437	30°29'53.1"N 77° 14'19.1"E N	52.53	Grazing, labour shortage
6.	RF Gumti Sambhalwa C.1 & C.2	CA	2017-18	Kotla	Kotla	Trilokpur	26.8	29.4	351	30°32'59.1"N 77°07'51.6"E SW	43.57	Fire prone and biotic pressure
7.	RF Lai Devi C.3	CA	2017-18	Mainthapal	Trilokpur	Trilokpur	6	8.1	437	30°32'37.3"N 77°13'44.9"E SE	31.57	Hard soil, dry conditions





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8.	RF Jamretwa C.6	CA	2017-18	Jamretwa	Bheron	Kolar	35	50	504	30°30'41.0N 77°18'33.8"E E to W	56.21	Dry conditions and grazing pressure
9.	Sunkar Khad River bed near RF Karondewali	CA	2017-18	Kolar	Kolar	Kolar	12	13.9	507	30°30'34.7"N 77° 24'33.3"E E	80.71	Grazing pressure and dry conditions
10.	RF Lohgarh C.29	CA	2017-18	Lohgarh-6	Lohgarh	Kolar	35	45.2	319	30°25'44.5"N 77° 24'27.1"E N/E	53.56	Grazing pressure
11.	RF Negiwala	CA	2017-18	Negiwala	Sambhalwa	Kolar	18	18.2	363	30°28'19.1"N 77°23'27.3"E SW	51.61	Grazing pressure
12.	RF Lohgarh C30	NPV	2017-18	Loharghat	Lohargh	Nahan	41.6	65.5	329	30°25'28.9"N 77°24'40.3"E S/E	45.90	Fire Prone
13.	RF Tallon C4 & C5	NPV	2017-18	Tallon	Jamta	Jamta	25	28.5	761	30°34'37.6"N 77°17'50.6"E S	52.43	Fire prone, Lantana infestation
14.	RF Tallon C7	NPV	2018-19	Tallon	Jamta	Jamta	10	13.1	968	30°35'00.08"N 77°18'11.94"E NE	55.60	Fire prone, Lantana infestation and grazing





#### 4.3.2 Paonta-Sahib Forest Division:

In Paonta Sahib Forest Division, there were 02 sites having the total area 45 ha for the period 2016-17 under the Compensatory Afforestation. Out of 02 sites, 01 site having the area 15 ha was taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 19 plantation sites having the total area 284.6 ha for the period 2017-18 under the Compensatory Afforestation. Out of 19 sites, 08 sites having the total area 101.6 were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.21**.

Under the scheme Compensatory Afforestation, survival of the one plantation raised during 2016-17 was average and during 2017-18, 08 plantation sites was evaluated, survival in 62.5%, 12.5% and 25.0%, plantation site was below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.22**:

**Table-4.22: Details of Survival in various sites of Paonta-Sahib Forest Division**

S. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>COMPENSATORY AFFORESTATION</b>					
<b>1.</b>	2016-17	--	100%	-	-	<b>01</b>
<b>2.</b>	2017-18	62.5%	12.5%	25.0%	-	<b>08</b>

The weighted average survival for plantations evaluated during the year 2016-17 and 2017-18 under the scheme Compensatory Afforestation was 34.06% and 21.46%, respectively. The detail of survival of plant species in various years is given in **Table-4.23**:







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**Table-4.23: Weighted Average Survival of various years in Paonta-Sahib Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1	2016-17	01	<b>34.06</b>
2	2017-18	08	<b>21.46</b>
	<b>TOTAL</b>	<b>09</b>	

The growth performance of the species viz., *Acacia catechu*, *Bauhinia vareigata*, *Cassia fistula*, *Dalbergia sissoo*, *Mangifera indica*, *Morus alba*, *Phyllanthus emblica*, *Psidium guajava*, *Syzygium cumini*, *Tectona grandis*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* was better some of the plantation sites. Species like *Acacia glauca*, *Aesculus indica*, *Albizia lebbeck*, *Anogeissus latifolia*, *Azadirachta indica*, *Chukrasia tabularis*, *Dendrocalamus strictus*, *Melia azedarah*, *Leucaena leucocephala*, *Mangifera indica*, *Pterospermum acerifolium*, *Punica granatum*, *Terminalia bellirica* and *Terminalia chebula* etc. did not performed well in some of the plantation sites.





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**Table-4.21: Division-wise Details of the Plantation Sites including GPS Coordinates of Paonta Sahib Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	RF Salatha C-3	Compensatory Afforestation	2016-17	Killor	Majri	Bhagani	15	14.86	520	30°31'39"N 77°49'27"E NE	34.06	Fire, grazing and damage by wild animals
2.	RF Majri C-7	Compensatory Afforestation	2017-18	Majri	Majri	Bhagani	18	19.96	815	30°31'43"N 77°47'26"E SW	10.78	Damage by stray animals
3.	RF Guttanpur C-20	Compensatory Afforestation	2017-18	Batamandi	Behral	Majra	20	30.33	390	30°25'35"N 77°033'38"E	10.07	Damage by wild animals
4.	RF Sukhimelion C-2&3	Compensatory Afforestation	2017-18	Majra	Majra	Majra	20	32.77	440	30°28'33"N 77°31'22"E	21.25	Fire and grazing
5.	RF Danda C-20	Compensatory Afforestation	2017-18	Danda	Rajpur	Bhagani	15	15.38	470	30°30'37"N 77°41'33"E	16.72	Fire and grazing
6.	RF Amboya C-4	Compensatory Afforestation	2017-18	Amboya	Bhagani	Bhagani	20	21.16	510	30°30'27"N 77°43'38"E	16.09	Damage by wild animals





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7.	RF Kando Bharog C-2	Compensatory Afforestation	2017-18	Bharog Baneri	Kansar	Giri Nagar	10	10.71	720	30°34'1"N 77°30'43"E NW	61.43	Damage by wild animal
8.	RF Kansar C-2	Compensatory Afforestation	2017-18	Kansar	Kansar	Giri Nagar	3.6	3.35	1020	30°33'30"N 77°29'13"E NW	59.97	Fire, grazing and damage by wild animals
9.	RF Chachheti C-10	Compensatory Afforestation	2017-18	Chachheti	Chachheti	Paonta	05	5.35	945	30°33'25"N 77°35'21"E	34.27	Fire, grazing and damage by wild animals





### 4.3.3 Rajgarh Forest Division:

In Rajgarh Forest Division, there was 01 site having the total area 10 ha for the period 2016-17 under scheme Net Present Value and same site was taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 11 sites having the total area 118.88 ha under the Compensatory Afforestation. Out of 11 sites, 06 sites having the total area 66 ha were taken for the evaluation. Whereas, 06 sites having the total area 58 ha under the scheme NPV for the period 2017-18. Out of 06 sites, 03 sites covering the total area 28 ha were taken for the evaluation and monitored as per standard methodology. During 2018-19, there were 04 sites having the total area 29.55 ha under the scheme Compensatory Afforestation. Out of 04 sites, 03 sites having the total area 20 ha were taken for the evaluation. Whereas, 08 sites having the total area 100 ha under the scheme NPV during 2018-19. Out of 08 sites, 04 sites covering the total area 30 ha were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.24**.

Under the scheme **Compensatory Afforestation**, during 2017-18, survival of 33.33% and 66.66% plantation site was below average and good, respectively and during 2018-19 survival of 33.33%, 33.33% and 33.33% plantation site was below average, average and good, respectively. Under the scheme NPV, during the year 2016-17 one plantation site was evaluated and plantation was below average. During 2017-18, survival of 66.66% and 33.33% plantation was below average and average, respectively and during 2018-19, 04 sites evaluated, all sites were below average. The detail of survival in various sites is given in **Table-4.25**:





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**Table-4.25: Detils of Survival in various sites of Rajgarh Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A]. COMPENSATORY AFFORESTATION</b>						
1	2017-18	33.33%	-	66.66%	-	<b>06</b>
2	2018-19	33.33%	33.33%	33.33%	-	<b>03</b>
<b>B]. NPV</b>						
1.	2016-17	100%	-	-	-	<b>01</b>
2.	2017-18	66.66%	33.33	-	-	<b>03</b>
3.	2018-19	100%	-	-	-	<b>04</b>

The weighted average survival for plantations evaluated during the year 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 36.79% and 25.95%, respectively. Whereas, under the scheme NPV during 2016-17, 2017-18 and 2018-19 the weighted average survival was Nil in a single site, 25.29% and 17.56%, respectively. The detail of survival of plant species in various years is given in **Table-4.26:**

**Table-4.26: Weighted Average Survival of various years in Rajgarh Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A]. Compensatory Afforestation</b>			
1.	2017-18	06	<b>36.79</b>
2.	2018-19	03	<b>25.95</b>
<b>B]. NPV</b>			
1.	2016-17	01	<b>Nil</b>
2.	2017-18	03	<b>25.29</b>
3.	2018-19	04	<b>17.56</b>
<b>TOTAL</b>		<b>17</b>	





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The growth performance of the species viz., *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dendrocalamus strictus*, *Grewia optiva*, *Melia azedarach*, *Morus alba*, *Olea glandulifera*, *Phyllanthus emblica*, *Prunus cerasoides*, *Psidium guajava*, *Punica granatum*, *Pyrus pashia*, *Quercus floribunda*, *Quercus oblongata*, *Syzygium cumini*, *Terminalia arjuna* and *Terminalia bellirica* etc. was better in the plantation sites. However, species like *Acacia catechu*, *Dendrocalamus strictus*, *Grewia optiva*, *Phyllanthus emblica*, *Populus ciliata*, *Punica granatum*, *Salix sp.*, *Sapindus mukorossi*, *Tectona grandis*, *Terminalia chebula* and *Toona ciliata* were not performed well in some of the sites. The low survival percentage in some of the site was due to damage caused by grazing, drought and lack of local nursery for raising planting stock material. The most of the plantation sites were well fenced however, in some sites fencing was damaged or was not fenced.





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**Table-4.24: Division-wise Details of the Plantation Sites including GPS Coordinates of Rajgarh Forest Division**

Sl. No.	Plantation Site	Name of the Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if Any
							As per Record	As per GPS Reading	Altitude (m)	Latitude, Longitude and Altitude		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	UF-Chukhar Dhagyar	NPV	2016-17	Ghagger	Ghini	Sarahan	10	10.47	1017	30° 45'37.23" N 077° 05'32.8" E SE & NE	--	Fire Burnt Site
2.	MF Sandral	Compensatory Afforestation	2017-18	Wasni	Narag	Narag	10	9.82	1360	30° 48'10.15" N 077° 10'41.2" E NE	52.86	-
3.	RF-32 Gadhol	Compensatory Afforestation	2017 -18	Didag / Churwadhar	Rajgarh	Rajgarh	10	9.26	1876	30°49'07.74" N 77°20'31.06" E SW	55	Churwadhar beat as per HPFSD records
4.	PF-Donga Saini	Compensatory Afforestation	2017-18	Dimber	Rajgarh	Rajgarh	10	8.37	1084	30°45'47.73" N 77°19'05.11"E W to SW	51.5	Open and dry with slight grazing pressure





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5.	RF-Katoga	Compensatory Afforestation	2017-18	Dhamla	Thandidhar	Habban	20	29.3	1879	30°54'44.37" N 77°23'02.03"E NE to SE	4.77	-
6.	RF-21 Dalmun Deothi	Compensatory Afforestation	2017-18	Ranaghat	Habban	Habban	10	10.6	1811	30°55'34.49" N 77°18'37.78"E SW	62.0	-
7.	UF-Kila Kalanch C-5	Compensatory Afforestation	2017-18	Chandog	Ghini	Sarahan	10	11.22	1237	30° 47'37.55" N 077° 06'13.88" E SE & WS	26.63	
8.	RF-Banar C2-b	NPV	2017-18	Shikor	Saindhar	Sarahan	10	11.71	1137	30° 39'35.24" N 077° 14'17.38" E NS	20.0	Fire Burnt Site
9.	UF Ghirar Sandrol C2	NPV	2017-18	Chandog	Ghinni	Sarahan	8	7.46	996	30° 47'18.87" N 077° 05'15.26" E SE & NW	11.0	Fire Burnt Site
10.	RF 53 Jayanti Dhar C2b	NPV	2017-18	Narag	Narag	Narag	10	10.28	1477	30°49'25.0"N 077°06'07.0"E SE	42.0	
11.	UF Mahlog C2	Compensatory Afforestation	2018-19	Chandoli	Naina Tikker	Narag	5	6	1405	30° 50'00.19" N 077° 08'54.00" E	35.81	







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12	RF-Sawana	Compensatory Afforestation	2018-19	Dol/Sawana	Habban/Bathaudhar	Habban/Rajgarh	10	21.98	2219	30°51'38.38" N 77°22'30.22" E NW	10.0	Major part of the site is a thick forest
13	RF-Hiun (C2a and C2b)	Compensatory Afforestation	2018 -19	Yashwant Nagar	Dimber	Rajgarh	5	5.7	1375	30°51'45.12" N 77°14'35.61" E Northern	52.0	-
14	PF Kairy C4	NPV	2018-19	Shikor	Sarahan	Sarahan	10	9.84	1137	30° 39'35.24" N 077° 14'17.38"E Eastern	24.62	-
15	UF Barachakli -C5	NPV	2018-19	Ghagger	Ghinni	Sarahan	10	9.26	1165	30° 45'89.4" N 077° 04'48.08" E Eastern	6.43	Fire Burnt Site
16	PF Gaithal C4	NPV	2018-19	Gaithal	Saindhar	Sarahan	10	11.91	1165	30° 41'21.72" N 077° 15'03.84"E Eastern	29.5	
17	RF Ghinni C1 &C2	NPV	2018-19	Jamun Ki Ser	Sarahan	Sarahan	10	10.88	1426	30° 42'04.69" N 077° 11'44.73" E Eastern	9.7	





#### 4.3.4 Renuka Ji Forest Division:

In Renuka Ji Forest Division, there were 04 plantation sites having the total area 60 ha for the period 2018-19 under the NPV programme of GoI. All 04 sites were taken for the evaluation and monitored as per standard methodology. The detail of evaluation of plantation sites is given in **Table-4.27**.

Under the scheme **Net Present Value**, during 2018-19 survival of 25.0%, 25.0% and 50.0% plantation was below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.28**:

**Table-4.28: Details of Survival in various sites of Renukaji Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	NPV					
1.	2018-19	25.0%	25.0%	50.0%	-	04

The weighted average survival for the plantations evaluated during the year 2018-19 under the scheme NPV was 41.41%. The detail of survival of plant species in various years is given in **Table-4.29**

**Table-4.29: Weighted Average Survival of various year in Renukaji Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A.	NPV		
1.	2018-19	04	41.41
	<b>Total</b>	<b>04</b>	

The growth performance of the species viz., *Bauhinia variegata*, *Grewia optiva*, *Olea cuspidata*, *Phyllanthus emblica*, *Pterospermum acerifolium*, *Punica granatum*, *Sapindus mukorossi*, *Syzygium cumini*, *Terminalia*





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*arjuna* and *Toona ciliata* were better in the plantation sites. However, *Albizia lebbeck*, *Bauhinia variegata* and *Terminalia bellirica* did not performed well in the a few sites. The low survival percentage in this site was due to damage caused by grazing, drought and lack of local nursery for raising planting stock material. The plantation sites were well fenced.





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**Table-4.27: Division-wise Details of the Plantation Sites including GPS Coordinates of RenukaJi Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	RF-Charighatti	NPV	2018 -19	Bandal	RenukaJi	RenukaJi	10	10.24	1199	30°35'58.43" N 77°30'57.28"E SE	61.2	-
2.	RF-Gatlog	NPV	2018 -19	Bhujond	Bogdhar	Nohra	5	4.4	1255	30°42'24.39" N 77°22'58.42"E SE	35.2	-
3.	RF-Kathar	NPV	2018 -19	Chandini	Ambon	Kafota	20	25	1464	30°35'38.31" N 77°33'28.98"E SE	15.5	Site selection is not good
4.	RF-Sataun C-4	NPV	2018 -19	Sataun	Sataun	Kafota	25	33	978	30°34'31.27" N 77°38'59.29 "E SE to SW	55.46	-





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### 4.3.1.1 SOLAN FOREST CIRCLE:

In this Forest Circle, plantation sites of Solan and Nalagarh Forest Divisions were evaluated as given below:

### 4.3.1.2 Solan Forest Division:

In Solan Forest Division, there were 06 sites, having the total area 144.06 ha for the period 2016-17 under the Compensatory Afforestation. Out of 06 sites, 04 sites covering the area 107 ha were taken for the evaluation and monitored as per standard methodology. During 2018-19, there was 01 site, having the total area 1.2 ha under the Compensatory Afforestation and same plantation site was taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.30**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17 survival of 75.0% and 25.0% plantation was good and very good, respectively and during 2018-19 one site was evaluated and site was good. The detail of survival in various sites is given in **Table-4.31**:

**Table-4.31: Details of Survival in various sites of Solan Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	<b>Compensatory Afforestation</b>					
1.	2016-17	--	--	75.0%	25.0%	<b>04</b>
2.	2018-19	--	--	100%	--	<b>01</b>

The weighted average survival for the plantation evaluated during the year 2016-17 and 2018-19 under the scheme Compensatory Afforestation was 65.76% and 52.42%, respectively. The detail of survival of plant species in various years is given in **Table-4.32**.





**Table-4.32: Plant Survival of various years in Solan Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
<b>1</b>	2016-17	04	<b>65.76</b>
<b>2</b>	2018-19	01	<b>52.42</b>
	<b>TOTAL</b>	<b>05</b>	

The growth performance of the species viz., *Albizia lebbeck*, *Bauhinia variegata*, *Cassia fistula*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Grevillea robusta*, *Jacaranda mimosifolia*, *Melia azedarach*, *Olea glandulifera*, *Phyllanthus emblica*, *Pinus roxburghii*, *Punica granatum*, *Pyrus pashia*, *Sapindus mucorosii*, *Syzygium cumini*, *Terminalia arjuna* and *Terminalia bellirica* was better in the plantation sites. However, species like *Acacia catechu*, *Aegle marmelos*, *Aesculus indica*, *Albizia lebbeck*, *Salix* sp., *Tecoma* sp., *Terminalia bellirica* and *Toona ciliata* were not performed well in some of the sites. The low survival percentage in some of the sites was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged and in some sites there was no fencing.



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**Table-4.30: Division-wise Details of the Plantation Sites including GPS coordinates of Solan Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Bagh-Kharki	Compensatory Afforestation	2016-17	Thathol	Serighat	Subathu	11	11.6	1137	31°02'50.39"N 077°0'07.34"E Western	53.83	Damage to the plantation due to Wild- Life
2.	D-230 Jangeshu C <sub>1</sub> and C <sub>2</sub>	Compensatory Afforestation	2016-17	Kasauli	Kasauli	Parwanoo	48	50.4	1362	30°52'47.66"N 76°57'38.21"E Eastern	56.40	--
3.	D-214 Gulzar, C-1 and 2	Compensatory Afforestation	2016-17	Johar ji	Johar ji	Dharampur	25	27.8	1295	30°49'26.29"N 77°04'25.99"E Eastern	88.61	--
4.	D-214- Gulzar- C-3	Compensatory Afforestation	2016-17	Johar ji	Johar ji	Dharampur	23	25.2	1235	30°48'58.52"N 77°04'56.12"E Eastern	66.20	--
5.	D-233- Datar-C-III	Compensatory Afforestation	2018-19	Parwanoo	Parwanoo	Parwanoo	1.2	1.1	1150	30°50'50.91"N 76°59'25.19"E Eastern	52.42	





#### 4.3.1.3 Nalagarh Forest Division:

In Nalagarh Forest Division, there were 04 sites, having the total area 108 ha for the period 2016-17 under the Compensatory Afforestation scheme. Out of 04 sites, 02 sites having the total area 48 ha were taken for the evaluation. During 2017-18, there were 01 site, having the total area 02 ha for the period 2017-18 under the Compensatory Afforestation and same was taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.33**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17 survival of 100% plantation was good and during 2018-19 one site was evaluated and site was good. The detail of survival in various sites is given in **Table-4.34**:

**Table-4.34: Details of Survival in various sites of Nalagarh Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	<b>Compensatory Afforestation</b>					
1.	2016-17	--	--	100%	--	<b>02</b>
2.	2017-18	--	--	100%	--	<b>01</b>

The weighted average survival for the plantation evaluated during the year 2016-17 and 2017-18 under the scheme Compensatory Afforestation was 64.75% and 61.22%, respectively. The detail of survival of plant species in various years is given in **Table-4.35**.







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**Table-4.35: Plant Survival of various years in Nalagarh Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
<b>1</b>	2016-17	02	<b>64.75</b>
<b>2</b>	2017-18	01	<b>61.22</b>
	<b>TOTAL</b>	<b>03</b>	

The growth performance of the species viz., *Acacia catechu*, *Acacia nilotica*, *Albizia lebbeck*, *Azadirachta indica*, *Bauhinia vahlii*, *Dalbergia sissoo*, *Dendrocalamus strictus* and *Prosopis juliflora* was better in the plantation sites. However, species like *Azadirachta indica*, *Dalbergia sissoo* and *Phyllanthus emblica* were not performed well in some of the sites. The low survival percentage in some of the sites was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged and in some sites there was no fencing.





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**Table-4.33: Division-wise Details of the Plantation Sites including GPS Coordinates of Nalagarh Forest Division (2016-17)**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Khol-D/pur C-5	Compensatory Afforestation	2016-17	Malku Majra	Baddi	Baddi	30	33.0	450	30°55'47.04"N 76°44'57.11"E NE	64.38	Fire prone Area
2.	Khol-D/pur C-3	Compensatory Afforestation	2016-17	Baddi	Baddi	Baddi	18	18.2	452	30°55'53.47"N 76°45'24.92"E NE	65.36	Fire prone Area
3.	Khol Dharampur	Compensatory Afforestation	2017-18	Baddi	Baddi	Baddi	02	02	432	30°55'36.24"N 76°45'45.71"E NE	61.22	--





#### 4.4 MANDI FOREST CIRCLE:

In this Forest Circle, plantation sites of Jogindernagar, Karsog, Mandi, Nachan and Suket Forest Division were evaluated as given below:

##### 4.4.1 Joginder Nagar Forest Division:

In Joginder Nagar Forest Division, there were 03 sites having the total area 25 ha for the period 2016-17 under the Compensatory Afforestation (CA). All the sites were taken for the evaluation. During 2017-18, there were 05 sites having the total area 54 ha under the scheme Net present Value (NPV). Out of 05 sites, 04 sites having the total area 44 ha were taken for the evaluation. During 2018-19, there were 06 sites having the total area 27 ha under the Net present Value (NPV). All the sites were taken for the evaluation. Whereas, there were 01 site having the area 4.5 ha under the scheme Compensatory Afforestation for the period 2018-19 and site was taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.36**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17, survival in 66.66% and 33.33% plantation sites was average and good, respectively and during 2018-19 there was 01 plantation site evaluated, survival in this site was recorded good. Under the scheme **NPV** plantation, during the year 2017-18, survival in 25.0% and 75.0% plantation sites were below average and average, respectively and during the year 2018-19, survival in 16.67% and 66.66.0% and 16.67% plantation sites were below average, average and good, respectively The detail of survival in various sites is given in **Table-4.37**:





**Table-4.37: Details of Survival in various sites of Joginder Nagar Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A]. Compensatory Afforestation</b>						
1	2016-17	-	66.66%	33.33%	-	<b>03</b>
2	2018-19	-	-	100%	-	<b>01</b>
<b>B]. NPV</b>						
1.	2017-18	25.0%	75.0%	-	-	<b>04</b>
2.	2018-19	16.67%	66.66%	16.67	-	<b>06</b>

The weighted average survival for plantations evaluated during the year 2016-17 and 2018-19 under the scheme Compensatory Afforestation was 42.72% and 54.04%, respectively. Whereas, under NPV during 2017-18 and 2018-19 the weighted average survival for plantation was 41.19% and 41.11%, respectively. The detail of survival of plant species in various years is given in **Table-4.38:**

**Table-4.38: Weighted Average Survival of various years in Joginder Nagar Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A]. Compensatory Afforestation</b>			
1	2016-17	03	<b>42.72</b>
2	2018-19	01	<b>54.04</b>
<b>B]. NPV</b>			
1.	2017-18	04	<b>41.19</b>
2.	2018-19	06	<b>41.11</b>
	<b>Total</b>	<b>14</b>	



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The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegata*, *Cedrus deodara*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Ficus racemosa*, *Grevillea robusta*, *Melia azedarach*, *Olea paniculata*, *Phyllanthus emblica*, *Psidium guajava*, *Pterospermum acerifolium*, *Punica granatum*, *Quercus oblongata*, *Sapindus mukorossi*, *Syzygium cumini*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* was better in all the plantation sites. However, species like *Bauhinia variegata*, *Bombax ceiba*, *Cassia fistula*, *Dendrocalamus strictus*, *Juglans regia*, *Prunus cerasoides*, *Psidium guajava*, *Sapindus mukorossi*, *Terminalia bellirica* and *Terminalia chebula* etc. did not performed well in some of the plantation sites. The low survival percentage in some of the site was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.36: Division-wise Details of the Plantation Sites including GPS Coordinates of Joginder Nagar Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1.	Karlon Machan	Compensatory Afforestation	2016-17	Aal	Langana	Ladbharol	10	9.1	1343	31°49'47.20"N 76°48'47.14"E Western	33.64	Forest Fire
2.	UPF Graman	Compensatory Afforestation	2016-17	Graman	Devgarh	Tikken	10	12.4	2190	31°59'52.9"N 76°55'26.1"E Northern	47.87	Forest Fire
3.	Bhadyar	Compensatory Afforestation	2016-17	Brang	Mandap	Dharampur	5	4	1019	31°46'03.07" 76°45'55.53" Western	50.60	--
4.	Chakki Nala	Net Present Value	2017-18	Dodar	Kamlah	Kamlah	20	26.8	754	31°47'43.91"N 76°43'12.13"E NE	37.3	-
5.	Draman-1	Net Present Value	2017-18	Langana	Langana	Ladbharol	3	3.2	846	31°52'01.6"N 76°45'30.1"E Southern	49.67	-
6.	Majhakar	Net Present Value	2017-18	Nainpur	Bhararoo	J/Nagar	5	4.7	1220	31°51'18.7"N 76°50'03.2"E North-Eastern	28.5	Fire burnt
7.	Risa Khad	Net Present Value	2017-18	Brang	Mandap	Dharam-pur	15	18	993	31°45'58.96" 76°45'57.92" W	48.90	-





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8.	Chab Bhararu	Net Value	Present	2018-19	Khazri	Chukki	Urla	4	5.8	1287	31°52'15.2"N 76°50'31.1"E Northern	45.25	Fire burnt
9.	Dart Bagla	Net Value	Present	2018-19	J/Nagar	J/Nagar	J/Nagar	5	5.1	903	31°57'09.6"N 76°46'54.6"E South-East	57.0	--
10	DPF Ghatta	Net Value	Present	2018-19	Ghatta	Chauntra	J/Nagar	4	4.7	1274	32°02'05.1"N 76°40'22.5"E Western Aspect	21.25	Fire burnt
11	DPF Gulana	Net Value	Present	2018-19	Tullah	Langana	Ladbharol	5	5.1	743	31°52'31.4"N 76°43'47.8"E Eastern	31.2	Fire burnt
12	DPF Dodar	Net Value	Present	2018-19	Dodar	Kamlah	Kamlah	5	5.0	649	31°47'08.4"N 76°44'30.6"E Northern	43.3	-
13	Darku Kathaili	Net Value	Present	2018-19	Brang	Mandap	Dharampur	4	5	733	31°46'17.72" 76°44'59.34" W	46.75	-
14	Murradhar	Compensatory Afforestation		2018-19	Mandap	Mandap	Dharampur	4.5	6	1408	31°44'20.31" 76°48'29.60" W	54.04	-





#### 4.4.2 Karsog Forest Division:

In Karsog Forest Division, there were 07 sites having the total area 50 ha for the period 2016-17 under the Compensatory Afforestation. Out of 07 sites, 03 sites having the total area 15 ha were taken for the evaluation. During 2017-18, there were 07 sites having the total area 73.82 ha under the Compensatory Afforestation. Out of 07 sites, 04 sites having the total area 43.82 were taken for the evaluation and monitored as per standard methodology. During 2018-19, there were 05 sites having the total area 125 ha under the scheme Net Present Value (NPV) and all the 05 sites were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.39**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17, survival in 33.33%, 33.33% and 33.33% plantation sites was below average, good and very good, respectively and during the year 2017-18, survival in 50.0%, 25.0% and 25.0% plantation site was average, good and very good, respectively. Under the scheme **NPV** plantation, during the year 2018-19, survival in 40.0%, 20.0% and 40.0% plantation site was below average, average and good good, respectively. The detail of survival in various sites is given in **Table-4.40**:

**Table-4.40: Details of Survival in various sites of Karsog Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A.</b>	<b>COMPENSATORY AFFORESTATION</b>					
1.	2016-17	33.33%	--	33.33%	33.33%	<b>03</b>
2.	2017-18	--	50.0%	25.0%	25.0%	<b>04</b>
<b>B.</b>	<b>NPV</b>					
1.	2018-19	40.0%	20.0%	40%	--	<b>05</b>







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The weighted average survival for plantation evaluated during the year 2016-17 and 2017-18 under the scheme Compensatory Afforestation was 52.18% and 58.47%, respectively. Under the scheme NPV, during the year 2018-19, survival was 39.2%. The detail of survival of plant species in various years is given in **Table-4.41:**

**Table-4.41: Weighted Average Survival of various years in Karsog Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1	2016-17	<b>03</b>	<b>52.18</b>
2	2017-18	<b>04</b>	<b>58.47</b>
<b>B].</b>	<b>NPV</b>		
1.	2018-19	<b>05</b>	<b>39.2</b>
	<b>TOTAL</b>	<b>12</b>	

The growth performance of the species viz., *Aesculus indica*, *Albizia lebeck*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Grewia optiva*, *Melia azedarach*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Punica granatum*, *Pyrus pashia*, *Quercus oblongata*, *Rhododendron arboreum*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Terminalia bellirica* and *Toona ciliata* was better in all the plantation sites. However, species like *Cedrus deodara*, *Dalbergia sissoo*, *Melia azedarach*, *Phyllanthus emblica*, *Punica granatum*, *Sapindus mukorossi*, *Syzygium cumini* and *Terminalia bellirica* were not performed well in some of the plantation sites. Drought conditions also causing mortality in some of the planted species. In future, site selection should be done after due consideration of basic amenities like water, road, and distance from plant nursery. Water conservation efforts should be adopted to combat drought conditions.





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**Table-4.39: Division-wise Details of the Plantation Sites including GPS Coordinates of Karsog Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	D-213 Niharinal	Compensatory Afforestation	2016-17	Niharinal	Seri	Seri	5	5.0	1857	31°18'25.7"N 76°47'08.7"E Western	--	Fire, Steep slope
2.	D-79 Mohru	Compensatory Afforestation	2016-17	Tattapani	Tattapani	Tattapani	5	5.2	1654	31°18'12.35"N 77°07'19.03"E Western	73.72	--
3.	D-80 Kanda	Compensatory Afforestation	2016-17	Tattapani	Tattapani	Tattapani	5	5.2	1735	31°18'43.73"N 77°06'29.95"E Western	82.81	--
4.	D-239 Darohal	Compensatory Afforestation	2017-18	Pokhi	Gowalpur	Seri	10	12.70	2319	31°24'49.92"N 77°19'24.36"E	38.95	Dry site condition having steep slope
5.	D-256 Jagol	Compensatory Afforestation	2017-18	Mahog	Mahog	Magroo	10	10.70	2065	31°24'54.43"N 77°20'12.5"E	62.27	--
6.	D-199 Dhanyara	Compensatory Afforestation	2017-18	Kashoul	Mamail	Karsog	10	10.4	1292	31°20'28.62"N 77°14'36.66"E Western	32.36	--
7.	D-72 Restadhar	Compensatory Afforestation	2017-18	Kanda	Tattapani	Tattapani	13.82	17.1	1813	31°19'51.38"N 77°06'12.32"E Western	88.73	--





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8.	D-252 Naganal	Net Present Value	2018-19	Gowalpur	Gowalpur	Seri	5	5.5	1357	31°23'33.74"N 77°22'22.81"E NW	55.20	--
9.	D-214 Jhunjhan (I & II)	Net Present Value	2018-19	Niharinal	Seri	Seri	3 & 2	2.9 & 4.7	856	31°16'09.89"N 77°17'17.25"E NE	---	Fire, Steep slope
10	D-199 Dhanyara	Net Present Value	2018-19	Kashoul	Mamail	Karsog	5	5.0	1304	31°20'16.33"N 77°14'28.71"E NW	67.00	--
11	D-79 Moharu C-1	Net Present Value	2018-19	Balindi	Tattapani	Pangana	10	20.9	1290	31°17'78.7"N 077°07'63.8"E SW	18.9	Transportaio nal shock to planting material along with grazing pressure
12	D-80 Lochar	Net Present Value	2018-19	Alsindi	Tattapani	Pangna	100	174	1205	31°17'07.8" N 077°06'30.5"E NW	41.0	





#### 4.4.3 Mandi Forest Division:

In Mandi Forest Division, there were 03 sites having the total area 90 ha for the period 2016-17 under the Compensatory Afforestation. Out of 03 sites, 01 site having the total area 30 ha were taken for the evaluation and under the scheme Net Present Value (NPV) there was 01 plantation site having the total area 10 ha and same site was taken for evaluation and monitored as per standard methodology. During 2017-18, there were 03 sites having the total area 30 ha under the scheme Net Present Value (NPV). All sites were taken for the evaluation and monitored as per standard methodology. During 2018-19, there were 11 sites having the total area 55 ha under the scheme NPV. Out of 11 sites, 06 sites covering the total area 27 ha were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.42**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17, survival in one site (100%) plantation was average. Under the scheme **NPV** plantation, during the year 2016-17, survival in one site (100%) plantation sites was below average. During 2017-18, survival in 33.33% and 66.67% plantation site was below average and good, respectively. During 2018-19, survival in 66.66%, 16.67% and 16.67% plantation site was below average, good and very good, respectively. The detail of survival in various sites is given in **Table-4.43**:

**Table-4.43: Details of Survival in various sites of Mandi Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1	2016-17	-	100%	-	-	01
<b>B].</b>	<b>NPV</b>					
1	2016-17	100%	-	-	-	01





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2	2017-18	33.33%	-	66.67%	-	03
3	2018-19	66.66%	-	16.67%	16.67%	06

The weighted average survival for plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation, was 36.58%. Whereas, plantations raised under the NPV during the year 2016-17, 2017-18 and 2018-19, weighted average was 19.93%, 45.21% and 48.42%, respectively. The detail of survival of plant species in various years is given in **Table-4.44**:

**Table-4.44: Weighted Average Survival of various year in Mandi Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
<b>1</b>	<b>2016-17</b>	01	36.58
<b>B.</b>	<b>NPV</b>		
<b>1</b>	<b>2016-17</b>	01	19.93
<b>2</b>	<b>2017-18</b>	03	45.21
<b>3</b>	<b>2018-19</b>	06	48.42
	<b>TOTAL</b>	<b>11</b>	

The growth performance of the species viz., *Acacia catechu*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Cinnamomum tamala*, *Dendrocalamus strictus*, *Grewia optiva*, *Morus abla*, *Olea cuspidata*, *Phyllanthus emblica*, *Prunus cerasoides*, *Punica granatum*, *Quercus oblongata*, *Sapindus mukorossi*, *Syzium cummni*, *Terminalia bellirica*, *Terminalia chebula* and *Ulmus wallichiana* was better in all the plantation sites. However, species like *Bauhinia variegata*, *Ficus* sp., *Punica granatum*, *Sapindus mukorossi* and *Terminalia bellerica* did not perform well in some of the plantation sites. The low survival percentage in some of the site was due to damage caused by wild animal, grazing and fire incidences. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.42: Details of the Plantation Sites including GPS Coordinates of Mandi Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Saira Nala	Compensatory Afforestation	2016-17	Siva	Shivabadar	Panarsa	30	31.8	1181m	31°41'41.89"N 77° 3'34.80"E E to S	36.58	-
2.	Chalahar	NPV	2016-17	Baggi	Kataula	Kataula	10	8.2	1632m	31°47'17.39"N 77° 4'16.66"E S to SW	19.93	-
3.	Chippnu	NPV	2017-18	Bijani	Rehardhar	Mandi	5	10.9	1199	31°43'23.42"N 76°56'53.72"E NW	60.4	-
4.	Mehni	NPV	2017-18	Mehni	Badar	Panarsa	10	9.5	1374	31°43'31.28"N 77° 2'34.99"E N to NW	25.34	-
5.	Gandharb	NPV	2017-18	Talyar	Sadar	Mandi	15	20.1	934	31°42'42.81"N 76°55'24.62"E Eastern	53.40	-
6.	Kangani	NPV	2018-19	Kangani	Tarapur	Mandi	5	4.2	985	31°40'34.63"N 76°57'49.76"E N to NE	35.08	-
7.	Kunda Nal	NPV	2018-19	Rani Ben	Sadar	Mandi	5	7.2	977	31°40'44.23"N 76°56'14.56"E S to SE	44.24	-





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8.	Brehal	NPV	2018-19	Siva	Shivabadar	Panarsa	5	7.4	1134	31°42'31.35"N 77° 2'57.27"E N to W	46.80	-
9.	Bikaner	NPV	2018-19	Kufri	Kufri	Drang	5	4.7	1183	31°50'34.71"N 76°51'56.27"E N to NW	61.32	-
10.	Jung Dhar	NPV	2018-19	Kamand	Kataula	Kataula	5	3.8	1300	31°48'32.39"N 76°59'6.04"E S	42.32	-
11.	Baglu	NPV	2018-19	Baglu	Kotli	Kotli	2	2.0	1723	31°41'15.26"N 76°50'4.48"E S to SW	79.25	-





#### 4.4.4 Nachan Forest Division:

In Nachan Forest Division, there were 13 sites having the total area 138 ha for the period 2017-18 under the scheme NPV. Out of which 05 sites were taken for the evaluation covering the area of 42 ha were taken for the evaluation as per standard methodology. During 2018-19, there were 20 sites having the total area 233 ha under the scheme NPV. Out of which 07 sites were taken for the evaluation covering the area of 75 ha were taken for the evaluation as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.45**.

Under the scheme **Net Present Value**, during the year 2017-18, survival in 60.0% and 40.0% site was below average and average, respectively. The detail of survival in various sites is given in **Table-4.46**:

**Table-4.46: Details of Survival in various sites of Nachan Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Net Present Value</b>					
1	2017-18	60.0%	40.0%	-	-	<b>05</b>
2.	2018-19	-	71.43%	28.57%	-	<b>07</b>

The weighted average survival for plantations evaluated during the year 2017-18 and 2018-19 under the scheme Net Present Value was 29.66% and 46.02%, respectively. The detail of survival of plant species in various years is given in **Table- 4.47**:

**Table-4.47: Weighted Average Survival of various years in Nachan Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Net Present Value</b>		
1	2017-18	05	29.66
2	2018-19	07	46.02
	<b>TOTAL</b>	<b>12</b>	







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The growth performance of the species of *Aesculus indica*, *Cedrus deodara*, *Grevillea robusta*, *Juglans regia*, *Punica granatum*, *Quercus oblongata* and *Syzygium cumini* was better in the plantation sites. However, species like *Aesculus indica*, *Dendrocalamus strictus*, *Grevillea robusta*, *Prunus cerasoides*, *Punica granatum* and *Quercus oblongata* did not perform in some of the plantation sites.





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**Table-4.45: Division-wise Details of the Plantation Sites including GPS Coordinates of Nachan Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plan-tation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Jassan 2nd	NPV	2017-18	Chail-chowk	Bassa	Nachan	12	11	1454	31°33'41.1"N 76°59'45.1"E NE	25.71	Wildlife and grazing problem and fire prone area.
2.	Satyagi-1	NPV	2017-18	Kotlu	Chhariyand	Nachan	6	4.8	1395	31°37'16.66"N 77°05'17.67"E NW	18.18	Grazing pressure, engagement of labours is difficult and fire prone area.
2.1	Satyagi-2	NPV	2017-18	Kotlu	Chhariyand	Nachan	5	8.6	1231	31°37'19.29"N 77°04'50.54"E W		Grazing pressure, engagement of labours is difficult and fire prone area.
3.	Janjohi C3a	NPV	2017-18	Pandoh	Pandoh	Pandoh	5	5	1548	31°40'32.82"N 77°01'27.71"E SE	47.40	Fire prone area and grazing problem
4.	OD 491 Tawa-1	NPV	2017-18	Tawa	Pandoh	Pandoh	5	4.8	1221	31°39'32.45"N 77°02'06.62"E NW		Grazing pressure , fire prone area





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4.1	OD 491 Tawa-2	NPV	2017-18	Tawa	Pandoh	Pandoh	5	8.3	1340	31°39'13.76"N 77°02'24.27"E NE	47.9	Grazing pressure , fire prone area
5.	Bakhali ND 325	NPV	2017-18	Sarua	Chaprahan	Pandoh	5	7.2	969	31°40'09.8"N 77°04'25.7"E SW	10.20	
6.	Pathri	NPV	2018-19	Chailchowk	Bassa	Nachan	10	1.1+9.1= 10.2	1487	31°34'31.3"N 76°59'22.0"E Southern	51.00	Grazing pressure and forest fire generally occur in summer months.
7.	ND 461- Babag C-II	NPV	2018-19	Machhrot	Bassa	Nachan	20	7.5+9.6= 17.1	1437 1417	31°36'27.85"N 77°03'21.11"E SE 31°36'26.76"N 77°03'16.20"E SE	58.15	Damage due to stray animals and fire prone area.
8.	OD 499 Janjohi C1	NPV	2018-19	Pandoh	Pandoh	Pandoh	10	12.9	1505	31°40'45.5"N 77°01'31.4"E NE	49.8	Damage due to stray animals and fire prone area.
9	ND 505 Bahlidhar C3f	NPV	2018-19	Badanu	Pandoh	Pandoh	5	6.5	1362	31°42'16.87"N 77°00'49.48"E N	36.4	Grazing pressure and fire prone area.
10	OD 336- Sarua	NPV	2018-19	Sarua	Chaprahan	Pandoh	10	11.4	1273	31°38'51.29"N 77°04'57.08"E SW	30.30	Damage due to stray animals and fire prone area.





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<b>11</b>	OD 159 Fanjar C4	NPV	2018-19	Bandal	Karthach	Pandoh	10	10.7	1379	31°40'16.7"N 77°05'34.9"E NW	50.30	Damage due to stray animals and fire prone area.
<b>12</b>	Bhella	NPV	2018-19	Saloi	Karthach	Pandoh	10	15	1383	31°40'23.3"N 77°05'41.8"E NW	30.6	Damage due to stray animals and fire prone area.





#### 4.4.5 Suket Forest Division:

In Suket Forest Division, there was 01 plantation site having the total area 7.06 ha for the period 2016-17 under the scheme Compensatory. Same site was taken for the evaluation. Whereas, 02 plantation sites having total area 15 ha under the scheme NPV. Out of 02 sites, 01 site covering the total area 5 ha for the period 2016-17 was taken for the evaluation and monitored as per standard methodology. During 2018-19, there were 02 plantation sites having the total area 23.31 ha under the scheme Compensatory Afforestation. Both sites were taken for evaluation. Whereas, 04 sites covering the area 32 ha under the scheme NPV. Both sites were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.48**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17, survival in one site (100%) was below average and during 2018-19 survival in 50.0% and 50.0% site was average and good, respectively. Under the scheme **NPV** plantation, during the year 2016-17, survival in one site was average and during 2018-19 survival in 50.0% and 50.0% was average and good, respectively. The detail of survival in various sites is given in **Table-4.49**:

**Table-4.49: Details of Survival in various sites of Suket Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	100%	-	-	-	<b>01</b>
2.	2018-19	-	50.0%	50.0%	-	<b>02</b>
<b>B].</b>	<b>NPV</b>					
1.	2016-17	-	100%	-	-	<b>01</b>
2.	2018-19	-	50.0%	50.0%	-	<b>02</b>





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The weighted average survival for plantation evaluated during the year 2016-17 and 2018-19 under the scheme Compensatory Afforestation was Nil and 51.44%, respectively. The survival of the plantations raised under the scheme NPV during the year 2016-17 and 2018-19 was 33.59% and 45.47%. The detail of survival of plant species in various years is given in **Table-4.50**:

**Table-4.50: Weighted Average Survival of various years in Suket Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1	2016-17	01	Nil
2	2018-19	02	51.44
<b>B].</b>	<b>NPV</b>		
1	2016-17	01	33.59
2	2018-19	02	45.47
	<b>Total</b>	<b>06</b>	

The growth performance of the species viz., *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Grevillea robusta*, *Phyllanthus emblica*, *Prunus cerasoides*, *Punica granatum*, *Quercus oblongata*, *Syzygium cumini* and *Terminalia bellirica* etc. was better in all the plantation sites. However, species like *Bauhinia variegata*, *Leucaena leucocephala*, *Melia azedarach* and *Punica granatum* did not perform in some of the plantation sites. The low survival percentage in some of the sites was due to damage caused by wild animal, fire and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.48: Division-wise Details of the Plantation Sites including GPS Coordinates of Suket Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	DPF Salayane	Compensatory Afforestation	2016-17	Seri kothi	Batwara	Kangoo	7.06	8.1	1500	31°24'27.9"N 076°58'56.8"E NW	Nil	--
2.	DPF Jodhnu	NPV	2016-17	Kinder	Trechh	Jhungi	5	9.4	1549	31°19'35"N 077°01'55"E Southern	33.59	--
3.	Narehli	Compensatory Afforestation	2018-19	Kinder	Trechh	Jhungi	13.99	4.8	1503	31°18'50.31"N 77°03'10.59"E Eastern	48.93	
4.	Jader	Compensatory Afforestation	2018-19	Seri kothi	Batwara	Kangoo	9.32	16.7	1319	31°24'11.9"N 076°58'19.8"E NE	55.21	--
5.	Tarehari	NPV	2018-19	Kinder	Trechh	Jhungi	20	26.1	1490	31°17'40.26"N 77°03'27.05"E SW	42.0	--
6.	Jamdwar	NPV	2018-19	Jamdwar	Thauna	Sarkaghat	12	12.7	879	31°43'35"N 077°46'19"E Southern	51.25	--





#### 4.5 SHIMLA FOREST CIRCLE:

In this forest circle, plantation sites of Chopal, Rohru, Shimla and Theog forest divisions were evaluated as given below:

##### 4.5.1 Chopal Forest Division:

In Chopal Forest Division, there were 11 sites having the total area 82.5 ha for the period 2016-17 under the Compensatory Afforestation, Out of 11 sites, 10 site was taken for the evaluation covering the area of 77.5 ha. The details of evaluation of plantation sites are given in **Table-4.51**.

Under the scheme **Compensatory Afforestation**, during the year 2016-17, survival in 30.0%, 50.0% and 20.0% plantation sites was below average and good, respectively. The detail of survival in various sites is given in **Table-4.52**:

**Table-4.52: Details of Survival in various sites of Chopal Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	<b>Compensatory Afforestation</b>					
1	2016-17	30.0%	50.0%	20.0%	-	10

The weighted average survival for plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation was 35.27%. The detail of survival of plant species in various years is given in **Table-4.53**:

**Table-4.53: Weighted Average Survival of various years in Chopal Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A.	<b>Compensatory Afforestation</b>		
1	2016-17	10	35.27
	<b>Total</b>	<b>10</b>	







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The growth performance of the species viz., *Cedrus deodara*, *Melia azedarach*, *Prunus armeniaca*, *Quercus oblongata* and *Sapindus mukorossi* etc. was better in the plantation sites. However, species like *Bauhinia variegata*, *Juglans regia*, *Robinia pseudoacacia* and *Sapindus mukorossi* did not performed well in some of the sites. The low survival percentage in some of the sites fencing was damaged. After, plantation, chances of fire incidences in fire prone areas and grazing pressure was also cited as constrained in achieving the desired results.





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**Table-4.51: Division-wise Details of the Plantation Sites including GPS Coordinates of Chopal Forest Division**

Sr. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude (N) Longitude (E) Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Thana UPF	Compensatory Afforestation	2016-17	Thana	Chopal	Chopal	6	8.2	2256	30°57'27.4"N 77°33'17.2"E SE to SW	6.88	Fire damaged Site
2.	Minus UPF	Compensatory Afforestation	2016-17	Minus	Sainj	Kanda	10	8.0	960	30°46'32.0"N 77°48'31.7"E S-SW	8.77	Intense Grazing and dry conditions
3.	Malnoon DPF	Compensatory Afforestation	2016-17	Reunshdhar	Kulag	Kanda	10	7.9	2513	30°49'06.3"N 77°30'51.4"E SE-SW	48.31	Grazing
4.	Shilla C-3	Compensatory Afforestation	2016-17	Shilla	Tharoch	Tharoch	4.5	3.2	2300	30°57'38.1"N 77°43'04.4"E N-NW	36.81	Fire and grazing
5.	Kharti Nalla	Compensatory Afforestation	2016-17	Tikkari	Tikkari	Tharoch	4.5	3.8	1816	30°54'39.5"N 77°45'09.1"E SE-SW	37.66	Dry and exposed site conditions and Grazing





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6.	Kajau	Compensatory Afforestation	2016-17	Kelvi	Jokhar	Deiya	9.5	10.3	2089	30°52'00.1"N 77°33'36.0"E S-SW	21.00	Dry site condition having steep slope
7.	Kashah UPF	Compensatory Afforestation	2016-17	Ghurla	Bamta	Bamta	9	8.6	2550	31°00'37.8"N 77°36'11.0"E E-SW	50.72	Grazing and fire prone
8.	Badlog UPF	Compensatory Afforestation	2016-17	Badlog	Jakholi	Sarian	12	10.1	2625	31°01'09.4"N 77°28'55.7"E S-SW	46.70	Fire prone and Grazing
9.	Kahu C9	Compensatory Afforestation	2016-17	Dalauna	Khadar	Nerwa	5	4.2	2123	30°55'15.1"E 77°34'52.6" Northern	38.94	Fire prone and grazing
10.	Kiarla UPF	Compensatory Afforestation	2016-17	Kiarla	Kiarla	Nerwa	7	7.4	1897	30°49'50.6"N 77°43'46.3"E N-NE	53.56	Grazing, Pressure





#### 4.5.2 Rohru Forest Division:

In Rohru Forest Division, there were 04 sites having the total area 30.0 ha for the period 2016-17 under the CAT PLAN, Out of 04 sites, 02 sites were taken for the evaluation covering the area of 10.0 ha. Whereas, 05 sites having the total area 57.0 ha for the period 2016-17 under the Compensatory Afforestation, all sites were taken for the evaluation. During 2017-18, there were 04 sites having the total area 29.0 ha under the CAT PLAN, Out of 04 sites, 02 sites were taken for the evaluation covering the area of 15.0 ha. Whereas 10 sites having the total area 142.47 ha for the period 2017-18 under the Compensatory Afforestation, Out of 10 sites, 07 sites were taken for the evaluation. During 2018-19, there were 02 sites having the total area 32.04 ha for the period 2018-19 under the Compensatory Afforestation, both sites were taken for the evaluation as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.54**.

Plantations evaluated during the year 2016-17 under the scheme CAT PLAN, survival in both sites was below observed below and during 2017-18, survival in 50.0% and 50.0% plantation site was below average and average, respectively. Under the scheme Compensatory Afforestation, during 2016-17, survival in 40.0%, 20.0%, 20.0% and 20.0%, plantation site was below average, average, good and very good, respectively. During 2017-18, survival in 71.43% and 28.57, plantation site was below average and average, respectively and during 2018-19, survival in 50.0% and 50.0%, plantation site was below average and good, respectively. The detail of survival in various sites is given in **Table-4.55**:





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**Table-4.55: Plant Survival of various years in Rohru Forest Division**

S. No.	Year of Plantation	Survival Category				Total
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A]</b>	<b>CAT PLAN</b>					
1.	2016-17	100%	-	-	-	2
2.	2017-18	50.0%	50.0%	-	-	2
<b>B]</b>	<b>COMPENSATORY AFFORESTATION</b>					
1.	2016-17	40.0%	20.0%	20.0%	20.0%	5
2.	2017-18	71.43%	28.57%	-	-	7
3.	2018-19	50.0%	-	50.0%	-	2

The weighted average survival for plantations raised under CAT PLAN during the year 2016-17 and 2017-18 was 18.94% and 32.90. Whereas, under the scheme 2016-17, 2017-18 and 2018-19, weighted average was 36.33%, 23.56% and 35.95%, respectively. The detail of survival of plant species in various years is given in **Table-4.56:**

**Table-4.56: Weighted Average of Survival in various sites of Rohru Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>CAT PLAN</b>		
1.	2016-17	02	<b>18.94</b>
2.	2017-18	02	<b>32.90</b>
<b>B].</b>	<b>COMPENSATORY AFFORESTATION</b>		
1.	2016-17	05	<b>36.33</b>
2.	2017-18	07	<b>23.56</b>
3.	2018-19	02	<b>35.95</b>
	<b>TOTAL</b>	<b>18</b>	





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The growth performance of the species viz., *Abies pindrow*, *Aesculus indica*, *Cedrus deodara*, *Hedychium spicatum*, *Juglans regia*, *Melia azadirachta* and *Prunus cornuta* etc. was better in some of the plantation sites. However, species like *Cedrus deodara*, *Prunus armeniaca*, *Prunus mira*, *Quercus oblongata* and *Saussurea costus* did not performed well in some of the plantation sites. The low survival percentage in some of the site was due to plantation areas having vigorous growth of bushes especially *Circium* sp. and *Indigofera* sp. Hence removal of bushes is required to ensure fast growth of species planted. Plantation and aftercare, forest fires, grazing pressure, and damage of the plants by wild animals.





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**Table-4.54: Division-wise Details of the Plantation Sites including GPS Coordinates of Rohru Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (ha.)		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1.	Shalgi Thach	CAT PLAN	2016-17	Gawas	Gawas	Rohru	5	5	2822	31°21'39.6"N 76°21'51.4"E NW	26.8	Labor problem, Grazing
2.	Sungri	CAT PLAN	2016-17	Ghirma	Summerkot	Rohru	5	7.43	2915	31°18'8.8"N 77°40'9.1"E North West	11.08	-
3.	UPF Malog I <sup>st</sup>	Compensatory Afforestation	2016-17	Ravingarh	Chajjpur	Saraswati Nagar	5	3.57	1554	31°05'33.3"N 77°45'56.5"E North East	Nil	-
4.	UPF-Jabbal	Compensatory Afforestation	2016-17	Chirgaon	Khashadhar	Khashadhar	10	9.9	2675	31°23'50.9"N 76°52'14.3"E NE	47.63	Grazing, Bush infestation
5.	Jakha-D	Compensatory Afforestation	2016-17	Jakha	Dodra Kwar	Rohru	8	7	2946	31°14'42.36"N 78°5'8.05"E SE	72.0	Some portion of site is having slightly grazing Pressure





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6.	UPF Kuthara	Compensatory Afforestation	2016-17	Kuthara	Rohru	Rohru	15	16.7	2331	31°16'0.07"N 77°45'0.05"E South West	1.09	Sampling
7.	UPF Shirola	Compensatory Afforestation	2016-17	Mandal	Mandal	Saraswati Nagar	20	23.7	2671	31°07'15.8"N 77°48'0.72"E South East	51.91	Sampling
8.	Bagi	CAT PLAN	2017-18	Bagi	Gawas	Rohru	5	5.1	2225	31°18'25.7"N 76°47'08.7"E Western	39.3	Fire and encroachment
9.	UPF Khalargi	CAT PLAN	2017-18	Machoti	Summerkot	Rohru	10	11	2215	31°15'0.6"N, 077°42'55.2"E South West	29.7	--
10	UPF Koti	Compensatory Afforestation	2017-18	Naksteli	Tikkar	Tikkar	20	26	2025	31°14'22.3"N, 77°39'52.9"E South West	1.04	--
11	UPF- Janglikh	Compensatory Afforestation	2017-18	Tangnu- Janglikh	Chirgaon	Khashadhar	16.36	21	2745	31°19'04.2"N 78°0'31.7"E Western	24.00	Grazing and stolen fence
12	Khabal	Compensatory Afforestation	2017-18	Sindasli	Khashadhar	Khashadhar	10	7	2653	31°15'41.7"N 77°55'04.8"E Western	45.60	Grazing
13	UPF- Dhara	Compensatory Afforestation	2017-18	Lower Koti	Gawas	Rohru	15.71	13	1914	31°19'06.2"N 76°29'38.8"E NW	46.70	Fire, Steep slope
14	UPF- Atgaon	Compensatory Afforestation	2017-18	Kharshali / Jakhnoti	Larot/ Chirgaon	Khashadhar	10	7.7	2861	31°17'53.05"N 77°51'42.26" SE	11.0	High grazing Pressure







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15	Jakha-C	Compensatory Afforestation	2017-18	Jakha	Dodra Kwar	Rohru	19.59	16.34	3108	31°16'31.00"N 78°04'54.17"E NE	24.11	Grazing pressure and Fire Problem
16	UPF Niltithach	Compensatory Afforestation	2017-18	Kharshali	Larot	Khasha-dhar	7.4	6.67	2513	31°12'21.38"N 77°56'25.08"E NW	20.09	-
17	UPF-Raigad	Compensatory Afforestation	2018-19	Jiskun/Jakha	Jakha	Dodra Kwar	18.73	15	2788	31°13'42.93"N 78°05'4.16"E SE	61.5	Grazing pressure
18	UPF Kashkandi	Compensatory Afforestation	2018-19	Kuthara	Rohru	Rohru	13.31	12.76	2186	31°15'9.4"N 77°44'47.4"E North East	Nil	--





#### 4.5.3 Shimla Forest Division:

In Shimla Forest Division, there were 05 sites having the total area 38.5 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 05 plantation sites, 02 sites having the total area 18.0 ha were taken for the evaluation. Whereas, there was 02 plantation sites having the total area 200 ha under the scheme Net Present Value (NPV) and both were taken for evaluation. During 2017-18, there were 02 sites having the total area 20.02 ha under the Compensatory Afforestation and both plantation sites were taken for the evaluation. Whereas, 03 sites having the total area 120 ha under the scheme Net Present Value. All 03 plantation sites were taken for the evaluation. During 2018-19, there was 01 site having the total area 10.0 ha under the scheme Compensatory Afforestation and same site were taken for the evaluation. Whereas, 05 sites having the total area 40.0 ha under the scheme Net Present Value. Out of 05 sites, 02 sites covering the total area 15 ha were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.57**.

One Plantation site of each year during the year 2016-17, 2017-18 and 2018-19 was evaluated under the scheme Compensatory Afforestation, survival in each site of each year was average. Whereas, 02 plantation sites were evaluated under the scheme NPV, during the year 2016-17, survival in both sites were observed below average. During 2017-18, survival in 33.33% and 66.67% Plantations site was below average and average, respectively and during 2018-19, survival in 50.0% and 50.0% plantation site was below average and average, respectively. The detail of survival in various sites is given in **Table-4.58**:





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**Table-4.58: Details of Survival in various sites of Shimla Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1	2016-17	-	100%	-	-	2
2	2017-18	-	100%	-	-	2
3.	2018-19	-	100%	-	-	1
<b>B].</b>	<b>NPV</b>					
1	2016-17	100%	-	-	-	2
2.	2017-18	33.33%	66.67%	-	-	3
3.	2018-19	50.0%	50.0%	-	-	2

The weighted average survival for plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 37.95%, 35.44% and 41.54%, respectively. Whereas, plantations raised under the NPV during the year 2016-17, 2017-18 and 2018-19, weighted average was 06.0%, 30.0% and 33.97%, respectively. The detail of survival of plant species in various years is given in **Table-4.59**.

**Table-4.59: Weighted Survival of various years in Shimla Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	02	<b>37.95</b>
2.	2017-18	02	<b>35.44</b>
3.	2018-19	01	<b>41.54</b>
<b>B].</b>	<b>NPV</b>		
1.	2016-17	02	<b>06.00</b>
2.	2017-18	03	<b>30.00</b>
3.	2018-19	02	<b>33.97</b>
	<b>TOTAL</b>	<b>12</b>	





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The growth performance of the species viz., *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Grewia optiva*, *Psidium guajava*, *Punica granatum*, *Pyrus pashia*, *Quercus oblongata*, *Robinia pseudoacacia*, *Syzygium cumini* and *Terminalia bellirica* etc. was better in some of the plantation sites. However, species like *Acacia catechu*, *Albizia lebbek*, *Bauhinia variegata*, *Dalbergia sissoo*, *Phyllanthus emblica*, *Grevillea robusta*, *Grewia optiva*, *Jakaranda mimosifolia*, *Juglans regia*, *Melia azedarach*, *Morus alba*, *Prunus armeniaca*, *Prunus cerasoides*, *Punica granatum*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* did not performed well in some of the plantation sites. The low survival percentage in some of the site was due to fire, drought and infestation of *Lantana camara*. The most of the plantation sites were well fenced however, in very few sites fencing was damaged.





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**Table-4.57: Details of the Plantation Sites including GPS Coordinates of Shimla Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	U-268 Jhandi, Chikkar	Compensatory Afforestation	2016-17	Karoli	Koti	Koti	8	8.15	1355	30°59'24.1"N, 77°18'44.8"E Eastern	40.05	--
2.	U-277 Katin Majhar	Compensatory Afforestation	2016-17	Mundaghat	Indira	Koti	10	12.12	1344	30°59'56.7"N 77°18'19.3"E South East	36.27	--
3.	Lunsu Mungna Plantation through ETF	NPV	2016-17	Kadarghat	Khatnol	Sunni	120	47	1475	31°13'07.08"N 77°11'46.61"E SW	Nil	Grazing pressure and carriage is difficult
4.	U-47 Jajhed Plantation through ETF	NPV	2016-17	Kadarghat	Khatnol	Sunni	80	126	1280	31°12'21.88"N 77°12'18.68"E NW	15.0	Fire prone area and carriage is difficult
5.	UF-36 Mandorghat	Compensatory Afforestation	2017-18	Mandorghat	Suni	Bhajji	3.5	3.9	1128	31°14'43.23"N 77°03'31.3"E E & SE	32.67	forest fire





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6.	U-22 Palag	Compensatory Afforestation	2017-18	Kadharghat	Khatnol	Bhajji	16.52	16.73	1329	31°13'33.03"N 77°12'46.62"E NW	36.03	Grazing and carriage problem
7.	UPF Jahakri Sarmana	NPV	2017-18	Badoo	Ghanahatti	Dhami	4.0	4.27	1470	31°08'42.84"N 77°02'38.56"E SE	26.25	Grazing pressure and carriage is difficult
8.	UPF Dhedog	NPV	2017-18	Okhroo	Halog	Dhami	8.0	3.71+3.9 4=7.65	1120	31°12'19.32"N 77°02'06.81"E SE	31.87	Grazing pressure and carriage is difficult
9.	U-47 Jhajed	NPV	2017-18	Khadhar	Khatnol	Bhajji	100	19.94	1330	31°12'23.9"N 77°12'21.0"E NW	31.79	--
10.	U-494 Okhroo Madya	Compensatory Afforestation	2018-19	Okhroo	Halog	Dhami	10	11.48	1085	31°12'20.81"N 77°00'32.81"E S & NW	41.54	Grazing and carriage problem
11.	U-268 Jhandi Dumehar	NPV	2018-19	Karoli	Koti	Koti	10	12.12	1385	30°58'20.7"N, 077°16'15.8"E North East	36.25	--
12.	U-578 Jud Judlu	NPV	2018-19	Chanawag	Suni	Bhajji	5	5.76	1426	31°17'58.6"N 76°47'12.7"E NW	29.40	Damage due to stray animals





#### 4.5.4 Theog Forest Division:

In Theog Forest Division, there were 02 plantation sites having the total area 17.29 during the year 2016-2017 under the scheme Compensatory Afforestation and the same sites were taken for evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.60**.

02 Plantation site was evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in both sites was good and during 2017-18, survival in 50.0% and 50.0% site was average and good, respectively. The detail of survival in various sites is given in **Table-4.61**:

**Table-4.61: Details of Survival in various sites of Theog Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	-	-	100%	-	2
2.	2017-18	-	50.0%	50.0%	-	2

The weighted average survival for the plantations evaluated during the year 2016-17 and 2017-18 under the scheme Compensatory Afforestation was 63.25% and 43.15%, respectively. The detail of survival of plant species in various years is given in **Table-4.62**:

**Table-4.62: Weighted Average Survival of various year in Theog Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	02	63.25
2.	2017-18	02	43.15
	<b>Total</b>	<b>04</b>	





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The growth performance of the species viz., *Cedrus deodara*, *Punica granatum*, *Quercus oblongata* and *Robinia pseudoacaciaa* etc. was better in all the plantation sites. The low survival percentage in some of the site was due to fire, grazing and drought. All the plantation sites were well fenced however, in some places fencing was damaged.







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**Table-4.60: Details of the Plantation Sites including GPS Coordinates of Theog Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	U-318 Riyog	Compensatory Afforestation	2016-17	Kalanj	Cheog	Theog	6.156	5.46	2116	31°05'38.9"N 77°19'22.2"E Eastern	60.65	-
2.	U-362 Deothi (Cheog)	Compensatory Afforestation	2016-17	Kuthar	Ghorna	Balsan	5	4.42	1669	31°00'45.9"N 77°25'9.3"E Eastern	66.45	-
3.	U-299 Aloti	Compensatory Afforestation	2017-18	Dharech	Cheog	Theog	2.39	5.62	1261	31°00'13.4"N 77°20'31.1"E South East	54.56	-
4.	U-490 Chanodhar	Compensatory Afforestation	2017-18	Himri	Gohach	Kotkhai	10.62	8.31	2282	31°08'23.3"N 77°27'50.4"E South East	40.59	-





#### 4.6 CHAMBA FOREST CIRCLE:

In this Forest Circle, plantation sites of Bharmour, Chamba, Churah and Dalhousie Forest Division were evaluated as given below:

##### 4.6.1 Bharmour Forest Division:

In Bharmour Forest Division, there were 53 sites having the total area 460 ha for the period 2016-17 under the scheme CAT PLAN. Out of 53 sites, 22 sites having the total area 169 ha were taken for the evaluation. Whereas, 03 sites having the total area 15.8 ha under the scheme Compensatory Afforestation. All 03 sites were taken for evaluation. During 2017-18, there were 41 sites having the total area 292 ha under the scheme CAT PLAN. Out of 41 sites, 13 sites having the total area 88 ha were taken for the evaluation. Whereas, 01 site having the total area 4.5 ha under the scheme Compensatory Afforestation and same was taken for evaluation. During 2018-19, there were 40 sites having the total area 258 ha under the scheme CAT PLAN. Out of 40 sites, 13 sites having the total area 71 ha were taken for the evaluation. Whereas, 01 site having the total area 05 ha under the scheme Compensatory Afforestation and same was taken for evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.63**.

Plantations evaluated during the year 2016-17 under the scheme **Compensatory Afforestation**, survival in 66.67%, 33.33% plantation sites were average and good, respectively and during 2017-18 survival in one site was good and similarly, during 2018-19, survival in one site was recorded average.

Whereas, plantations raised under the **CAT PLAN** during the year 2016-17, survival in 36.36%, 54.55% and 09.09% plantation site was below average, average and good, respectively and during the year 2017-18, survival in 15.38%, 61.54% and 23.08% plantation sites was below average, average and good, respectively. During 2018-19, survival in





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15.38%, 53.85% and 30.77% plantation site was below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.64:**

**Table-4.64: Details of Survival in various sites of Bharmour Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	-	66.67%	33.33%	-	<b>3</b>
2.	2017-18	-	-	100%	-	<b>1</b>
3.	2018-19	-	100%	-	-	<b>1</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	36.36%	54.55%	09.09%	-	<b>22</b>
2.	2017-18	15.38%	61.54%	23.08%	-	<b>13</b>
	2018-19	15.38%	53.85%	30.77%	-	<b>13</b>

The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 51.32% and 62.0% and 31.81%, respectively. Whereas, plantations raised under CAT PLAN during the year 2016-17, 2017-18 and 2018-19, survival was 32.22%, 43.20% and 40.44%, respectively. The detail of survival of plant species in various years is given in **Table-4.65:**

**Table-4.65: Weighted Average Survival of various years in Bharmour Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	03	51.32
2.	2017-18	01	62.0
3.	2018-19	01	31.81





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<b>B.</b>	<b>CAT PLAN</b>		
1	2016-17	22	32.22
2	2017-18	13	43.20
3	2018-19	13	40.44
	<b>Total</b>	<b>53</b>	

The growth performance of the species like *Aesculus indica*, *Ailanthus excelsa*, *Cedrus deodara*, *Juglans regia*, *Melia azedarach*, *Pinus wallichiana*, *Populus deltoides*, *Prunus armeniaca*, *Quercus ilex* and *Robinia pseudoacacia* etc. was better in most of the plantation sites. However, species like *Aesculus indica*, *Cedrus deodara*, *Juglans regia*, *Prunus armeniaca*, *Prunus persica* and *Robinia pseudoacacia* etc. did not performed in some of the plantation sites. The low survival percentage in some of the site was due to damage caused by grazing, steep slope, drought and forest fire. Low survival was also due to thick growth of bushes and weeds in most of the plantation sites. The most of the plantation sites were well fenced however, in some sites fencing was found in damaged condition.





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**Table-4.63: Details of the Plantation Sites including GPS Coordinates of Bharmour Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Hilling RF Part	CAT PLAN	2016-17	Chanail	Lamu	Tretha	8	6.9	1680	32°22'28.1"N 76°30'35.5"E N	49.23	--
2.	Bharari DPF	CAT PLAN	2016-17	Chanail	Lamu	Tretha	10	9.9	2395	32°23'11.1"N 76°30'42.2"E SW	45.15	--
3.	Digu	CAT PLAN	2016-17	Runukothi	Runukothi	Swai	5	5.9	2670	32°26'15.2"N 76°24'62.7"E Southern	63.6	Fire and Damage by stray animals
4.	Siya	CAT PLAN	2016-17	Chhanouta	Chhanouta	Swai	5	5.6	2248	32°22'60.0"N 76°29'0.16"E N	32.96	Grazing pressure
5.	Kalrani	CAT PLAN	2016-17	Swai	Garola	Swai	5	6.3	2637	32°25'74.6"N 76°28'32.14"E NE	36.36	Steep slope
6.	Palani	CAT PLAN	2016-17	Digu	Banni	Swai	5	5.2	2763	32°30'40.8"N 76°29'36.8"E W	31.27	Glacier prone area and grazing





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7.	Damari Dhar	CAT PLAN	2016-17	Nayagran	Bara Bhancho	Tretha	10	12.80	3549	32°15.7690'N 76°38.6937'E Southern	5.21gm/m <sup>2</sup>	Fire, grazing and damage by wild animals
8.	Riyali Dhar	CAT PLAN	2016-17	Nayagran	Bara Bhancho	Tretha	10	9.50	3609	32°15.5877'N 76°38.3263'E Southern	5.73gm/m <sup>2</sup>	Damage by stray animals
9.	Khandyala Dhar	CAT PLAN	2016-17	Yada	Bara Bhancho	Tretha	10	9.20	2831	32°13'13.49"N 76°40'48.16"E Southern	5.01gm/m <sup>2</sup>	Damage by wild animals
10	Dali kuttla	CAT PLAN	2016-17	Lamu	Lamu	Tretha	12	9.84	3513	32°20.3633'N 76°29.8490'E Southern	5.60gm/m <sup>2</sup>	Fire and grazing
11	Khiyogdi	CATPLAN	2016-17	Sirdi	Sandi	Bharmour	5	5.47	2403	32°30'02.9"N 76°29'10.7"E NE	Nil	Fire prone
12	Phat	CAT PLAN	2016-17	Chobia	Sandi	Bharmour	5	5.24	2325	32°28'43.81"N 76°29'69.7"E Southern	10	Grazing and landslide prone
13	Mando	CAT PLAN	2016-17	Chobia	Sandi	Bharmour	5	5.44	2406	32°29'50.80"N 76°34'11.5"E Southern	47	Fire prone and grazing
14	Topi Goth	CAT PLAN	2016-17	Pranghalla	Sandi	Bharmour	8	8	3282	32°26'06.31"N 76°35'22.67"E Southern	Nil	Grazing
15	Kanjralla Dhar	CAT PLAN	2016-17	Bharmour	Sandi	Bharmour	8	7.7	3171	32°25'45.3"N 76°30'48.7"E South West	Nil	Damage by wild animal





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16	Moru	CAT PLAN	2016-17	Gharadu	Bharmour	Bharmour	5	3.49	2392	32°26'41.2"N 76°31'03.8"E NW	23.96	Fire and grazing by animals
17	Drobi	CAT PLAN	2016-17	Bharmour	Bharmour	Bharmour	5	4.61	2774	32°25'41.2"N 76°32'16.9"E NE	18.64	Carriage, grazing and browsing pressure.
18	Jutta Dhar	CAT PLAN	2016-17	Sutkar	Holi	Tretha	12	18.77	3070	32°18'08.67"N 76°31'18.57"E	5.21gm/m <sup>2</sup>	Fire, grazing and damage by wild animals
19	Sarod Dhar	CAT PLAN	2016-17	Deol	Holi	Tretha	10	9.43	3151	32°17'02.10"N 76°34'21.11"E	5.73gm/m <sup>2</sup>	Damage by stray animals
20	Guwar-II	CAT PLAN	2016-17	Deol	Holi	Tretha	8	8.0	2607	32°18'01.82"N 76°33'48.16" E Eastern	57.62	Grazing pressure
21	Kuthed DPF-II	CAT PLAN	2016-17	Sutkar	Holi	Tretha	10	12.0	2165	32°20'31.9"N 076°31'24.6"E North Eastern	49.09	Grazing pressure
22	Oie Nala DPF	CAT PLAN	2016-17	Tiyari	Holi	Tretha	8	17.58	1843	N32°20'54.0, 076°32'46.1"E Western	34.51	Grazing pressure
23	Sutkar	Compensatory Afforestation	2016-17	Sutkar	Holi	Tretha	10	9.9	2417	N32°19'32.2" 076°31'30.6" E North Eastern	60.13	Grazing pressure
24	Chakratha	Compensatory Afforestation	2016-17	Lahal	Bharmour	Bharmour	5	4.8	1563	32°27.864"N 76°28.920E Northen	45	Grazing, Fire prone and landslide prone





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25	Rahela	Compensatory Afforestation	2016-17	Lahal	Bharmour	Bharmour	5	4.94	1899	32°27'01.8"N 76°29'56.2"E NorthWest	40	landslide prone and Damage by stray animals
26	Sureshi DPF	CAT PLAN	2017-18	Surehi	Barabancho	Tretha	10	18.7	2482	32°16'30.7"N 76°40'57.4"E NW	68.0	--
27	Sindhi DPF	CAT PLAN	2017-18	Bajol	Barabancho	Tretha	10	8.7	3852	32°16'36.6"N 76°40'25.9"E Western	35.0	--
28	Sua DPF	CAT PLAN	2017-18	Chanail	Lamu	Tretha	10	14.2	2285	32°23'28.8"N 76°20'22.2"E SW	45.46	
29	Banoi	CAT PLAN	2017-18	Runukothi	Runukothi	Swai	5	4.5	2673	32°25'45"N 76°24'60.7E Northen	57.2	Grazing pressure
30	Lunighar	CAT PLAN	2017-18	Chhanouta	Chhanouta	Swai	5	5.2	2375	32°22'22.6"N 76°29'69.7"E N	52.7	Fire prone
31	Basanda	CAT PLAN	2017-18	Swai	Garola	Swai	5	5	2595	32°25'23.07"N 76°28'34.1"E SE	48.18	Grazing
32	Chanjoti	CAT PLAN	2017-18	Garola	Garola	Swai	5	5.2	2702	32°26'24.8"N 76°26'56.3"E NE	32.27	Very steep slope
33	Toni Mata Mandir	CAT PLAN	2017-18	Sirdi	Sandi	Bharmour	5	5.3	2494	32°28'11.9"N 76°31'30.9"E N	35.0	Fire prone and grazing







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34	Farku	CAT PLAN	2017-18	Hadser	Sandi	Bharmour	5	6.1	2078	32°27'21.97"N 76°26'55.05"E Northern	30.0	Grazing and landslide prone
35	Thalla	CAT PLAN	2017-18	Chobia	Sandi	Bharmour	5	5.24	2796	32°28'11.75"N 76°349'29.78"E Southern	15.0	Bushy and grazing
36	Bero	CAT PLAN	2017-18	Siunr	Bharmour	Bharmour	3	3.34	1951	32°25'44.6"N 76°29'38.0"E Southern	16.36	Heavy grazing pressure and high risk of land slide.
37	Kuir DPF	CAT PLAN	2017-18	Deol	Holi	Tretha	10	9.8	2793	32°16'45.1"N 076°34'045.8"E Eastern	43.76	Grazing pressure
38	Seri DPF	CAT PLAN	2017-18	Tiyari	Holi	Tretha	10	12.1	2697	N32°21'31.3" 076°34'24.0" E Eastern	47.82	Grazing pressure
39	Naini Nalla	Compensatory Afforestation	2017-18	Sirdi	Bharmour	Bharmour	4.5	4.7	2612	32°28'08.1"N 76°30'29.8"E Southern	62.0	Grazing and fire
40	Bajoli DPF	CAT PLAN	2018-19	Bajol	Barabancho	Tretha	7	5.5	2309	32°17'43.5"N 76°40'14.0"E SW	32.4	--
41	Khol	CAT PLAN	2018-19	Banog	Lamu	Tretha	5	5.9	1735	32°22'06.0"N 76°31'08.0"E SW	55.1	
42	Dugh	CAT PLAN	2018-19	Chanail	Lamu	Tretha	10	10.9	1953	32°23'02.1"N 76°30'35.1"E Southern	64.0	
43	Guwad	CAT PLAN	2018-19	Runukothi	Runukothi	Swai	5	5.2	1739	32°28'04.82"N 76°25'59.09"E Western	47.27	Grazing pressure





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44	Chobu	CAT PLAN	2018-19	Ulansa	Garola	Swai	5	5.7	2187	32°27'18.79"N 76°26'55.4"E NW	34.5	Grazing pressure
45	Gudagar	CAT PLAN	2018-19	Chobia	Sandi	Bharmour	5	6.13	2385	32°27'38.25"N 76°34'20.62"E Southern	42.0	Grazing
46	Charangadi	CAT PLAN	2018-19	Gharadu	Bharmour	Bharmour	5	5	2360	32°26'31.0"N 76°30'3832.5"E NE	33.36	Fire prone area, heavy grazing pressure.
47	Changuie Peda	CAT PLAN	208-19	Lahal	Bharmour	Bharmour	5	5.21	1608	32°27'29.1"N 76°21'40.3"E Northern	20.45	Long carriage distance from roadside and grazing pressure.
48	Goth	CAT PLAN	2018-19	Arki	Bharmour	Bharmour	5	4.95	1533	32°26'20.3"N 76°28'24.1"E Southern	16.55	Fire and Drought prone area.
49	Baldi	CAT PLAN	2018-19	Tiyari	Holi	Tretha	10	11.79	1837	32°20'46.0" N 076°32'37.3"E Western	37.27	Grazing pressure
50	Majharan	CAT PLAN	2018-19	Sutkar	Holi	Tretha	5	5.1	1802	32°18'44.2"N 076°32'42.2"E Eastern	34.58	Grazing pressure
51	Jabal	CAT PLAN	2018-19	Deol	Holi	Tretha	1	1.3	1810	32°19'37.4" N 076°33'31.9"E Northern	55.45	Grazing pressure
52	Kelang Marhi	CAT PLAN	2018-19	Sutkar	Holi	Tretha	3	7.1	2338	32°19'39.5" N 076°31'20.7" E North Western	52.60	Grazing pressure
53	Sulia	Compensatory Afforestation	2018-19	Runukothi	Runukothi	Swai	5	5.5	1851	32°28'35.3"N 76°25'58.5"E Western	31.81	Grazing pressure





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### 4.6.2 Chamba Forest Division:

In Chamba Forest Division, there were 06 sites having the total area 50.0 ha for the period 2016-17 under the scheme CAT PLAN. Out of 06 sites, 03 sites covering the total area 20 ha were taken for the evaluation. During 2017-18, there were 02 sites having the total area 12 ha under the scheme Compensatory Afforestation. Both sites were taken for evaluation. Whereas, 01 plantation site having the total area 10 ha for the year 2017-18 under the scheme CAT PLAN were taken for evaluation. During 2018-19, there were 07 numbers of sites having the total area 32 ha under the scheme NPV. Out of 07 sites, 04 sites covering the total area 17 ha were taken for evaluation. Whereas, 04 number of sites having the total area 35 ha under the scheme CAT PLAN for the year 2018-19. Out of 04 sites, 02 sites covering the total area 15 ha were taken for evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.66.**

Plantations evaluated during the year 2017-18 under the scheme Compensatory Afforestation, survival in 50.0% and 50.0% sites were good and very good, respectively. Under the scheme CAT PLAN, during 2016-17, survival in 66.67% and 33.33% sites was below average and good, respectively. During 2017-18 and 2018-19 one plantation site was evaluated of each year, survival was below average of both year. Under the scheme NPV, during 2018-19, survival in 25.0%, 25.0 and 50.0% sites were below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.67:**





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**Table-4.67: Details of Survival in various sites of Chamba Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2017-18	-	-	50.0%	50.0%	<b>02</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	66.67%	-	33.33%	-	<b>03</b>
2.	2017-18	100%	-	-	-	<b>01</b>
	2018-19	100%	-	-	-	<b>02</b>
<b>C].</b>	<b>NPV</b>					
1.	2018-19	25.0%	25.0%	50.0%	-	<b>04</b>

The weighted average survival for the plantations evaluated during the year 2017-18 under the scheme Compensatory Afforestation was 66.92%. Whereas, plantations raised under CAT Plan during the year 2016-17, 2017-18 and 2018-19 survival was 15.04, 05.90 and 06.09, respectively. Under the scheme NPV, during 2018-19, weighted average was 34.91%. The detail of survival of plant species in various years is given in **Table-4.68:**

**Table-4.68: Weighted Average Survival of various forests in Chamba Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1	2017-18	02	66.92
<b>B].</b>	<b>CAT PLAN</b>		
1.	2016-17	03	15.04
2.	2017-18	01	05.90
3.	2018-19	02	06.09
<b>C].</b>	<b>NPV</b>		
1.	2018-19	04	34.91
	<b>TOTAL</b>	<b>12</b>	





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The growth performance of the species viz., *Cedrus deodara*, *Dalbergia sissoo*, *Melia azedarach*, *Phyllanthus emblica*, *Quercus oblongata*, *Robinia pseudoacacia* and *Sapindus mukorossi* etc. was better in the plantation sites. However, in some of the sites species like *Aesculus indica*, *Bauhinia variegata*, *Dendrocalamus strictus*, *Grevillea robusta*, *Grewia optiva*, *Melia azadarach*, *Pinus wallichiana*, *Quercus oblongata*, *Robinia pseudoacacia*, *Sapindus mukprossi*, *Terminalia bellirica* and *Toona ciliata* did not respond well. The low survival percentage in some of the sites was due to fire, grazing and drought. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.66: Details of the Plantation Sites including GPS Coordinates of Chamba Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Shuklu	CAT PLAN	2016-17	Chanju	Chanju	Tikri	5.0	6.6	2346	32°44'00.8"N 76°16'03.7"E North-Western	55.96	Grazing pressure
2.	Bhangori	CAT PLAN	2016-17	Sundari	Chanju	Tikri	5.0	5.5	1715	32°43'19.5"N 76°15'04.3"E Eastern	4.21	Fire prone area and grazing pressure
3.	Khareu	CAT PLAN	2016-17	Bhagei	Chanju	Tikri	10.0	9.8	1962	32°45'47.7"N 76°16'13.1"E Eastern	-	Tough terrain
4.	Sulah	CA	2017-18	Kalandra	Bakni	Upper Chamba	6.5	3.08	1461	32°28'39.10"N 076°15'00.72" Eastern	78.80	Fire prone area, grazing and long dry spell during summer months.
5.	Karian DPF	CA	2017-18	Shamdhar	Chamba	Lower Chamba	5.5	11.02	1429	32°31'54.75"N 076°09'14.32" Southern	52.87	Heavily fire prone area. Grazing pressure and high risk of land slide





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6.	Msrot	CAT PLAN	2017-18	Bhagai	Chanju	Tikri	10	9.14	1720	32°45.1064'N 76°17.022'E	5.90	Fire, grazing and damage by wild animals
7.	Dugli DPF	NPV	2018-19	Dugli	Masroond	Masroond	5.0	6.93	909	32°44'01.46"N 076°06'09.72" W	50.80	Heavily fire prone area. Grazing pressure and high risk of land slide.
8.	Draman DPF	NPV	2018-19	Sarodi	Chamba	Lower Chamba	2.0	1.9	950	32°33'45.8"N 76°06'41.4"E Northen	53.20	-
9.	Bhania DPF	NPV	2018-19	Chhabaru	Chabaru	Lower Chamba	5.0	7.1	1105	32°30'58.6"N 76°08'46.4"E Western	-	Fire prone area
10	Meh DPF	NPV	2018-19	Kalandra	Bakani	Upper Chamba	5.0	9.0	1700	32°29'16.7"N 76°11'44.0"E Eastern	46.61	Grazing pressure and fire prone area
11	Dalotu	CAT PLAN	2018-19	Dantuin	Chanju	Tikri	07	6.44	2321	32°42'3"N 76°21'2"E	5.52	Damage by stray animals
12	Topi	CAT PLAN	2018-19	Sundri	Chanju	Tikri	08	6.55	1987	32°70.626'N 76°27.8611'E	6.59	Damage by wild animals





### 4.6.3 Churah Forest Division:

In Churah Forest Division, there were 07 sites having the total area 72 ha for the period 2016-17 under the NPV-Scheme. Out of 07 plantation sites, 03 sites having the total area 17 ha were taken for the evaluation. During 2018-19, there were 06 sites having the total area 62 ha funder the NPV-Scheme. Out of 06 plantation sites, 03 sites having the total area 30 ha were taken for the evaluation and monitored as per standard methodology. The detail of evaluation of plantation sites is given in **Table-4.69**.

Plantations evaluated during the year 2016-17 under the scheme NPV, survival in 66.67% and 33.33% sites were below average and average, respectively. Similarly, during 2018-19, survival in 66.67% and 33.33% sites were below average and average, respectively. The detail of survival in various sites is given in **Table-4.70**:

**Table-4.70: Details of Survival in various sites of Churah Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>NPV</b>					
<b>1.</b>	2016-17	66.67%	33.33%	-	-	<b>3</b>
<b>2.</b>	2018-19	66.67%	33.33%	-	-	<b>3</b>

The weighted average survival for the plantations evaluated during the year 2016-17 and 2018-19 under the scheme NPV was 12.02% and 23.97%. The detail of survival of plant species in various years is given in **Table-4.71**:







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**Table-4.71: Weighted Average Survival of various years in Churah Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A.	NPV		
1.	2016-17	03	12.02
2.	2018-19	03	23.97
	<b>Total</b>	<b>06</b>	

The growth performance of the species viz., *Sapindus mukorossi*, *Bauhinia variegata* and *Dalbergia sissoo* was better in some the plantation sites. However, species like *Melia azedarach*, *Sapindus mukorossi*, *Syzygium cumini* and *Toona ciliata* did not perform well in some of the sites. The low survival percentage in some of the site was due to damage caused by fire, grazing, growth of bushes and low moisture retention capacity. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.69: Division-wise Details of the Plantation Sites including GPS Coordinates of Churah Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Matodu	NVP	2016-17	Wangal	Bhalei	Bhalei	2	3.70	1175	32°37'14.22"N 75°59'16.05"E Eastern	32.70	Heavy grazing pressure, Lantana infestation and long dry spell.
2.	Badhel DPF	NPV	2016-17	Bhalei	Bhalei	Bhalei	5	3.92	999	32°37'23.12"N 75°59'57.41"E SE	27.80	Heavy land slide due to road construction. Fire prone, grazing and Long dry spell during summer months.
3.	Parchi DPF	NPV	2016-17	Smah	Bhunad	Bhalei	10	11.94	1051	32°36'54.8"N 75°56'09.4"E SW	Nil	Heavy Lantana infestation, Grazing pressure and Long dry spell.
4.	Bhalei DPF	NVP	2018-19	Bhalei	Bhalei	Bhalei	15	15.99	934	32°37'46.05"N 76°00'27.18"E SE	Nil	F.I.R. has been lodged against fire burnt Bhalei DPF.





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5.	Badyundi	NVP	2018-19	Wangal	Bhalei	Bhalei	5	3.48	1241	32°36'12.36"N 75°57'34.10"E Southern	34	Heavy grazing pressure, Lantana infestation and fire prone area, long dry spell.
6.	Sarain DPF	NVP	2018-19	Smah	Bhunad	Bhalei	10	6.65	1344	32°37'50.86"N 75°57'23.92"E Western	18.95	Heavy grazing pressure and long dry spell.





#### 4.6.4 Dalhousie Forest Division:

In Dalhousie Forest Division, there were 02 sites having the total area 35.6 ha for the period 2016-17, under the Compensatory Afforestation, both sites were taken for the evaluation. During 2017-18, there were 02 sites having the total area 40 ha under the scheme NPV. Same sites were taken for the evaluation. During 2017-18, 04 sites having the total area 59 ha under the scheme CAT PLAN. Out of 04 sites, 02 sites having the total area 24 ha were taken for the evaluation. During 2018-19, there was 01 site having the total area 8.22 ha under the Compensatory Afforestation, and same was taken for the evaluation. Similarly, 01 site having the total area 5 ha for the period 2018-19 under the scheme NPV, and same site was taken for the evaluation. Whereas, 03 sites having the total area 9 ha for the period 2018-19 under the scheme CAT PLAN, out of 03 plantation sites, 02 sites covering the area 04 ha were taken for the monitoring and evaluation. The details of evaluation of plantation sites are given in **Table-4.72**.

Plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in 50%, 25% and 25% sites were below average, average and very good respectively. During 2018-19, survival in one site was below average. Whereas, under the scheme CAT PLAN, 2017-18, survival in one site was good and during 2018-19, survival in 50% and 50%, plantation site was below average and good, respectively. Under the scheme NPV, during 2017-18, survival in one site was below average and during 2018-19, survival in one site was recorded good. The detail of survival in various sites is given in **Table-4.73**:





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**Table-4.73: Details of Survival in various sites of Dalhousie Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1	2016-17	50.0%	50.0%	--	--	<b>02</b>
2.	2018-19	100%	-	--	--	<b>01</b>
<b>B].</b>	<b>CAT PLAN</b>					
1	2017-18	-	--	100%	--	<b>02</b>
2	2018-19	50.0%	--	50.0%	--	<b>02</b>
<b>C].</b>	<b>NPV</b>					
	2017-18	100.0%	--		--	<b>02</b>
	2018-19	--	--	100%	--	<b>01</b>

The weighted average survival for the plantations evaluated during the year 2016-17 and 2018-19 under the scheme Compensatory Afforestation was 25.47% and 10.45, respectively. Whereas, plantations raised under CAT PLAN during the year 2017-18 and 2018-19, survival was 59.02 and 28.48%, respectively. Under the scheme NPV, during 2017-18 and 2018-19, survival was 04.88% and 62.8%, respectively. The detail of survival of plant species in various years is given in **Table-4.74**.

**Table-4.74: Weighted Survival of various years in Dalhousie Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
<b>1</b>	2016-17	02	25.47
<b>2</b>	2018-19	01	10.45
<b>B.</b>	<b>CAT PLAN</b>		
<b>1</b>	2017-18	02	59.02





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2	2018-19	02	28.48
<b>B.</b>	<b>NPV</b>		
1.	2017-18	02	04.88
2.	2018-19	01	62.80
	<b>Total</b>	<b>10</b>	

The growth performance of species viz; *Aesculus indica*, *Bauhinia variegata*, *Cedrus deodara*, *Dalbergia sissoo*, *Melia azedarach*, *Phyllanthus emblica*, *Punica granatum*, *Sapindus mukorossi*, *Syzygium cumini* and *Terminalia chebula* etc. was better in most of the plantation sites. However, species like *Acacia catechu*, *Albizia* sp., *Grewia tiliifolia*, *Mangifera indica*, *Morus alba*, *Pinus roxburghii*, *Punica granatum*, *Quercus oblongata*, *Sapindus mukorossi*, *Terminalia bellirica* and *Toona ciliata* etc. did not perform in some of the sites. The low survival percentage in some of the plantation sites was due to damage caused by infestation of *Lantana camara* and bushes. All the plantation sites were fenced with fencing posts.





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**Table-4.72: Details of the Plantation Sites including GPS Coordinates of Dalhousie Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude and Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Sundla	Compensatory Afforestation	2016-17	Awan	Kainthly	Chowari	20	24.16	1800	32°27'44"N 76°1'29"E	35.36	Fire, grazing and damage by wild animals
2.	Gandhiyar	Compensatory Afforestation	2016-17	Golly	Drada	Dalhousie	15.6	28.16	988	32°35'24"N 76°58'49"E	12.79	Damage by stray animals
3.	Jhanjroo	CAT PLAN	2017-18	Lower chakki	Raipur	Chowari	9	8.99	1440	32°26'38"N 76°3'15"E	53.98	Damage by wild animal
4.	Chafru Sipiyan da	CAT PLAN	2017-18	Manhuta	Manhuta	Chowari	15	17.78	1565	32°21'51"N 76°4'19"E	62.04	Fire, grazing and damage by wild animals
5.	DPF Mandhour Nag	NPV	2017-18	Lower chowari	Chowari	Chowari	20	20.79	1290	32°27'38"N 76°1'4"E	9.75	Fire and grazing





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6.	DPF Hutta Choura I	NPV	2017-18	Singi	Chaned	Dalhousie	10	15.18	1005	32°34'44"N 76°4'46"E	Nil	Fire and grazing
6.1	DPF Hutta Choura II	NPV	2017-18	Singi	Chaned	Dalhousie	10	10.98	940	32°35'44"N 76°5'10"E	Nil	Fire and grazing
7.	Godra	CAT PLAN	2018-19	Manhuta	Manhuta	Chowari	3	4.07	910	32°22'35"N 76°0'46"E	17.27	Fire, grazing and damage by wild animals
8.	Gumrahar	CAT PLAN	2018-19	Parsiyara	Manhuta	Chowari	1.0	1.28	1625	32°22'19"N 76°4'49"E	62.09	-
9.	Manmassi	Compensatory Afforestation	2018-19	Suhar	Sihunta	Bhattiyat	8.22	11.02	1340	32°20'45"N 76°6'27"E	10.45	Damage by wild animals
10.	Kaimbly	NPV	2018-19	Saloh	Raipur	Chowari	5	6.84	1220	32°24'40"N 76°1'18"E	62.8	Damage by wild animals







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### 4.7 DHARAMSHALA FOREST CIRCLE:

In this forest circle, plantation sites of Dharamshala, Nurpur and Palampur forest division were evaluated as given below:

#### 4.7.1 Dharamshala Forest Division:

In Dharamshala Forest Division, there was one site having the total area 15.62 ha for the period 2016-17 under the Compensatory Afforestation and site was taken for the evaluation. During 2017-18, there was one site having the total area 04 ha under the scheme NPV and same site was taken for the evaluation. During 2018-19, there was one site having the total area 2.0 ha under the scheme Compensatory Afforestation and same site was taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.75**.

One plantation site was evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in this site was average and during 2018-19, survival in one site was recorded good. Under the scheme NPV, during 2017-18, survival in one site was recorded average. The detail of survival in various sites is given in **Table- 4.76**:

**Table-4.76: Details of Survival in various sites of Dharamshala Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A.</b>	<b>Compensatory Afforestation</b>					
1.	<b>2016-17</b>	-	100%	-	-	<b>01</b>
2.	<b>2018-19</b>	-	-	100%	-	<b>01</b>
<b>B.</b>	<b>NPV</b>					
1.	<b>2017-18</b>	-	100%	-	-	<b>01</b>

The weighted average survival for the plantations evaluated during the year 2016-17 and 2018-19 under the scheme Compensatory Afforestation was 42.90% and 55.60%, respectively. Under the scheme





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NPV, during 2017-18, weighted average was 39.26%. The detail of survival of plant species is given in **Table-4.77:**

**Table-4.77: Weighted Survival in various sites of Dharamshala Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1	2016-17	01	42.90
2.	2018-19	01	55.60
<b>B.</b>	<b>NPV</b>		
1.	2017-18	01	39.26
	<b>Total</b>	<b>03</b>	

The growth performance of the species viz., *Cedrus deodara*, *Dalbergia sissoo*, *Phyllanthus emblica*, *Quercus oblongata*, *Syzygium cumini* and *Terminalia arjuna* etc. was better in the plantation sites. However, species like *Bombex ceiba*, *Platanus orientalis*, *Prunus ceresoides* and *Toona ciliata* did not performed well in a few sites. The low survival percentage was due to drought conditions, lack of irrigation facility and damage caused by wild animals and grazing pressure.





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**Table-4.75: Details of the Plantation Sites including GPS Coordinates of Dharmashala Forest Division**

S. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	P40K CB Kareri C-17	Compensatory Afforestation	2016-17	Kareri	Kareri	Dharm-shala	15.622	15.60	2220	32° 19' 09.6" 076° 14' 48.2" NW & SW	42.90	--
2.	CFS Sarah P-2	NPV	2017-18	Sihnal	Dharam-shala	Dharam-shala	4	3	1052	32° 11' 16.6" 076° 18' 06.8" Western	39.26	
3.	P.40 K CB Kareri	Compensatory Afforestation	2018-19	Kareri	Kareri	Dharam-shala	2	2.1	1635	32° 16' 41.9" 076° 17' 16.9" SW	55.60	-





#### 4.7.2 Nurpur Forest Division:

In Nurpur Forest Division, there were 33 sites having the total area 305 ha for the period 2016-17 under the scheme NET PRESENT Value. Out of 33 plantation sites, 17 sites having the total area 155 ha were taken for evaluation. Whereas, 02 sites having the total area 5.87 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 02 plantation sites, both were taken for the evaluation and monitored as per standard Methodology. During 2017-18, there was only 01 site having the total area 7.31 ha under the scheme Compensatory Afforestation and same was taken for the evaluation and monitored as per standard methodology. During 2018-19, there were 25 sites having the total area 260 ha under the scheme NPV. Out of 25 sites, 18 sites having the total area 187.5 ha were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.78**.

Plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in 100% (02 sites) plantation sites was very good and during 2017-18, survival in one site was average. Whereas, under the NPV during the year 2016-17, survival in 17.65%, 52.94%, 11.76% and 17.65% plantation site was below average, average, good and very good, respectively. During the year 2018-19 under the scheme NPV, survival in 22.22%, 38.89% and 38.89% plantation sites were average, good and very good, respectively. The detail of survival in various sites is given in **Table- 4.79**:





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**Table-4.79: Details of Survival in various sites of Nurpur Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	-	-	-	100%	<b>02</b>
1.	2017-18	-	100%	-	-	<b>01</b>
<b>B].</b>	<b>NPV</b>					
1	2016-17	17.65%	52.94%	11.76%	17.65%	<b>17</b>
2	2018-19	-	22.22%	38.89%	38.89%	<b>18</b>

The weighted average survival for the plantations evaluated during the year 2016-17 and 2017-18 under the scheme Compensatory Afforestation was 75.22% and 34.2%, respectively. The survival for the plantations evaluated during the year 2016-17 and 2018-19 under the scheme NPV was 44.82% and 61.64%, respectively. The detail of survival of plant species in various years is given in **Table-4.80:**

**Table-4.80: Weighted Average Survival of various years in Nurpur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	02	75.22
2.	2017-18	01	34.20
<b>B].</b>	<b>NPV</b>		
1.	2016-17	17	44.82
2.	2018-19	18	61.64
	<b>TOTAL</b>	<b>38</b>	





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The growth performance of the species viz., *Acacia nilotica*, *Albizia lebbek*, *Bauhinia variegata*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Eucalyptus* sp., *Mangifera indica*, *Melia azedarach*, *Morus alba*, *Phyllanthus emblica*, *Psidium guajava*, *Punica granatum*, *Sapindus mukorossi*, *Syzygium cumini*, *Tectona grandis*, *Terminalia arjuna*, *Terminalia bellirica*, *Terminalia chebula* and *Toona ciliata* etc. was better in the plantation sites. However, species like *Acacia catechu*, *Aegle marmelos*, *Azadirachta indica*, *Bombax ceiba*, *Cassia fistula*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Eriobotrya japonica*, *Ficus religiosa*, *Leucaena leucocephala*, *Mangifera indica*, *Melia azadirachta*, *Morus alba*, *Oroxylum indicum*, *Punica granatum*, *Sapindus mukorossi*, *Syzygium cumini*, *Terminalia bellirica*, *Toona ciliata*, and *Ziziphus* sp. did not performed well in some of the plantation sites. The low survival percentage in some of the site was due to damage caused by wild animal, grazing and infestation of *Lantana camara* and bushes. The most of the plantation sites were well fenced however, in some sites especially NPV plantations there is no provision of fencing.





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**Table-4.78: Division-wise Details of the Plantation Sites including GPS Coordinates of Nurpur Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	U 96 Sakri	NPV	2016-17	Rehan	Rehan	Jawali	5	5.2	553	32°10'30.6"N 75°53'44.6"E Nothern	46.6	-
2.	UP 129 Dini C3	NPV	2016-17	Dini	Fatehpur	Jawali	5	6.5	556	32°08'37.9"N 75°50'33.3"E Nothern	73.6	-
3.	DP Chakban Harsar	NPV	2016-17	Harsar	Jawali	Jawali	10	9.5	515	32°06'37.0"N 76°02'41.1"E Western	60.02	-
4.	R 16 N Bindraban C 2 & C 3	NPV	2016-17	Bindraban	Nurpur	Nurpur	15	14.2	636	32°18'33.3"N 75°56'10.1"E Eastern	40.5	-
5.	U 50 Kothiwanda C 2	NPV	2016-17	Tattal	Jounta	Nurpur	10	8.9	704	32°15'32.1"N 76°00'04.5"E NW	18.5	-
6.	R4N Batuhi C-4	NPV	2016-17	Batuhi	Mastgarh	Kotla	10	10.7	658	32° 13' 68.6" 076° 00' 66.2" SW	36.5	-
7.	P-47 Anuhi C-2	NPV	2016-17	Anuhi	Bagga	Kotla	10	11.6	634	32° 13' 40.4" 076° 02' 45.0" SW	30.3	-





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8.	U-52 Soldha C-8	NPV	2016-17	Soldha	Kotla	Kotla	10	12.9	547	32° 14' 43.7"N 075° 02' 43.3"E NE	33.4	-
9.	U-84 Dole C-1	NPV	2016-17	Dole	Bhali	Kotla	5	10.4	699	32° 12' 18.1" 076° 08' 12.0" NW	34	
10	UP-165 Nangal C-21	NPV	2016-17	Nangal	Rey	Rey	10	10.6	425	32° 02' 53.1" 075° 50' 45.0" SE	31	
11	U-25 Anoh C-9	NPV	2016-17	Anoh	Dhameta	Rey	10	11.8	309	31° 59' 18.1" 075° 54' 24.0" NW	25	
12	UPF- 115 Bhehri C-31	NPV	2016-17	Dhiala	Gangath	Indora	10	11	509	32° 10' 04.1"N 75° 49' 00.7"E NE	25.3	
13	CFS-Lodhwan U-69	NPV	2016-17	Dainkwan	Dhamtal	Indora	20	22	385	32° 14' 98.6"N 75° 43' 87.9"E SW	73.6	
14	CFS- Dhontol U-1	NPV	2016-17	Tappa	Indora	Indora	10	11.9	422	32° 09' 24.2"N 75° 44' 40.2" SE	75.9	
15	UP114 Madholi C-8	NPV	2016-17	Mangwal	Mangwal	Indora	10	17.5	497	32° 10' 43.2"N 75° 47' 08.2"E NE	61.3	
16	CFS Deothi U-5	NPV	2016-17	Badukhar	Badukhar	Rey	10	9.0	370	32° 63' 37.6"N 75° 49' 51.2"E SE	39.6	
17	UP-142 Plakhi C-4	NPV	2016-17	Bhogrwan	Bhogrwan	Rey	10	8.4	260	32° 04' 26.1" 075° 46' 35.2" SW	40	
18	Tikka Raja Khassa	CA	2016-17	Raja Khassa	Indora	Indora	4.87	5.6	346	32° 10' 27.8"N	75.96	







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	Khasra No. 2712 & 2938/ 2887/2713									75°40.42.6"E Northern		
19	U 70 Bari	Compensatory Afforestation	2016-17	Gurial	Rehan	Jawali	1	1.3	604	32°13'17.6"N 75°56'22.9"E NE	71.3	
20	UP 3 Kukher Khawara C 6	Compensatory Afforestation	2017-18	Gurchal	Sadwan	Nurpur	7.31	7.0	548	32°23'34.8"N 75°54'02.6"E Nothorn	34.2	-
21	UP 78 Sidhpurghar C3	NPV	2018-19	Sidhpurghar	Rehan	Jawali	10	12.6	538	32°12'22.6"N 75°58'41.3"E SW	74.8	
22	UP 130 Bagroli C 4	NPV	2018-19	Hori	Fatehpur	Jawali	10	9.8	525	32°07'43.8"N 75°54'09.8"E NW	83.1	
23	P6N Harsar Nana C3b	NPV	2018-19	Harsar	Jawali	Jawali	5	4.8	489	32°07'26.5"N 76°02'01.6"E SE	75.7	
24	R1N Tattal C3c	NPV	2018-19	Tattal	Jounta	Nurpur	15	12.6	633	32°17'05.4"N 75°57'39.1"E Western	71.2	
25	R7N Jhakhar C2	NPV	2018-19	Nurpur	Nurpur	Nurpur	15	18.9	640	32°18'19.1"N 75°58'45.8"E Western	70.5	
26	UP 9 Aund 12	NPV	2018-19	Haral	Khanni	Nurpur	10	10.6	653	32°20'31.8"N 75°51'43.0"E Western	61.7	
27	U 47 Banoli C 8	NPV	2018-19	Minjgran	Minjgran	Nurpur	20	24.7	583	32°14'17.3"N	71.4	





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										75°57'02.9"E Southern		
28	P-2N- Devi Da Ban	NPV	2018-19	Amble	Mastgarh	Kotla	7	8.6	514	32° 10' 94.0" 075° 59' 95.0" SE	51	
29	P-47 Anuhi C-3	NPV	2018-19	Anuhi	Bagga	Kotla	10	9.8	619	32° 13' 27.3" 076° 02' 19.2" SE	43	
30	U-52 Soldha C-4	NPV	2018-19	Soldha	Kotla	Kotla	7.5	8.2	625	32° 14' 35.9" 076° 03' 07.6" SW	41	
31	U-84 Dole C-21	NPV	2018-19	Dole	Bhali	Kotla	10	11.2	628	32° 11' 28.7" 076° 05' 49.6" NW	55	
32	UP-165 Nangal C-10	NPV	2018-19	Nangal	Rey	Rey	10	15.6	495	32° 03' 59.0" 075° 53' 26.1" SE	32	
33	UP-142 Plakhi C-4	NPV	2018-19	Bhogrwan	Bhogrwan	Rey	5	8.8	281	32° 04' 30.1" 075° 46' 43.1" SW	42	
34	UP41 Aghar C-1	NPV	2018-19	Sukhar	Gangath	Indora	10	11.5	526	32°15'18.4"N 75°52'48.4"E NE	53.1	
35	P24N Sugarnal C-1c	NPV	2018-19	Kandwal	Dhamtal	Indora	10	10.8	516	32°16'17.7"N 75°47'26.2"E SE	75.7	
36	CFS Ghandran C-4&5	NPV	2018-19	Ghandran	Indora	Indora	10	9.1	321	32°07'13.8"N 75°43'28.8"E SE	52.3	





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37	UP 92 Dharwal C-7	NPV	2018-19	Ghoran	Mangwal	Indora	10	14	382	32°12'10.6"N 75°44'38.4"E SE	57	
38	U40 Kartah C-3	NPV	2018-19	Khatiar	Dhameta	Rey	10	9.0	509	32°59'01.0"N 75°56'21.0"E NW	69	





### 4.7.3 Palampur Forest Division:

In Palampur Forest Division, there were 14 sites having the total area 72 ha for the period 2018-19 under the NPV. Out of 14 sites, 9 sites covering the area of 41 ha were taken for the evaluation as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.81**.

Plantations evaluated during the year 2018-19 under the scheme NPV, survival in 22.22%, 33.33% and 44.45% site was below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.82**:

**Table-4.82: Details of Survival in various sites of Palampur Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A.</b>	<b>NPV</b>					
1	2018-19	22.22%	33.33%	44.45%	-	<b>9</b>

The weighted average survival for plantations evaluated during the year 2018-19 under the scheme NPV was 42.71%. The detail of survival of plant species in various years is given in **Table-4.83**:

**Table-4.83: Weighted Average Survival of various years in Palampur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>NPV</b>		
1	2018-19	09	42.71

The growth performance of the species viz., *Cedrus deodara*, *Dalbergia sissoo*, *Melia azedarach*, *Phyllanthus emblica*, *Quercus oblongata*,





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*Syzygium cumini*, *Terminalia arjuna* and *Terminalia bellirica* etc. was better in the plantation site. However, species like *Bauhinia variegata*, *Moringa* sp., *Prunus cornuta*, *Prunus cerasoides*, *Terminalia bellirica* and *Terminalia chebula* did not performed in some of the sites. The average survival percentage in this site was due to drought conditions, lack of irrigation facility and damage caused by wild animals and grazing pressure.





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**Table-4.81: Details of the Plantation Sites including GPS Coordinates of Palampur Forest Division**

S. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	U 8 P Kandi C2	NPV	2018-19	Kandi	Palampur	Palampur	5	4.9	1443	32° 07' 50.6"N 076° 31' 05.1"E SW	14.52	-
2.	P61 P Badsar	NPV	2018-19	Baner	Gopalpur	Palampur	5	5.4	1443	32° 09' 15.5"N 076° 27' 52.6"E SW	60.0	-
3.	P 24 P Ghenta C1b	NPV	2018-19	Ghaneta	Panaper	Palampur	5	9.8	619	32° 13' 27.3"N 076° 02' 19.2"E SE	31	-
4.	UP 49 J Alampur C21B	NPV	2086-19	Gander	Gander	Jaisinghpur	3	3	693	31° 53' 08.1"N 076° 30' 09.6"E NE	58.63	-
5.	U 46 B Jhikli Beth C3	NPV	2018-19	Bhadraina	Baijnath	Baijnath	5	7.1	1035	32° 04' 40.0"N 076° 37' 01.2"E SE	54	-
6.	Banmaffi Lanod	NPV	2018-19	Lanot	Deol	Baijnath	5	5.7	1278	32° 05' 40.7"N 076° 38' 58.1"E SW	53	-





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7.	UP 38 B Chobin C4	NPV	2018-19	Chobin	Bajnath	Bajnath	5	13.3	872	31° 58' 21.7"N 076° 40' 24.5"E SW	48.93	-
8.	CFs Maniara	NPV	2018-19	Maniara	Andretta	Bajnath	3	4.8	905	32° 01' 48.1"N 076° 31' 38.5"E NW	7.0	-
9.	P-12 B Panjalla C1 A	NPV	2018-19	Sansal	Deol	Bajnath	5	6.8	1278	32° 04' 06.0"N 076° 41' 01.6"E Southern	49.39	-





#### 4.8 RAMPUR FOREST CIRCLE:

In this forest circle, plantation sites of Rampur, Kotgarh, Ani and Kinnaur Forest Division were evaluated as given below:

##### 4.8.1 Rampur Forest Division:

In Rampur Forest Division, there were 09 sites having the total area 37 ha for the period 2016-17 under the scheme Net Present Value. Out of 09 sites, 05 sites having the total area 28 ha were taken for the evaluation. Whereas, 07 sites having the total area 35 ha under the scheme CAT PLAN, Out of 07 sites, 03 sites covering the total area 15 ha were taken for the evaluation. During 2017-18, there were 04 sites having the total area 21.87 ha under the Compensatory Afforestation, out of 04 sites, 03 sites covering the total area 11.79 ha were taken for the evaluation. Whereas, 06 plantation sites having the total area 35 ha under the scheme CAT PLAN. Out of 06 sites, 03 sites having the total area 15 ha were taken for the evaluation. During 2018-19, there were 06 sites having the total area 24.34 ha under the Compensatory Afforestation, Out of 06 sites, 04 sites having the total area 15.62 ha were taken for the evaluation. Whereas, 05 sites having the total area 30 ha under the scheme CAT PLAN. Out of 05 sites, 02 sites having the total area 10 ha were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.84**.

Out of 03 plantations evaluated during the year 2017-18 under the scheme Compensatory Afforestation, survival in 33.33% and 66.67% plantation sites were average and good, respectively and during 2018-19, survival in 50.0% and 50.0% plantation sites were average and good, respectively. Whereas, one plantation raised under the CAT PLAN, plantation sites was good. Out of 03 plantations evaluated during the year 2017-18 under the scheme CAT PLAN, survival in 33.33% and 66.66% site was below average and average, respectively







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and during 2018-19, 02 plantation site was evaluated, both sites was recorded good. Whereas, out of 05 plantations raised under the NPV during the year 2016-17, survival in 40.0% and 60.0% plantation sites was average and good, respectively. The detail of survival in various sites is given in **Table-4.85:**

**Table-4.85: Details of Survival in various sites of Rampur Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2017-18	--	33.33%	66.67%	-	<b>03</b>
2.	2018-19	-	50.0%	50.0%	-	<b>04</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	--	-	100%	-	<b>03</b>
2.	2017-18	33.33%	66.67%	-	-	<b>03</b>
3.	2018-19	-	-	100%	-	<b>02</b>
<b>A].</b>	<b>NPV</b>					
1.	2016-17	--	40.0%	60.0%	-	<b>05</b>

The weighted average survival for the plantations evaluated during the year 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 50.92% and 52.78%, respectively. Whereas, plantations raised under CAT PLAN during the year 2016-17 & 2017-18 and 2018-19 survival was 58.62%, 24.93% and 57.56%, respectively and under the scheme NPV, during 2016-17, weighted average was 46.3%. The detail of survival of plant species in various years is given in **Table-4.86:**





**Table-4.86: Weighted Average Survival of various years in Rampur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1.	2017-18	03	50.92
2.	2018-19	04	52.78
<b>B].</b>	<b>CAT PLAN</b>		
1.	2016-17	03	58.62
2.	2017-18	03	24.93
3.	2018-19	02	57.56
<b>C].</b>	<b>NPV</b>		
1.	2016-17	05	46.3
	<b>TOTAL</b>	<b>20</b>	

The growth performance of the species like *Abies pindrow*, *Aesculus indica*, *Albizia lebbeck*, *Cedrus deodara*, *Melia azadirachta*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus mira*, *Punica granatum*, *Pyrus pashia*, *Robinia pseudoacacia* and *Sapindus mukorossi* were better in most of the plantation sites.

However, species like *Abies pindrow*, *Albizia lebbeck*, *Bauhinia variegata*, *Cedrus deodara*, *Dioscorea deltoidea*, *Grewia optiva*, *Jacaranda* sp., *Juglans regia*, *Jurinea dolomoea*, *Angelica glauca*, *Leucaena leucocephala*, *Pinus roxburghii*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus mira*, *Punica granatum*, *Pyrus pashia*, *Quercus floribunda*, *Rheum australe*, *Salix* sp., *Sinopodophyllum hexandrum*, *Syzygium cumini* and *Vitis* sp. were not performed well in some of the plantation sites.





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The low survival percentage in some of the plantation sites was due to damage caused by grazing, fire, wild animals and heavy mortality of naked rooted plants. The entire plantation sites were fenced however, in some of the sites fencing was damaged or conditions of the fencing was not good.





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**Table-4.84: Division-wise Details of the Plantation Sites including GPS Coordinates of Rampur Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1.	UF-Kaleda	NPV	2016-17	Beauthal	Surad	Bhali	5	7	1675	31°20'08.0"N 77°37'20.5"E South Eastern	60.8	Grazing and Fire incidents
2.	UF-Doi	NPV	2016-17	Delath	Sholli	Nankhari	10	21.1	1016	31°22'47.4"N 77°32'55.8"E Southern	32.4	Grazing and Fire incidents
3.	Rampur	NPV	2016-17	Rampur	Rampur	Rampur	3	3	1024	31°27'02.8"N 77°37'58.1"E Southern	65.8	Grazing and fire
4.	Dutt nagar	NPV	2016-17	Dutt nagar	Nogli	Rampur	5	5.1	1135	31°23'15.4"N 77°35'53.0"E Eastern	39.5	Grazing and fire
5.	UF- Badhal (Bai- Bagh)	NPV	2016-17	Badhal	Sarahan	Sarahan	5.0	4.8	1257	31°31'47.72"N 77°46'29.98"E NW	54.70	-
6.	C-202 Sadali Gad	CAT PLAN	2016-17	Jagori	Jagori	Sarahan	5.0	5.5	2541	31°37'09.54"N 77°43'30.70"E N	55.30	Grazing Pressure





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7.	UF-14 Karai	CAT PLAN	2016-17	Jagori	Jagori	Sarahan	5.0	5.2	2557	31°36'34.82"N 77°45'12.88"E Eastern	69.35	Carriage of material and grazing pressure
8.	C-213 b Manjkalaya	CAT PLAN	2016-17	Sarpara	Phancha	Sarahan	5.0	5.1	2635	31°33'56.40"N 77°42'41.20"E N	51.21	Carriage of material and grazing pressure
9.	UF-Shandal	Compensatory Afforestation	2017-18	Dansa	Nogli	Rampur	0.44	0.5	1957	31°25'17.3"N 77°41'32.2"E Western	36.3	Grazing
10	UF-Shahdhar	Compensatory Afforestation	2017-18	Sarahan	Sarahan	Sarahan	8.21	11.6	1736	31°30'27.73"N 77°46'04.49"E NW	51.17	Wild life and Grazing pressure.
11	C-122 Bai-Bahli (Part-II)	Compensatory Afforestation	2017-18	Bai Bahli	Nankhari	Nankhari	3.14	4.2	2852	31°16'04.4"N 77°37'54.1.98"E N	52.31	Grazing pressure
12	Thala	CAT PLAN	2017-18	Munish	Deothi	Rampur	5	5.0	2508	31°25'27.5"N 77°44'39.1"E South Western	--	Grazing
13	Janthal	CAT PLAN	2017-18	Munish	Deothi	Rampur	5	7.7	2190	31°25'00.8"N 77°44'21.1"E North Eastern	31.2	Grazing
14	C-201 Barcha	CAT PLAN	2017-18	Jagori	Jagori	Sarahan	5	5.6	2519	31°37'16.35"N 77°48'16.61"E N	43.60	Carriage of material and grazing pressure





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15	UF-Shandal	Compensatory Afforestation	2018-19	Dansa	Nogli	Rampur	2.55	2.3	1965	31°25'12.8"N 77°41'31.6"E Western	44.2	Grazing
16	UF-Badhal	Compensatory Afforestation	2018-19	Badhal	Sarahan	Sarahan	3.4	4.0	2100	31°32'12.77"N 77°49'10.42"E W	47.55	Wild life and Grazing pressure.
17	UF- Chadali	Compensatory Afforestation	2018-19	Gopalpur	Gopalpur	Sarahan	5.52	6.96	1891	31°30'11.49"N 77°44'56.84"E NW	59.23	Carriage of material and grazing problem
18	C-122 Bai-Bahli (Part- II)	Compensatory Afforestation	2018-19	Bai Bahli	Nankhari	Nankhari	4.15	4.5	2870	31°16'05.19"N 77°37'48.49"E N	53.75	Grazing pressure
19	UF- Chandi	CAT PLAN	2018-19	Jaghori	Jaghori	Sarahan	5.0	5.3	2762	31°36'66.0"N 77°45'32.9"E N	57.84	Grazing pressure and carriage of material
20	Kupri	CAT PLAN	2018-19	Phancha	Phancha	Sarahan	5.0	5.4	2348	31°36'25.89"N 77°43'55.62"E N	57.27	Carriage of material and grazing pressure





#### 4.8.2 Kotgarh Forest Division:

In Kotgarh Forest Division, there was one site having the total area of 10 ha for the period 2016-17 under the Compensatory Afforestation and same was taken for the evaluation as per standard methodology. During 2017-18, there was one site having the total area of 0.5 ha under the Compensatory Afforestation and same was taken for the evaluation. During 2018-19, there was one site having the total area of 2.5 ha under the Compensatory Afforestation and same was taken for the evaluation as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.87**.

One plantation site was evaluated in each year i.e. 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation, survival in these sites was below average and good, respectively. The detail of survival in various sites is given in **Table- 4.88**.

**Table-4.88:Details of Survival in various sites of Kotgarh Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	<b>Compensatory Afforestation</b>					
1	2016-17	100%	--	--	--	01
2	2017-18	--	--	100%	--	01
3.	2018-19	--	--	100%	--	01

The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the Compensatory Afforestation was 28.18%, 50.90% and 54.0%, respectively. The detail of survival of plant species in various years is given in **Table-4.89**.





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**Table-4.89: Weighted Average Survival of various years in Kotgarh Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	01	28.18
2.	2017-18	01	50.90
3.	2018-19	01	54.0
	<b>TOTAL</b>	<b>03</b>	

The growth performance of the species like *Phyllanthus emblica*, *Pinus roxburghii* and *Punica granatum* was better in most of the plantation sites. However, species like *Bauhinia variegata*, *Delbergia sissoo*, *Melia azedarach*, *Pyrus pashia*, *Robinia pseudoacasia*, *Sapindus mukorossi* and *Syzygium cumini* did not respond well in some of the plantation sites. The low survival percentage in this site was due to fire and thick growth of bushes and weeds in the plantation site.







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**Table-4.87: Details of the Plantation Sites including GPS Coordinates of Kotgarh Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	UPF Banahardhar	Compensatory Afforestation	2016-17	Shiwan	Baragaon	Kumarsain	10	13	850	31°19'9.6"N 77°20'8.4"E NE	28.18	Steep slope
2.	UPF Kanda C-149	Compensatory Afforestation	2017-18	Naulla	Bhareri	Kotgarh	0.5	0.6	1134	31°20'.49.8"N 77°29'45.3"E NE	50.90	Very steep slope
3.	DPF Kepu CN-35	Compensatory Afforestation	2018-19	Sainj	Bhareri	Kotgarh	2.5	2	1092	31°20'15.98"N 77°27'12.28"E NW	54	Grazing pressure





### 4.8.3 Ani Forest Division:

In Ani Forest Division, there were 10 sites having the total area 95.77 ha for the period 2016-17 under the Compensatory Afforestation, Out of 10 sites, 08 sites were taken for the evaluation covering the area of 85.77 ha. During 2017-18, there were 11 sites having the total area 111.96 ha f under the Compensatory Afforestation, Out of 11 sites, 06 sites were taken for the evaluation covering the area of 34.39 ha. During 2018-19, there were 02 sites having the total area 10.76 ha under the Compensatory Afforestation and both plantation sites were taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.90**.

Under the scheme Compensatory Afforestation during the year 2016-17, survival in 50.0%, 12.5%, 37.5% plantation sites was below average, average and good, respectively. During the year 2017-18, survival in 66.66%, 16.67% and 16.67% sites were average, good and very good, respectively. During 2018-19, survival in 50.0% and 50.0% plantation was average and good, respectively. The detail of survival in various sites is given in **Table- 4.91**.

**Table-4.91:Details of Survival in various sites of Ani Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A]	<b>Compensatory Afforestation</b>					
1.	2016-17	50.0%	12.5%	37.5%	-	<b>08</b>
2.	2017-18	--	66.66%	16.67%	16.67%	<b>06</b>
3.	2018-19	--	50.0%	50.0%	--	<b>02</b>





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The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 25.61%, 51.38% and 46.44%, respectively. The detail of survival of plant species in various years is given in **Table-4.92**

**Table-4.92: Weighted Average Survival of various years in Ani Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A].	<b>Compensatory Afforestation</b>		
1.	2016-17	08	25.61
2.	2017-18	06	51.38
3.	2018-19	02	46.44
	<b>TOTAL</b>	<b>16</b>	

The growth of plant species viz; *Acacia catechu*, *Aesculus indica*, *Albizia lebbeck*, *Cedrus deodara*, *Dalbergia sissoo*, *Grewia optiva*, *Melia azedarach*, *Phyllanthus emblica*, *Pinus roxburghii*, *Prunus armeniaca*, *Punica granatum*, *Pyrus pashia*, *Quercus oblongata*, *Robinia pseudoacacia* and *Syzygium cumini* were better in most of the plantation sites. However, species like *Acacia catechu*, *Ailanthus altissima*, *Albizia lebbeck*, *Bauhinia variegata*, *Melia azedarach*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus mira*, *Punica granatum*, *Pyrus pashia*, *Salix* sp., *Sapindus mukorossi* and *Toona ciliata* did not performed well in some of the sites. The low survival percentage in some of sites was due to damage caused by biotic pressure, grazing, fire and dry seasons after plantation. All the plantation sites were fenced, however in some of the sites fencing was found damaged.

Low survival was also due to and prevailing harsh conditions of the sites. The most of plantation sites were well fenced however, in some of the sites fencing was damaged.





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**Table-4.90: Division-wise Details of the Plantation Sites including GPS Coordinates of Ani Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude and Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Shorladhar	Compensatory Afforestation	2016-17	Peog	Pano	Chowai	8	8	1661	31°25'42.7"N 77°22'45.3"E Eastern	Nil	Site was damaged by fire
2.	Prakot shill-1	Compensatory Afforestation	2016-17	Kohila	Khang	Chowai	4	4.6	2109	31°29'07"N 76°26'13.09"E Western	53.6	--
3.	Shadidhar (9 hac)	Compensatory Afforestation	2016-17	Koil	Nither	Nither	9	14.01	1009	31°23'22.85"N 77°32'50.19"E S to SE	28.32	Open, dry grassland; prone to fire
4.	Nagerh	Compensatory Afforestation	2016-17	Juagi	Sarahan	Arsu	20	18.35	2183	31°32'11.8" N 77°34'54.5"E SE to SW	5.18	Rocky, steep slopes; grassland, prone to fire
5.	1/10 Bashad	Compensatory Afforestation	2016-17	Margi	Margi	Nither	5.25	4.45	1786	31°27'49.2" N 77°30'25.2"E SE	34.89	Grassland, steep slopes; fire prone
6.	UPF-Dagaini	Compensatory Afforestation	2016-17	Ghatoo	Margi	Nither	12	13.11	1478	31°25'54.34"N 77°32'33"E	64.00	--





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7.	Kathanda	Compensatory Afforestation	2016-17	Nirmand	Nirmand	Arsu	8	6.80	1927	31°25'29.60" N 77°35'44.10" E SW	45.56	Open grassland; moderate slopes
8.	Bai	Compensatory Afforestation	2016-17	Luhri	Dalash	Nither	10	12.37	1085	31°21'26.76" N 77°28'9.58"E SE	06.45	Open dry, rocky grassland; fire prone; bushy
9.	UPF-Brow	Compensatory Afforestation	2017-18	Brow	Nirmand	Nirmand	7.6	7.6	2673	31°26'11.3"N 77°36'59.5"E Northern	42.72	Prone to fire
10.	UPF Jaon	Compensatory Afforestation	2017-18	Tarala	Khang	Chowai	3.25	3	2274	31°30'21.0"N 77°28'39.4"E NW	45.0	Fire prone
11.	UPF Khaneri	Compensatory Afforestation	2017-18	Patarna	Paneo	Chowai	6.17	6.7	2348	32°29'36.6"N 77°22'49.86E N	43.62	--
12.	UPF Rishta	Compensatory Afforestation	2017-18	Bai	Paune	Chowai	2.12	2	2350	31°26'43.0"N 77°22'43.1"E W	39.30	Grazing pressure
13.	Shadidhar (11.65)	Compensatory Afforestation	2017-18	Koil	Nither	Nither	11.65	15.41	1208	31°23'34.35"N 77°32'49.05"E S to SE	58.76	Open, dry grassland; fire prone; steep slopes
14.	Tharvi	Compensatory Afforestation	2017-18	Tharvi	Arsu	Arsu	3.6	3.38	2290	31°30'2.89"N 77°34'57.81"E North	72.0	Moist shaded; bushy





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15.	Prakot shill-II	Compensatory Afforestation	2018-19	Kohila	Khang	Chowai	1.05	1.4	2109	31°29'07"N 76°26'13.09E Western	50.4	--
16.	Gudheldhar	Compensatory Afforestation	2018-19	Nore	Margi	Nither	9.712	11.8	1378	31°28'43.9"N 77°33'15.2"E North-West	46.0	--.





#### 4.8.4 Kinnaur Forest Division:

In Kinnaur Forest Division, there were 44 sites having the total area 202 ha for the period 2016-17 under the CAT PLAN, Out of 44 sites, 14 sites were taken for the evaluation covering the area of 62 ha. Whereas 11 sites having the total area 115 ha for the period 2016-17 under the Compensatory Afforestation, Out of 11 sites, 05 sites were taken for the evaluation covering the area 55 ha as per standard methodology. During 2017-18, there were 19 sites having the total area 86 ha under the CAT PLAN, Out of 19 sites, 10 sites were taken for the evaluation covering the area of 36 ha. Whereas, 17 sites having the total area 87.12 ha for the period 2017-18 under the Compensatory Afforestation, Out of 17 sites, 08 sites covering the area 45 ha were taken for the evaluation as per standard methodology. During 2018-19, , there were 12 sites having the total area 67 ha under the CAT PLAN, Out of 12 sites, 04 sites were taken for the evaluation covering the area of 21 ha. Whereas, 19 sites having the total area 110 ha for the period 2018-19 under the Compensatory Afforestation, Out of 19 sites, 12 sites were taken for the evaluation covering the area 65 ha as per standard methodology. The detail of evaluation of plantation sites is given in **Table-4.93**.

Under the scheme Compensatory Afforestation, during the year 2016-17, survival in 80.0% and 20.0% sites was below average and average, respectively. During the year 2017-18, survival in 25.0%, 37.5%, 25.0% and 12.5% sites were below average, average, good and very good, respectively. During the year 2018-19, Whereas, plantations raised under the CAT PLAN during the year 2016-17, survival in 42.86%, 28.57% and 28.57% plantation site was below average, average and good, respectively and during the year 2017-18, survival in 50.0%, 40.0% and 10.0% plantation sites were below average, average and good, respectively. During the year 2018-19, survival in 75.0% and 25.0% plantation was below average and good, respectively. The detail of survival in various sites is given in **Table- 4.94**.





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**Table-4.94: Details of Survival in various sites of Kinnaur Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	80.0%	20.0%	-	-	<b>5</b>
2.	2017-18	25.0%	37.5%	25.0%	12.5%	<b>8</b>
3.	2018-19	25.0%	50.0%	08.34%	16.66%	<b>12</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	42.86%	28.57%	28.57%	-	<b>14</b>
2.	2017-18	50.0%	40.0%	10.0%	-	<b>10</b>
	2018-19	75.0%	-	25.0%	-	<b>4</b>

The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18, 2018-19 under the scheme Compensatory Afforestation was Nil, 48.22% and 30.91%, respectively. Whereas, plantations raised under the CAT PLAN during the year 2016-17, 2017-18, 2018-19, survival was 36.60%, 32.38% and 21.45%, respectively. The detail of survival of plant species in various years is given in **Table-4.95**.

**Table-4.95: Weighted Average Survival of various years in Kinnaur Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1.	2016-17	05	Nil
2.	2017-18	08	48.22
3.	2018-19	12	30.91
<b>B.</b>	<b>CAT PLAN</b>		
1.	2016-17	14	36.60
2.	2017-18	10	32.38
3.	2018-19	04	21.45
	<b>TOTAL</b>	<b>53</b>	







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The growth performance of the species viz., *Aesculus india*, *Betula utilis*, *Cedrus deodara*, *Dioscorea esculenta*, *Melia azedarach*, *Pinus gerardiana*, *Populus ciliata*, *Prunus armaniaca*, *Prunus mira*, *Robinia pseudoacacia*, *Salix* sp. and *Sapindus mukorosi* etc. was better in all the plantation sites. However, *Acorus calamus*, *Ailanthus excelsa*, *Juglans regia*, *Melia azedarach*, *Picrorhiza kurroa*, *Populus nigra*, *Prunus armeniaca*, *Prunus mira*, *Robinia pseudoacacia*, *Salix* sp., *Sapindus mukorossi* and *Saussurea costus* did not performed well in some of the plantation sites. The low survival percentage in some of the site was due to fire, drought like conditions, erosion prone areas and grazing pressure. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.93: Division-wise Details of the Plantation Sites including GPS Coordinates of Kinnaur Forest Division**

Sl. No.	Plantation Site	Name of Sector / Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	C-239	CAT PLAN	2016-17	Kalpa	Kalpa	Kalpa	5	5.49	2761	31°33'57.96"N 78°15'48.97"E NE	28.75	Water Scarcity, Fire, grazing and damage by wild animals
2.	C-240(a) II	CAT PLAN	2016-17	Pangi	Kalpa	Kalpa	5	6.70	2606	31°35'0.26"N 78°16'1.32"E NW	35.87	Water Scarcity, Fire, grazing and damage by wild animals
3.	C-234	CAT PLAN	2016-17	Pangi	Kalpa	Kalpa	5	5.19	2894	31°36'3.36"N 78°17'9.41"E NE	39.77	Water Scarcity, Fire, grazing and damage by wild animals
4.	UF- Janakpuri	CAT PLAN	2016-17	Tapri	Urni	Kalpa	3	2.90	2410	31°31'21"N 78°06'48"E SE	15.06	Water Scarcity, Fire, grazing and damage by wild animals
5.	C-216	CAT PLAN	2016-17	Lippa	Jangi	Moorang	5	6.4	3082	31°39'47.2"N 78°24'3.3"E South East	2.12	--
6.	UF Asrang	CAT PLAN	2016-17	Lippa	Jangi	Moorang	3	3.1	3526	31°39'35.1"N 78°19'1.04"E North East	15.62	-
7.	C-187	CAT PLAN	2016-17	Ribba	Ribba	Moorang	5	4.58	2745	31°35'24.5"N 78°20'54.9"E North East	69.62	-





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8.	C-188	CAT PLAN	2016-17	Ribba	Ribba	Moorang	3	4.3	2729	31°34'22.6"N 78°21'46.5"E North East	57.9	-
9	C-71b	CAT- PLAN	2016-17	Tranda	Tranda	Nichar	5	5.1	2480m	31°32'32.09"N 77°53'25.62"E Northern	42.24	-
10	C-82	CAT- PLAN	2016-17	Nichar	Nichar	Nichar	5	6.6	2365m	31°32'55.10"N 77°59'10.58"E Northern	48.17	-
11	UF- Yalling	CAT- PLAN	2016-17	Barang	Shongthong	Kalpa	5	7.1	2129m	31°30'43.50"N 78°15'16.91"E Western	23.75	-
12	UF- Kandar	CAT PLAN	2016-17	Nathpa	Katgaon	Katgaon	5	4.42	2198	31°33'48.8"N 77°59'46.5"E Southern	9.27	Damage by stray animals, grazing and fire, dryness
13	C-167 Ralli	CAT PLAN	2016-17	Ralli	Karchham	Kilba	5	4.8	2362	31°29'29"N 78°12'11"E NE	64.05	-
14	UF Sangla	CAT PLAN	2016-17	Sangla	Sangla	Kilba	3	3	2828	31°24'39.8"N 78°15'19.6"E SE	61.81	-
15	UF Jangi	Compensatory Afforestation	2016-17	Jangi	Jangi	Moorang	10	12.8	2661	31°37'51.4"N, 78°25'38.4"E South West	Nil	-
16	UF Shurting	Compensatory Afforestation	2016-17	Moorang	Ribba	Moorang	10	13	3592	31°26'48.08"N 78°34'12.76"E North East	17.86	-
17	UF- B/Nagar	Compensatory Afforestation	2016-17	B/Nagar	B/Nagar	B/Nagar	5	3.1	1610	31°33'49.7"N 77°57'59.3"E NW	47.45	Grazing and dumping of road material issues





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18	C-166 Wadang	Compensatory Afforestation (Afforestation)	2016-17	Sapni	Karchham	Kilba	10	13	2252	31°29'05.1"N 78°11'11.6"E SW	21.00	
19	UF-160 Mastrang	Compensatory Afforestation (Afforestation)	2016-17	Rakchham	Sangla	Kilba	20	20	3268	31°22'01.0"N 78°23'53.2"E Southern	21.15	
20	C-241	CAT PLAN	2017-18	Kalpa	Kalpa	Kalpa	7	7.30	2910	31°32'35"N 78°15'03"E SE	26.12	Water Scarcity, Fire, grazing and damage by wild animals
21	UF- Kutano	CAT PLAN	2017-18	Urni	Urni	Kalpa	3	2.29	2080	31°31'16"N 78°07'45"E SE	11.96	Water Scarcity, Fire, grazing and damage by wild animals
22	C-186	CAT PLAN	2017-18	Ribba	Ribba	Moorang	5	6.18	2670	31°35'29.3"N 78°20'43.6"E North East	30.18	Sampling
23	C-182c	CAT PLAN	2017-18	Purbani	Shongthong	Kalpa	3	3.0	2575m	31°35'12.10"N 78°18'14.25"E Northern	20.12	
24	UF- Wangtoo	CAT PLAN	2017-18	Nichar	Nichar	Nichar	4	0.7	2017m	31°31'49.47"N 78° 0'58.10"E Western	10.18	
25	Teska	CAT PLAN	2017-18	Bari	Sungra	Nichar	2	1.8	2437m	31°31'26.32"N 77°55'44.23"E Western	42.12	
26	C-71b	CAT PLAN	2017-18	Tranda	Tranda	Nichar	2	2.6	2306m	31°32'24.76"N 77°53'7.42"E Northern	39.93	





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27	UF-46	CAT PLAN	2017-18	Sholtu	Sholtu	B/Nagar	5	4.26	2610	31°29'13.1"N 78°04'39.3"E SW	21.50	Site damaged by fire
28	UF Chispan	CAT PLAN	2017-18	Seringcha	Sangla	Kilba	5	8	2788	31°25'02.5"N 78°17'49.2"E Southern	47.25	
29	NC-4 (NC-1)	CAT PLAN	2017-18	Chaura	B/Nagar	B/Nagar	5	4.3	1689	31°33'59.1"N 77°51'55.8"E SW	69.81	Fire, grazing and dumping of road material issues
30	UF- Gharsu	Compensatory Afforestation	2017-18	Bada Kamba	B/Nagar	B/Nagar	5	7.09	1996	31°34'34.7"N 77°53'38.1"E Southern	58.98	Fire and grazing problem
31	UPF-26- Nathpa	Compensatory Afforestation	2017-18	Nathpa	Katgaon	Katgaon	5	6.69	1623	31°34'01.5"N 77°58'28.8"E Southern	18.54	Grazing and fire problem
32	UF- Ramni	Compensatory Afforestation	2017-18	Jani Ramni	Sholtu	B/Nagar	5	3.89	1828	31°31'11.4"N 78°04'03.6"E Northern	40.55	Fire and grazing
33	C-239	Compensatory Afforestation	2017-18	Kalpa	Kalpa	Kalpa	5	5.13	2920	31°33'20.71"N 78°15'28.44"E NE	40.96	Water Scarcity, Fire, grazing and damage by wild animals
34	C-190 (C-186)	Compensatory Afforestation	2017-18	Ribba	Ribba	Moorang	5	4.4	2342	31°34'43.8"N 78°24'1.0"E South East	22.27	100%
35	UF Wangtoo	Compensatory Afforestation	2017-18	Nichar	Nichar	Nichar	5	4.2	1619m	31°33'16.68"N 77°59'49.87"E NW Western	45.20	





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36	C-141 Kanai	Compensatory Afforestation	2017-18	Sapni	Karchham	Kilba	5	5	2298	31°30'06.9"N 78°09'48.5"E Northern	68.23	
37	UF Hurba	Compensatory Afforestation	2017-18	Sangla	Sangla	Kilba	5	7	2630	31°25'02.5"N 78°16'00.8"E Northern	91.05	
38	C-241	CAT PLAN	2018-19	Kalpa	Kalpa	Kalpa	5	6.28	3210	31°32'42"N 78°16'20"E NE	9.79	Water Scarcity, Fire, grazing and damage by wild animals
39	UF- Rangly	CAT PLAN	2018-19	Runang	Urni	Kalpa	3	3.04	2275	31°31'21"N 78°09'08"E SE	11.66	Water Scarcity, Fire, grazing and damage by wild animals
40	Lalanti Kanda	CAT PLAN	2018-19	Moorang	Ribba	Moorang	10	10.7	3806	31°26'46.41" N, 78°32'14.02" E North-East aspect.	21gms	Sampling





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41	C-173	CAT PLAN	2018-19	Barang	Shongthong	Kalpa	3	2.9	2836m	31°30'20.13"N 78°15'17.25"E Northern	52.20	
42	UF Jangi	Compensatory Afforestation	2018-19	Jangi	Jangi	Moorang	5	6.7	2604	31°38'46.8"N, 78°24'50.0"E South East	32.2	Sampling
43	C-197	Compensatory Afforestation	2018-19	Moorang	Ribba	Moorang	5	6.23	2540	31°35'13.0"N 78°26'58.3"E North East	48.18	Sampling
44	UF Dubling	Compensatory Afforestation	2018-19	Dubling	Pooh	Pooh	10	12.2	3019	31°44'37.3"N 78°38'10.2"E North West	16.95	Sampling
45	NC-14 Kaksthal	Compensatory Afforestation	2018-19	Kaksthal	Nichar	Nichar	5	4.0	1841m	31°31'7.85"N 78° 3'19.24"E Eastern	42.40	-
46	C-82	Compensatory Afforestation	2018-19	Nichar	Nichar	Nichar	5	6.7	2564m	31°32'42.94"N 77°59'12.93"E Northern	35.23	-
47	C-239	Compensatory Afforestation	2018-19	Kalpa	Kalpa	Kalpa	5	7.56	2719	31°33'9.32"N 78°15'8.60"E NE	32.03	Water Scarcity, Fire, grazing and damage by wild animals
48	UF- Kaksthal	Compensatory Afforestation	2018-19	Tapri	Urni	Kalpa	5	6.54	1725	31°31'16"N 78°04'40"E Southern	8.69	Water Scarcity, Fire, grazing pressure
49	C-29	Compensatory Afforestation	2018-19	Katgaon	Katgaon	Katgaon	5	3.68	2767	31°04'01.4"N 77°10'20.1"E SE	45.60	Fire and Grazing





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50	NC-5	Compensatory Afforestation	2018-19	Chaura	B/Nagar	B/Nagar	5	4.28	1606	31°34'03.9"N 77°50'06.4"E NW	51.54	Fire, grazing and dumping of road material issues
51	C- 68c	Compensatory Afforestation	2018-19	Chaura	Bhawa Nagar	B/Nagar	5	4.31	1694	31°33'55.6"N 77°52'03.1"E NW	75.72	Grazing and fire
52	UF-160 Chhitkul	Compensatory Afforestation	2018-19	Rakchham	Sangla	Kilba	5	5	3397	31°21'08.1"N 78°25'01.9"E Southern	22.32	-
53	C-48 Brua	Compensatory Afforestation	2018-19	Shong	Karchham	Kilba	5	5	2358	31°28'22"N 78°10'28"E Northern	70.23	-







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### 4.9 KULLU FOREST CIRCLE:

In this forest circle, plantation sites of Kullu, Lahaul, Parvati and Seraj Forest Division were evaluated as given below:

#### 4.9.1 Kullu Forest Division:

In Kullu Forest Division, there were 02 sites having the total area 10 ha for the period 2016-17 under the scheme NPV, Out of 02 sites, 01 site were taken for the evaluation covering the area of 4 ha. Whereas, 03 sites having the total area 40 ha for the period 2016-17 under the CAT PLAN, Out of 03 plantation sites, 02 sites covering the area 30 ha were taken for the evaluation and similarly, there were 02 sites having the total area 20.0 ha for the period 2016-17 under the Compensatory Afforestation, both 02 sites were taken for the evaluation. During 2017-18, there were 01 site having the total area 05 ha under the NPV, same was taken for the evaluation. Whereas 01 site having the total area 10 ha for the period 2017-18 under the CAT PLAN and same was taken for the evaluation and similarly, there were 02 sites having the total area 50.58 ha for the period 2017-18 under the Compensatory Afforestation, Out of 02 sites, 01 site covering the area of 15.52 ha were taken for the evaluation. During 2018-19, there were 05 sites having the total area 82.12 ha under the Compensatory Afforestation. Out of 05 sites, 04 sites covering the area of 41.12 ha were taken for the evaluation, Whereas, 01 site having the total area 4 ha for the period 2018-19 under the CAT PLAN and same was taken for the evaluation as per standard methodology. The details of evaluation of plantation sites is given in **Table-4.96**

Under the scheme Compensatory Afforestation during the year 2016-17, survival in 50.0% and 50.0% plantation sites were below average and good, respectively and during the year 2017-18 survival in one plantation site was observed good. During 2018-19, survival in 50.0%, 25.0% and 25.0% plantation sites were average, good and very good, respectively.





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Whereas, plantations evaluated during the year 2016-17 under the scheme CAT PLAN, survival in both site was average and during the year 2017-18 survival in one site was also registered average. Similarly, during 2018-19 one plantation site was evaluated and site was recorded average. Under the scheme NPV, during 2016-17 and 2017-18, one plantation site was evaluated in each year and sites were recorded average and good, respectively. The detail of survival of plant species in various sites is given in **Table- 4.97**.

**Table-4.97: Details of Survival in various sites of Kullu Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	50.0%	-	50.0%	-	<b>02</b>
2.	2017-18	-	-	100%	-	<b>01</b>
3.	2018-19	-	50.0%	25.0%	25.0%	<b>04</b>
<b>B].</b>	<b>CAT PLAN</b>					
1.	2016-17	-	100%	-	-	<b>02</b>
2.	2017-18	-	100%	-	-	<b>01</b>
3.	2018-19	-	100%	-	-	<b>01</b>
<b>C].</b>	<b>NPV</b>					
1.	2016-17	-	100%	-	-	<b>01</b>
2.	2017-18	-	-	100%	-	<b>01</b>

The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 46.08%, 57.99% and 45.21%, respectively. Whereas, plantations raised under the CAT PLAN during the year 2016-17, 2017-18 and 2018-19, survival was 34.38%, 36.04% and 39.06%, respectively. Under the scheme weighted average survival for the





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plantation evaluated during the year 2016-17 and 2017-18, survival was 44.09% and 61.81%, respectively. The detail of survival of plant species in various years is given in **Table- 4.98**.

**Table-4.98: Weighted Average Survival in various sites of Kullu Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
1	2016-17	02	46.08
2	2017-18	01	57.99
3	2018-19	04	45.21
<b>B].</b>	<b>CAT PLAN</b>		
1	2016-17	02	34.38
2	2017-18	01	36.04
3	2018-19	01	39.06
<b>C].</b>	<b>NPV</b>		
	2016-17	01	44.09
	2017-18	01	61.81
	<b>TOTAL</b>	<b>13</b>	

The growth performance of the species viz., *Abies pindrow*, *Aesculus indica*, *Alnus nitida*, *Cedrus deodara*, *Juglans regia*, *Prunus armeniaca*, *Prunus cornuta* and *Salix* sp. was better in the plantation sites. However, species like *Cedrus deodara*, *Aesculus indica* and *Melia azedarach* did not performed in a few plantation sites. The low survival percentage in some of the site was due to damage caused by wild animal, fire, grazing and thick growth of bushes and weeds in most of the plantation sites. The most of the plantation sites were well fenced.





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**Table-4.96: Division-wise Details of the Plantation Sites including GPS Coordinates of Kullu Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	2/42 Hamshushill	NPV	2016-17	Neri	Fozal	Patlikuhah	4	4.0	2024	32°05'16.4"N 077°04'55.3" E Northern	44.09	Difficulty in getting labour and grazing pressures
2.	BG-III Shethally Nallah	CAT PLAN	2016-17	Patlikuhah	Katrain	Patlikuhah	20	31.4	2287	32°07'4.4"N 077°07'29.5" E S.W	30.55	Difficulty in getting labour and grazing pressure
3.	2/17 Hamta Gahar C-I-a	CAT PLAN	2016-17	Prini	Vashishat	Manali	10	8.9	2830	32°14'11.6"N 077°13'36.7" E S.W	42.04	Grazing by wild and domestic animals, wild fire
4.	2/10 Pataalsu-C-II-a	Compensatory Afforestation	2016-17	Palchan	Palchan	Manali	15	13.6	2803	32°19'10.3"N 077°09'56.4" E Western	53.02	Grazing pressure, snowfall
5.	Beas Bihal	Compensatory Afforestation	2016-17	Goshal	Manali	Manali	5	3.3	1964	32°15'31.1"N 077°11'06.2" E Western	25.25	Flood in Beas river





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6.	BG-III Thana Pande	NPV	2017-18	Pankot	Katrain	Patlikuhah	5	4.8	2524	32°08'54.9"N 077°06'51.7" E Northern	61.81	Difficulty in getting labour and grazing pressure
7.	2/10 Pataalsu-C-II-b	Compensatory Afforestation	2017-18	Palchan	Palchan	Manali	15.12	15.6	2830	32°19'12.2"N 077°09'58.5"E S.W	57.99	Grazing, fire, and heavy snow fall
8.	2/17 Hamta C-I-c	CAT PLAN	2017-18	Prini	Vashishat	Manali	10	16	2613	32°14'50.3"N 077°13'40.3" E Northern	36.04	Grazing and Theft issues
9.	H-III Kukri Pichhe	Compensatory Afforestation	2018-19	Neri	Fozal	Patlikuhah	14 (7+7)	13.3	2329	32°07'18.9"N 077°02'46.3"E Northern	70.64	Difficulty in getting labour and lack of connectivity
10	BG-III-Bhujnu Matiyani	Compensatory Afforestation	2018-19	Patlikuhah	Katrain	Patlikuhah	16 (8+8)	15.1	1851	32°06'02.7"N 077°06'34.2"E Southern	35.00	Carriage and labour, grazing pressure
11	2/10 Pataalsu-C-V	Compensatory Afforestation	2018-19	Palchan	Palchan	Manali	17.8066	17.4	2798	32°19'07.2"N 077°10'35.3"E S.W	54.99	Labour, gazing pressure and no road connectivity
12	2/10 Pataalsu-C-II-	Compensatory Afforestation	2018-19	Palchan	Palchan	Manali	3.316	2.6	2671	32°19'16.5"N 077°09'43.4"E S.W	41.97	Carriage and labour problems
13	2/17 Hamta C-I-c	CAT PLAN	2018-19	Prini	Vashishat	Manali	4	4.6	2737	32°14'35.3"N 077°13'32.6" E Northern	39.06	Grazing and Theft issues





#### 4.9.2 Lahaul Forest Division:

In Lahaul Forest Division, there were 05 sites having the total area 155 ha for the period 2018-19 under the Compensatory Afforestation. All 05 sites were taken for the evaluation as per standard methodology. The details of evaluation of plantation sites is given in **Table-4.99**.

Under the scheme Compensatory Afforestation during the year 2018-19, survival in 60.0%, 20.0% and 20.0% sites were average, good and very good, respectively. The detail of survival in various sites is given in **Table- 4.100**.

**Table-4.100: Details of Survival in various sites of Kullu Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Compensatory Afforestation</b>					
1	2018-19	-	60.0%	20.0%	20.0%	<b>05</b>

The weighted average survival for the plantations evaluated during the year 2018-19 under the scheme Compensatory Afforestation was 48.33%. The detail of survival of plant species in various years is given in **Table-4.101**.

**Table-4.101: Weighted Average Survival of various years in Lahaul Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1	2018-19	05	48.33
	<b>Total</b>	<b>05</b>	





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The growth performance of the species viz., *Cedrus deodara*, *Hippophae rhamnoides*, *Juniperus polycarpos*, *Pinus wallichiana*, *Robinia psuedoacacia* and *Salix sp.* was better in the plantation sites. However, species like *Corylus jacquemontii*, *Hippophae salicifolia*, *Juglans regia*, *Populus sp.* and *Prunus armeniaca* was not performed in some of the sites. The low survival percentage in some of the site was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced.



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**Table-4.99: Division-wise Details of the Plantation Sites including GPS Coordinates of Lahaul Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	UPF Patseo	Compensatory Afforestation	2018-19	Jispa	Bhaga	Keylong	40	47	3798	32°44'58.0"N 77°16'00.1"E NS	73.79	-
2.	RF Uргуim-R9	Compensatory Afforestation	2018-19	Koksar	Chandra	Keylong	25	33	3081	32°26'03.0"N 77°10'35.7"E N	42.05	-
3.	DPF Gharel	Compensatory Afforestation	2018-19	Bhujund	Tindi	Tindi	30	30	2410	32°48'14.8"N 76°25'08.9"E N	35.68	-
4.	DPF-Khanzar main	Compensatory Afforestation	2018-19	Urgoss	Myar	Udaipur	30	Part I- 18.4 & Part- II 17.8	Part- I 3586 Part- II 3698	Part- I 32°52'21.5"N 76°51'42.5"E Northern Part- II 32°52'22.5"N 76°52'13.3"E Northern	54.12	Limited working season, difficult terrain and carriage of material to the plantation site.







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5.	UPF-Lindoor	Compensatory Afforestation (Afforestation)	2018-19	Jahalman	Lower Pattan	Lower Pattan	30	30.4	3380	32°38'34.0"N 76°52'41.7"E Eastern	26.46	Limited working season, engagement of labour, damage to the plantation by the animals.
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### 4.9.3 Parvati Forest Division:

In Parvati Forest Division, there were 04 sites having the total area 34 ha for the period 2016-17 under the scheme CAT PLAN. Out of 04 sites, 03 sites having the total area 24 ha were taken for the evaluation. Whereas, under the scheme Compensatory Afforestation, there was only 01 site for the period 2016-17 having the total area 9.1 ha and same was taken for evaluation and monitored as per the standard methodology. During 2017-18, there were 04 sites having the total area 27 ha under the scheme CAT PLAN. Out of 04 sites, 03 sites having the total area 15 ha were taken for the evaluation. Whereas, under the scheme Compensatory Afforestation, there was only 01 site for the period 2017-18 having the total area 47.5 ha and same was taken for evaluation. During 2018-19, there were 03 sites having the total area 20.85 ha under the Compensatory Afforestation. All 03 sites were taken for the evaluation and monitored as per the standard methodology. The details of evaluation of plantation sites are given in **Table-4.102.**

Under the scheme Compensatory Afforestation, during the year 2016-17, 2017-18, survival in both sites of each year was reorded below average. During 2018-19, survival in 33.33% and 66.67% plantation site was average and good, respectively. Whereas, the sites evaluated under the scheme CAT PLAN for the period 2016-17, survival in 33.33%, 33.33% and 33.33% sites was below average, average and good respectively. During 2017-18, survival in 66.66% and 33.33% sites was below average and average, respectively. The detail of survival in various sites is given in **Table-4.103.**

**Table-4.103:Details of Survival in various sites of Parvati Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Compensatory Afforestation</b>					
1	2016-17	100%	-	-	-	<b>01</b>





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2	2017-18	100%	-	-	-	<b>01</b>
3	2018-19	-	33.33%	66.67%	-	<b>03</b>
<b>B</b>	<b>CAT PLAN</b>					
1.	2016-17	33.33%	33.33%	33.33%	-	<b>03</b>
2.	2017-18	66.67%	33.33%	-	-	<b>03</b>

The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 19.33%, 30.23% and 46.88%, respectively. Whereas, plantations raised under the CAT PLAN during the year 2016-17 and 2017-18, survival was 39.69% and 28.66%. The detail of survival of plant species in various years is given in **Table-4.104**.

**Table-4.104: Weighted Average Survival of various years in Parvati Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A].</b>	<b>Compensatory Afforestation</b>		
<b>1.</b>	2016-17	01	19.33
<b>2.</b>	2017-18	01	30.23
<b>3.</b>	2018-19	03	46.88
<b>B].</b>	<b>CAT PLAN</b>		
<b>1.</b>	2016-17	03	39.69
<b>2.</b>	2017-18	03	28.66
	<b>TOTAL</b>	<b>11</b>	

The growth performance of the species viz., *Abies pindrow*, *Aesculus indica*, *Ailanthus altissima*, *Alnus nitida*, *Cedrus deodara*, *Diospyros lotus*, *Juglans regia*, *Morus alba*, *Prunus armeniaca*, *Punica granatum*, *Quercus oblongata*, *Robinia pseudoacacia*, *Salix* sp. and *Sapindus mukorossi* was better in the plantation sites. However, species like *Abies pindrow*, *Grewia optiva*, *Quercus oblongata*, *Sapindus mukorossi* and *Salix* sp. did not performed in a few sites. The low survival percentage in



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some of the sites was due to drought conditions, lack of irrigation facility and damage caused by wild animals. All the plantation sites were well fenced with fence posts and barbed wire.





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**Table- 4.102: Division-wise Details of the Plantation Sites including GPS Coordinates of Parvati Forest Division**

S. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival Percentage of the Plantation	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Malana Pichhe	CAT PLAN	2016-17	Malana	Kasol	Kasol	5	3.2	2305	32° 2'56.29"N 77°15'29.08"E E	12.81	-
2.	Bhandang	CAT PLAN	2016-17	Tulga	Pulga	Kasol	11	12.2	2711	31°58'53.77"N 77°26'59.56"E NE	55.03	-
3.	Sharage	CAT PLAN	2016-17	Tosh	Tosh	Kasol	8	10.8	2710	32° 0'55.04"N 77°26'29.82"E E	35.39	-
4.	Tundaban	Compensatory Afforestation	2016-17	Dyar	Bhuin	Hurla	9.1	6.5	2365	31°52'13.65"N 77°12'4.93"E S to E	19.33	-
5.	Ushko	CAT- PLAN	2017-18	Malana	Kasol	Kasol	5	6.9	2559	32° 3'34.97"N 77°15'46.44"E NW	21.29	-
6.	Bhandang	CAT- PLAN	2017-18	Tulga	Tulga	Kasol	5	6.6	3135	31°58'10.00"N 77°26'50.24"E E	28.93 (6.91*)	* Biomass of Grasses/m <sup>2</sup> in Plantation Area
7.	Shadithach	CAT- PLAN	2017-18	Tosh	Tosh	Kasol	5	8.3	3032	32° 2' 18.63"N 77°27' 42.20"E E	35.76 (5.64*)	*Biomass of Grasses/m <sup>2</sup> in Plantation Area



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8.	1/20 Cherithach C, IIa	Compensatory Afforestation	2017-18	Barogi	Bhuin	Hurla	47.5	35.2	2418	31°54'21.94"N 77°15'2.76"E S to W	30.23	-
9.	Maharaja III UPF (Jawalage)	Compensatory Afforestation	2018-19	Sandhar	Doh- ranala	Bhuntar	7.58	8.80	1658	31°54'20.22"N 77° 5'39.83"E N to E	35.13	
10.	1/33 Shahita DPF	Compensatory Afforestation	2018-19	Kashwari	Pini	Jari	4.85	4.6	2110	31°55'52.88"N 77° 9'19.79"E E to N	57.60	
11.	Trehandhar Kot Kandi-III	Compensatory Afforestation	2018-19	Narogi	Bhuin	Hurla	6	5.9	1704	31°52'59.73"N 77°10'33.61"E S to W	53.06	





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### 4.9.4 Seraj Forest Division:

In Seraj Forest Division, there were 07 sites having the total area 40 ha for the period 2016-17 under the CAT PLAN, Out of 07 sites, 03 sites were taken for the evaluation covering the area of 20 ha. Whereas 03 sites having the total area 100 ha for the period 2016-17 under NPV, Out of 03 sites, 02 sites covering the area of 63.0 ha were taken for the evaluation. During 2017-18, there were 05 sites having the total area 22 ha under the CAT PLAN, Out of 05 sites, 02 sites were taken for the evaluation covering the area of 10 ha. Whereas 02 sites having the total area 30.65 ha for the period 2017-18 under Compensatory Afforestation, both 02 sites were taken for the evaluation as per standard methodology. During 2018-19, there were 03 sites having the total area 15 ha under the CAT PLAN, Out of 03 sites, 01 site were taken for the evaluation covering the area of 6 ha. Whereas, 01 site having the total area 30 ha for the period 2018-19 under the NPV and same were taken for the evaluation and similarly, there were 03 sites having the total area 26.45 ha for the period 2018-19 under the Compensatory Afforestation, and same were taken for the evaluation as per standard methodology. The details of plantation sites are given in **Table-4**.

Under the scheme Compensatory Afforestation during the year 2017-18, survival in 50.0% and 50.0% sites was average & good, respectively and during 2018-19 survival in 66.67% and 33.33% sites was average and good, respectively. Whereas, under the scheme CAT PLAN during the year 2016-17, survival in one site was average and during 2017-18, survival in 66.67% and 33.33% site was average and good, respectively. During 2018-19, survival in one site was recorded good. Under the scheme NPV, during 2016-17 & 2018-19, survival in both year plantation was observed average. The detail of survival in various sites is given in **Table-4.106**.



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**Table-4.106: Details of Survival in various sites of Seraj Forest Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A]. Compensatory Afforestation</b>						
1.	2017-18	-	50.0%	50.0%	-	<b>02</b>
2.	2018-19	-	66.67%	33.33%	-	<b>03</b>
<b>B]. CAT PLAN</b>						
1.	2016-17	-	100%	-	-	<b>03</b>
2.	2017-18	-	66.67%	33.33%	-	<b>03</b>
3.	2018-19	-	-	100%	-	<b>01</b>
<b>C]. NPV</b>						
1.	2016-17	-	100%	-	-	<b>02</b>
2.	2018-19	-	100%	-	-	<b>01</b>

The weighted average survival for the plantations evaluated during the year 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 46.64% and 46.72%, respectively. Whereas, plantations raised under the CAT Plan during the year 2016-17, 2017-18 and 2018-19, survival was 43.42%, 49.73% and 50.48%, respectively. The weighted average survival for the plantations evaluated during the year 2016-17 and 2018-19 under the scheme NPV was 41.15% and 45.87%, respectively. The detail of survival in various years is given in **Table-4.107**.

**Table-4.107: Weighted Average Survival of various years in Seraj Forest Division**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A. Compensatory Afforestation</b>			
1	2017-18	02	46.64







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2	2018-19	03	46.72
<b>B.</b>	<b>CAT PLAN</b>		
1	2016-17	03	43.42
2	2017-18	03	49.73
3	2018-19	01	50.48
<b>C.</b>	<b>NPV</b>		
1	2016-17	02	41.15
2	2018-19	01	45.87
	<b>TOTAL</b>	<b>15</b>	

The growth performance of the species viz., *Abies Pindrow*, *Aesculus indica*, *Bauhinia variegata*, *Cedrus deodara*, *Dalbergia sissoo*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Punica granatum*, *Quercus oblongata* and *Sapindus mukorossi* was better in the plantation sites. However, species like *Abies Pindrow*, *Acacia catechu*, *Aesculus indica*, *Ailanthus altissima*, *Bauhinia variegata*, *Melia azedarach*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus cornuta*, *Salix sp.*, *Sapindus mukorossi* and *Syzygium cumini* were not performed well in a few sites. The low survival percentage in some of the site was due to damage caused by wild animal and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged.



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**Table-4.105: Division-wise Details of the Plantation Sites including GPS Coordinates of Seraj Forest Division**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Chharon	CAT PLAN	2016-17	Gohi	Sainj	Sainj	5	5.23	1686	31°46'41.1"N 077°18'30.8"E Southern	44.52	--
2.	Chilyala	CAT PLAN	2016-17	Sainj	Sainj	Sainj	5	4.4	1776	31°46'12.7"N 77°20'56.9"E SW	48.32	--
3.	Bakerdhar	CAT PLAN	2016-17	Bhallon	Larji	Sainj	10	8.4	1242	31°46'08.9"N 077°16'08.5"E Southern	40.42	
4.	Thawari Parashi	NPV	2016-17	Kotla	Panihar	Tirthan	13	19.94	1158	31°42'54.6"N 77°14'36.7"E NW	43.67	--
5.	Dhaman	NPV	2016-17	Kotla	Panihar	Tirthan	50	66	1180	31°42'57.9"N 077°14'50.6"E NE	40.50	--
6.	Tindadhar	CAT PLAN	2017-18	Deori	Sainj	Sainj	5	4.8	1992	31°45'17.1"N 77°20'42.2"E NE	55.45	--
7.	Faglaphat	CAT PLAN	2017-18	Gohi	Sainj	Sainj	5	6.2	1475	31°46'35.9"N 077°17'35.2"E SW	44.00	--





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8.	Dalashani	Compensatory Afforestation	2017-18	Dalashani	Larji	Sainj	25.5	41.2	1307	31°47'09.4" N 077°12'11.5"E Southern	44.84	--
9.	Bhekhaldhar-III	Compensatory Afforestation	2017-18	Kalawari	Palach	Tirthan	5.15	9.7	2717	31°40'25.1"N 077°21'55.1"E NE	52.70	--
10.	Banganala	Compensatory Afforestation	2017-18	Dalashni	Larji	Sainj	30	32	1168	31°45'35.5"N 077°12'38.0"E SE	47.12	--
11	Kartahphat	CAT PLAN	2018-19	Sainj	Sainj	Sainj	6	11.5	1632	31°46'31.5"N 077°20'20.6"E NW	50.48	--
12	Sallash	NPV	2018-19	Larji	Larji	Sainj	30	26.7	1160	31°45'11.9" N 077°14'25.1"E NE	45.87	--
13	Kutla(Bhekhali dhar-II)	Compensatory Afforestation	2018-19	Chanon	Panihar	Tirthan	8	11.20	1619	31°40'22.2"N 077°18'15.0"E SW	44.60	--
14	Lahauldhar	Compensatory Afforestation	2018-19	Kotla	Panihar	Tirthan	10	9.30	1909	31°43'17.1"N 077°15'52.5"E	41.36	--
15	Sarchi aage (Bhekhaldhar-I)	Compensatory Afforestation	2018-19	Bandal	Palach	Tirthan	8.45	11.40	2444	31°36'35.3"N 077°25'04.9"E NE	55.08	--



#### 4.10 GREAT HIMALAYAN NATIONAL PARK (GHNP), SHAMSHI:

In GHNP Wildlife Division, there were 20 sites having the total area 143 ha for the period 2016-17 under the CAT PLAN, Out of 20 sites, 08 sites were taken for the evaluation covering the area of 49 ha. Whereas 2 sites having the total area 20 ha for the period 2016-17 under the Compensatory Afforestation, out of 02 sites, 01 site was taken for the evaluation covering the area 10 ha as per standard methodology. During 2017-18, there were 15 sites having the total area 76 ha under the CAT PLAN, Out of 15 sites, 05 sites were taken for the evaluation covering the area of 23.63 ha as per standard methodology. During 2018-19, there were 16 sites having the total area 101 ha under the CAT PLAN, Out of 16 sites, 10 sites were taken for the evaluation covering the area of 60.17 ha as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.108**.

Plantations evaluated under the scheme Compensatory Afforestation during the year 2016-17, survival in one site was average. Whereas, under the scheme CAT PLAN during the year 2016-17, survival in 62.5%, and 37.50% was below average and average, respectively and during the year 2017-18 survival in 40.0% and 60.0% plantation was below average and average, respectively. During 2018-19, survival in 30.0%, 50.0% and 20.0% site was below average, average and good, respectively. The detail of survival in various sites is given in **Table-4.109**.

**Table-4.109: Details of Survival in various sites of GHNP Shamshi**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Compensatory Afforestation</b>					
1	2016-17	-	100%	-	-	<b>01</b>





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<b>B</b>	<b>CAT PLAN</b>					
1	2016-17	62.5%	37.5%	-	-	<b>08</b>
2	2017-18	40.0%	60.0%	-	-	<b>05</b>
3	2018-19	30.0%	50.0%	20.0%	-	<b>10</b>

The weighted average survival for the plantation evaluated during the year 2016-17 under the scheme Compensatory Afforestation was 36.32%. Whereas, plantations raised under the CAT PLAN during the year 2016-17, 2017-18 and 2018-19 survival was 23.38%, 28.84% and 38.75%, respectively. The detail of survival of plant species in various years is given in **Table-4.110**:

**Table-4.110: Weighted Average Survival in various sites of GHNP Shamshi**

<b>Sl. No.</b>	<b>Year of Plantation</b>	<b>Number of Sites Evaluated</b>	<b>Weighted Average Survival (%)</b>
<b>A].</b>	<b>Compensatory Afforestation</b>		
1	2016-17	01	36.32
<b>B].</b>	<b>CAT PLAN</b>		
1	2016-17	08	23.38
2	2017-18	05	28.84
3	2018-19	10	38.75
	<b>Total</b>	<b>24</b>	

The growth performance of the species viz., *Cedrus deodara*, *Quercus floribunda*, *Picrorhiza kurroa*, *Syzygium cumini*, *Punica granatum*, *Prunus persica*, *Salix sp.*, *Taxus wallichiana*, *Sapindus mukorossi*, *Valeriana jatamansi*, *Angelica glauca*, *Prunus armeniaca* etc. was better in the plantation sites. However, species like *Hippophae sp.*, *Prunus armeniaca*, *Prunus cerasoides*, *Pyrus pashia*, *Quercus oblongata* and *Salix sp.* did not performed well in some of the sites. All the plantation sites were fenced with wooden / cement posts having barbed wire.



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**Table-4.108: Division-wise Details of the Plantation Sites including GPS Coordinates of GHNP Shamshi**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Ropa	CAT PLAN	2016-17	Suchain	Shanghar	Sainj	12.0	11.6	1637	31°45'56.2"N 77°21'50.1"E N	23.40	
2.	Pradhshirdhar - II	CAT PLAN	2016-17	Shanghar	Shanghar	Sainj	5.0	4.7	2500	31°44'41.9"N 77°22'43.2"E Eastern	44.52	
3.	Tisipur	CAT PLAN	2016-17	Lapah	Marror	Sainj	5.0	4.6	2435	31°45'38.2"N 77°26'07.6"E Eastern	24.15	
4.	Kathiban	CAT PLAN	2016-17	Pashi	Kunder	Jiwanal	5.0	5.2	1816	31°48'25.8"N 77°20'12.1"E SE	11.4	
5.	Buga Dhar (Chogad)	CAT PLAN	2016-17	Pashi	Kunder	Jiwanal	3.0	3.2	2042	31°39'18.0"N 77°20'25.3"E W	-	
6.	Ratna	CAT PLAN	2016-17	Bah	Deun	Jiwanal	10	10.7	2421	31°47'15.2"N 77°23'55.7"E NW	14.88	Grazing pressure and carriage of planting material.





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7.	Sharanghad	CAT PLAN	2016-17	Saran	Railla	Jiwanal	5	5.2	2335	31°47'37.0"N 77°18'49.2"E SW	36.80	Terrain very tough to work and engagement of labours is difficult
8.	Larogi	CAT PLAN	2016-17	Neuli	Raila	Jiwanal	4.0	5.3	2881	31°48'25.8"N 77°21'44.8"E North west	32.97	Grazing pressure and carriage is difficult
9.	Mail	Compensatory Afforestation	2016-17	Majhan	Deun	Jiwanal	10	10.6	1895	31°46'50.8"N 77°24'21.3"E South east	36.32	Carriage, wildlife and grazing problem
10	Madrachi	CAT PLAN	2017-18	Madrachi	Shanghar	Sainj	5.0	6.96	2418	31°44'10.0"N 77°23'39.2"E Northern	19.25	Damage to plantation by wild animals and carriage of material to the plantation site.
11	Kunder	CAT PLAN	2017-18	Pashi	Kunder	Jjiwana l	5.0	5.4	2260	31°50'15.1"N 77°21'10.6"E Eastern	12.06	Grazing pressure, carriage of p bag and engagement of labours is difficult



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12	Chanu Nala	CAT PLAN	2017-18	Mashiyar	Bathad	Tirthan	3.63	3.8	2385	31°36'18.5"N 77°30'39.4"E Northern	47.78	Damage due to Wildlife and grazing problem
13	Jognidhar	CAT PLAN	2017-18	Majhan	Deun	Jiwanal	5	6.7	2512	31°47'27.3"N 77°25'14.5"E SW	36.00	Damage due to stray animals and carriage is difficult
14	Murda	CAT PLAN	2017-18	Bhupan	Kunder	Jiwanal	5.0	5.5	2310	31°48'00.7"N 77°18'29.4"E Eastern	34.32	Grazing and carriage problem
15	Ratna- I	CAT PLAN	2018-19	Suchain	Shanghar	Sainj	13	16.01	2215	31°45'04.8"N 77°21'14.5"E NW	30.72	Grazing pressure and carriage
16	Ratna- II	CAT PLAN	2018-19	Suchain	Shanghar	Sainj	2	1.8	1724	31°45'48.1"N 77°21'23.8"E N	-	
17	Pradhshirdhar - I	CAT PLAN	2018-19	Shanghar	Shanghar	Sainj	5.0	4.8	2465	31°44'05.1"N 77°24'02.9"E plain	22.05	Damage to the plantation due to wild animals
18	Shakti	CAT PLAN	2018-19	Shakti	Marror	Sainj	5.0	4.6	2247	31°47'19.4"N 77°29'09.2"E plain	40.30	Carriage of material e.g. barbed wire up to the plantation site engagement of labour is difficult.







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19	Tung - III UPF (Chogad)	CAT PLAN	2018-19	Chalori	Bathad	Tirthan	12.17	12.57	2185	31°36'09.5"N 77°29'26.7"E S	65.0	Fire prone area and grazing problem
20	Thali Age	CAT PLAN	2018-19	Neuli	Raila	Jiwanal	3.0	2.3L	1890	31°46'22.7"N 77°21'34.8"E SW	48.13	Carriage of material e.g. barbed wire and engagement of labour is difficult and grazing pressure
21	Ean thach and jammu thach	CAT PLAN	2018-19	Bah	Deun	Jiwanal	10	14.8	2810	31°48'13.8"N 77°24'22.2"E NW	32.00	Carriage , wildlife and grazing problem
22	Niharni	CAT PLAN	2018-19	Bah	Deun	Jiwanal	5.0	4.3	2258	31°47'10.3"N 77°24'27.4"E E	50.24	Grazing pressure , carriage of p bag and engagement of labours is difficult



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23	Niharni 2nd	CAT PLAN	2018-19	Bah	Deun	Jiwanal	3.0	4.6	2376	31°47'40.1"N 77°23'32.5"E SW	6.13	Very steep slope , terrain is difficult to work and grazing pressure , fire prone area
24	Khanorani	CAT PLAN	2018-19	Bhupan	Kunder	Jiwanal	2.0	2.5	2426	31°41'12.8"N 77°18'8.8"E NE	47.86	Fire prone area and grazing problem





#### 4.11 WILDLIFE CIRCLE, DHARAMSHALA:

In this Wildlife Circle, evaluation of the plantations raised under CAMPA in Wildlife Division Chamba and details of the evaluation are being given as below:

##### 4.11.1 Wildlife Division Chamba:

In Chamba Wildlife Division, there were 07 sites having the total area 55 ha for the period 2016-17 under the CAT PLAN, out of 07 sites 03 sites having the total area of 20 ha were taken for evaluations as per standard methodology. During, 2017-18, there were 04 sites having the total area 20 ha under the CAT PLAN, out of 04 sites 02 sites having the total area of 10 ha were taken for evaluations as per standard methodology. The details of evaluation of plantation sites is given in **Table-4.111**.

Plantations evaluated under the scheme CAT PLAN during the year 2016-17, survival in 75.0% and 25.0% plantation sites was below and average, respectively and during the year 2017-18, survival in 50.0% and 50.0% plantation sites was also below average and average, respectively. The detail of survival in various sites is given in **Table-4.112**:

**Table-4.112:Details of Survival in various sites of WL Division Chamba**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>CAT PLAN</b>					
1	2016-17	75.0%	25.0%	-	-	<b>03</b>
2	2017-18	50.0%	50.0%	-	-	<b>02</b>



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The weighted average survival for the plantations evaluated during the year 2016-17 and 2017-18 under the scheme CAT Plan was 23.97% and 34.30% respectively. The detail of survival of plant species in various years is given in **Table-4.113**.

**Table-4.113: Weighted Average Survival of various years in Wildlife Division Chamba**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A].	<b>CAT PLAN</b>		
1.	2016-17	03	23.97
2.	2017-18	02	34.30
	<b>TOTAL</b>	<b>05</b>	

The growth performance of species viz., *Aesculus indica*, *Cedrus deodara* and *Pinus wallichiana* was better in maximum sites. However, species like *Prunus persica* and *Prunus armeniaca* did not performed well in a few sites. The low survival percentage in some of the site was due to damage caused by wild animal, fire and grazing. The most of the plantation sites were well fenced however, in some sites fencing was damaged.





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**Table-4.111: Details of the Plantation Sites including GPS Coordinates of Wildlife Division Chamba**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Tandeidhar-I	CAT PLAN	2016-17	Tundah	Tundah	Wild Life Bharmour	10	7.69	2825	32°33'32.7"N 76°27'37.8"E Northern	30.35	--
2.	Thanari DPF	CAT PLAN	2016-17	Dharol	Wild Life Kugti	Wild Life Bharmour	5	5.98	2182	32°27'16.6"N 76°39'00.1"E Northern	11.22	Fire, grazing pressure, land sliding and damage by wild animals.
3.	Deosa DPF	CAT PLAN	2016-17	Lower Kugti	Wild Life Kugti	Wild Life Bharmour	5	5.14	2827	32°28'33.9"N 76°41'08.8"E Southern	23.96	Carriage, Labour issue, avalanche site, Grazing and browsing pressure.
4.	Tandeidhar-II	CAT PLAN	2017-18	Tundah	Tundah	Wildlife Bharmour	5	8.3	2583	32°32'77.1"N 76°26'50.0"E Northern	45.18	--
5.	Chalathu	CAT PLAN	2017-18	Upper Kugti	Wildlife Kugti	Wildlife Bharmour	5	4.38	2991	32°28'40.1"N 76°44'09.6"E Southern	23.42	Heavy grazing pressure, carriage and high risk of land slide.



#### 4.12 WILDLIFE CIRCLE, SHIMLA:

In this circle, plantation sites of Shimla, Sarahan and Spiti wildlife division were evaluated as given below:

##### 4.12.1 Wildlife Division, Shimla:

In Shimla Wildlife Division, there were 03 sites having the total area 60 ha for the period 2016-17 under the scheme Compensatory Afforestation. Out of 03 sites, 02 sites covering the total area 40 ha were taken for the evaluation and monitored as per standard methodology. During 2017-18, there were 02 sites having the total area 65 ha under the scheme Compensatory Afforestation. Out of 02 sites, 01 site covering the total area 30 ha were taken for the evaluation and monitored as per standard methodology. During 2018-19, there was 01 site having the total area 25 ha for the period 2018-19 under the scheme Compensatory Afforestation and same site was taken for the evaluation and monitored as per standard methodology. The details of evaluation of plantation sites are given in **Table-4.114**.

Plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in both sites was average. During the year 2017-18 and 2018-19, one site of each year was evaluated, survival in both year was also recorded average. The detail of survival in various sites is given in **Table-4.115**:

**Table-4.115: Details of Survival in various sites of Wildlife Division, Shimla**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A</b>	<b>Compensatory Afforestation</b>					
1	2016-17	--	100%	-	-	<b>02</b>
2	2017-18	-	100%	-	-	<b>01</b>
3	2018-19	-	100%	-	-	<b>01</b>





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The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme Compensatory Afforestation was 38.15%, 35.37% and 36.44%. The detail of survival of plant species in various years is given in **Table-4.116:**

**Table-4.116: Weighted Average Survival in various sites of Wildlife Division Shimla**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A].	<b>Compensatory Afforestation</b>		
1.	2016-17	02	38.15
2.	2017-18	01	35.37
3.	2018-19	01	36.44
	<b>TOTAL</b>	<b>04</b>	

The growth performance of the species viz., *Bauhinia variegata*, *Olea glandulifera*, *Prunus cerasoides*, *Punica granatum*, *Psidium guajava*, *Pyrus pashia* and *Syzygium cumini* etc. was better in the plantation sites. However, species like *Aegle marmelos*, *Bauhinia variegata*, *Citrus* sp., *Diospyros* sp., *Olea glandulifera*, *Phoenix sylvestris*, *Phyllanthus emblica*, *Prunus cerasoides*, *Punica granatum*, *Quercus oblongata* and *Salix* sp. did not performed in some of the plantation sites. The low survival percentage in some of the site was due to fire and drought. Plantation sites were well fenced however, in some places fencing was damaged.



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**Table-4.114: Details of the Plantation Sites including GPS Coordinates of Wildlife Division Shimla**

Sl. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised (Ha.)		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	D-11 Majathal	Compensatory Afforestation	2016-17	Kangri	Kashlog	Chandi	20	29.39	1520	31°17'06.3"N 76°58'51.8"E Northern	38.85	Grazing pressure, carriage of p bag and engagement of labours is difficult
2.	D-12 Harsang Baghal	Compensatory Afforestation	2016-17	Chandi	Harsang	Chandi	20	49.5	1235	31°16'33.0"N 77°00'29.3"E SE	37.44	Grazing pressure, carriage of p bag and engagement of labours is difficult
3.	D-13 Harsang Bhagal	Compensatory Afforestation	2017-18	Harsang Baghal	Harsang	Chandi	30	29.6	1747	31°15'30.0"N 77°00'47.1"E Eastern	35.37	Very steep slope, terrain is difficult to work and grazing pressure, fire prone area
4.	D-12 Harsang C1	Compensatory Afforestation	2018-19	Chandi	Harsang	Chandi	25	81.3	1610	31°15'59.7"N 77°00'35.3"E	36.44	Grazing pressure, carriage of p bag and engagement of labours is difficult







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### 4.12.2 Wildlife Division Sarahan:

In Sarahan Wildlife Division, there were 07 sites having the total area 41 ha for the period 2016-17 under the CAT PLAN, out of 07 sites 03 sites having the total area of 15 ha were taken for evaluations as per standard methodology. During 2017-18, there were 05 sites having the total area 19 ha under the CAT PLAN, out of 05 sites 04 sites having the total area of 16 ha were taken for evaluations as per standard methodology. During, 2018-19, there were 03 sites having the total area 09 ha under the CAT PLAN, out of 03 sites 02 sites having the total area of 06 ha were taken for evaluations as per standard methodology. The details of evaluation of plantation sites is given in **Table-4.117**.

Plantations evaluated during the year 2016-17 under the scheme CAT PLAN, survival in 33.33%, 33.33% and 33.33% plantation sites were below average, average and good respectively. During 2017-18, survival in 25.0%, 50.0% and 25.0%, site was below average, average and very good, respectively. During 2018-19, survival in 50.0% and 50.0% was below average and average, respectively. The detail of survival in various sites is given in **Table-4.118**:

**Table-4.118: Details of Survival in various sites of Wildlife Sarahan Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
A].	CAT PLAN					
1.	2016-17	33.33%	33.33%	33.33%	-	<b>03</b>
2.	2017-18	25.0%	50.0%	-	25.0%	<b>04</b>
3.	2018-19	50.0%	50.0%	-	-	<b>02</b>



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The weighted average survival for the plantations evaluated during the year 2016-17, 2017-18 and 2018-19 under the scheme CAT Plan was 34.01%, 34.92% and 25.62%, respectively. The detail of survival of plant species in various years is given in **Table-4.119:**

**Table-4.119: Weighted Average Survival in various sites of Wildlife Division Sarahan**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
A].	<b>CAT PLAN</b>		
1.	2016-17	03	34.01
2.	2017-18	04	34.92
3.	2018-19	02	25.62
	<b>TOTAL</b>	<b>09</b>	

The growth of planted species like *Aesculus indica*, *Arnebia benthamii*, *Cedrus deodara*, *Dioscorea deltoidea*, *Juniperus polycarpus*, *Jurinia macrocephala*, *Picrorhiza kurroa*, *Prunus armeniaca*, *Prunus persica*, *Rheum australe* and *Saussurea lappa* was better in the plantation sites. However, species like *Angelica glauca*, *Rheum* sp. and *Salinum vaginatum* did not performed in some of the sites.

The low survival percentage in some of the site was due to damage caused by wild animal, grazing, fire and due to thick growth of bushes. All the plantation sites were fenced with bushes as there was no provision of barbed wire fencing. However, at all sites fencing was found in damaged conditions.





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**Table-4.117: Division-wise Details of the Plantation Sites including GPS Coordinates of Wildlife Division Sarahan**

S. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	C-96 Dudarang	CAT PLAN	2016-17	Chhota Kamba	Chhota Kamba	Rupi	5	6.5	2226	31°34'52.2" 77°54'27.8" NE	58.62	Nomadic grazing
2.	UF-27 Sargangdhar	CAT PLAN	2016-17	Katgaon	Salaring	Rupi	5	8.6	3114	31°40'52.7" 078°00'03.5" NE	7.87	Grazing, Glacier damage prone area and water logging
3.	Sarangasha Kanda	CAT PLAN	2016-17	Asrang	Sangla	Sangla	5	4.8	3795	31°40'44.1" 078°16'45.4" NE	35.54	Nomadic grazing
4.	C-185(b) Khaidhar	CAT PLAN	2017-18	Bajwa	Dofda	Dofda	5	7.2	2580	31°27'12.4" 077°48'49.5" NE	35.05	Nomadic grazing
5.	Sokeny UF-16	CAT PLAN	2017-18	Chhota Kamba	Chhota Kamba	Rupi	5	4.3	2988	31°18'25.7" 76°47'08.7" Eastern	--	Plantation has been destroyed completely by fire incidence.
6.	C-94 (a) Sukutang	CAT PLAN	2017-18	Salaring	Salaring	Rupi	3	3.8	2502	31°35'29.8" 077°55'38.6" NE	46.67	Fire and Land slide prone site



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7.	Dumti Kanda (Mujlang)	CAT PLAN	2017-18	Chhitkul	Sangla/Rakchham	Sangla	3	3	3532	31°20'34.9"N 78°29'0.91"E Southern	81.13	--
8.	UF-3 Jayamanch	CAT PLAN	2018-19	Rupi	Rupi	Rupi	3	2.9	2580	31°36'44.00"N 077°49'36.6" E SE	34.41	Grazing pressure
9.	Namshajang Kanda	CAT PLAN	2018-19	Asrang	Sangla	Sangla	3	2.7	3985	31°41'01.9" 078°16'16.5" Eastern	16.82	Nomadic grazing





#### 4.12.3 Wildlife Division Spiti:

In Wildlife Division Spiti, there were 02 sites having the total area 35.0 ha for the period 2016-17 under the Compensatory Afforestation. Out of 02 sites, 01 site covering the total area 10 ha was taken for the evaluation and monitored as per standard methodology. The detail of evaluation of plantation site is given in **Table-4.117**.

One plantation site was evaluated during the year 2016-17 under the scheme Compensatory Afforestation, survival in this site was below average. The detail of survival in various sites is given in **Table-4.118**:

**Table-4.118:Details of Survival in various sites of Wildlife Sarahan Division**

Sl. No.	Year of Plantation	Survival Category				Total Sites
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A.</b>	<b>Compensatory Afforestation</b>					
1	2016-17	100%	-	-	-	<b>01</b>

The weighted average survival for the plantations evaluated during the year 2016-17 under the scheme Compensatory Afforestation was 8.63%. The detail of survival of plant species in various years is given in **Table-4.119**:

**Table-4.119: Weighted Average Survival in various sites of Wildlife Division, Spiti**

Sl. No.	Year of Plantation	Number of Sites Evaluated	Weighted Average Survival (%)
<b>A.</b>	<b>Compensatory Afforestation</b>		
1	2016-17	01	8.63
	<b>TOTAL</b>	<b>01</b>	



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The growth of planted species like *Hippophae rhamnoides*, *Robinia pseudoacacia* and *Salix* sp. was better in the plantation site. The low survival percentage in the plantation site was due to establishment and survival of the plants in dry and skeletal soils is difficult.





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**Table-4.117: Division-wise Details of the Plantation Sites including GPS Coordinates of Wildlife Division Spiti**

S. No.	Plantation Site	Name of Sector and Scheme	Year of Plantation	Beat	Block	Range	Area of Plantations Raised		GPS Coordinates		Average Survival Percentage of the Plantation (%)	Remarks, if any
							As per Record	As per GPS Reading	Altitude (m)	Latitude Longitude Aspect		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Lari Pharka	Compensatory Afforestation	2016-17	Lari/Tabo	Tabo	Tabo	10	15.5	3280	N32°05'27.7" E078°23'36.9" SE	8.63	Carriage of material is difficult because the site is approachable by means of Jhula over Spiti River.



## **CHAPTER-5**

### **SOCIOECONOMIC IMPACT OF CAMPA PLANTATIONS**

Plantation forestry has expanded considerably in the recent years in India. Plantations are being established on forest/ private land on regular basis in several regions of the country and provide a source of employment and income generation. Understanding the current socioeconomic impacts of plantation forestry is important, particularly to aid prediction of the impacts of future expansion of the sector.

The main objective of carrying out the socioeconomic survey is to assess the impact of the plantation for upliftment of the socioeconomic status of the residents of adjoining villages. Keeping in view the above, socioeconomic survey of 10% of the households of a particular village around the plantation sites was carried out by following standard methodology. A questionnaire has been developed for recording the data in question/ opinion of the general public.

The people of the surveyed villages were of the opinion that plantation activities will benefit the general public in the times to come. The plantation will definitely result in meeting the requirements of the fuel, fodder, timber and will also help in soil conservation, recharging the water resources and maintenance of environment in general. There must be some provision of funds for after care/ watch & ward of the plantations so that the main objective of the plantation can be achieved.

During selection of species for planting, the opinion of local people should be considered beforehand and fruit- bearing species should also be planted to tackle monkey and wild animals menace. More number of fodder and fuel wood species needs to be included in forest plantations those directly benefiting rural masses and generate the additional income. The people are also concerned about forest fires in Chirpine plantations and suggested intensive aftercare for better results.





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The species such as *Grewia optiva* (Behul), *Quercus oblongata* (Ban oak), *Quercus floribunda* (Mohru oak), *Terminalia tomentosa* (Sain), *Terminalia chebula* (Harad), *Terminalia bellirica* (Bahera) and *Shorea robusta* (Sal) along with high yielding grass species should be include for plantation activities. The soil conservation work along Nallahs be taken up on priority basis for preventing soil erosion.

In some of forest divisions, people of adjoining villagers are opinion that plantations activities and fencing the area has reduced the grazing ground for the cattle. The people are also enthusiastic about organizing training programmes on various forestry and environmental issues by reputed organization.

In case of *Lantana* infested areas people suggested complete uprooting and burning with the participation of local people. People were benefited by grass production due to fencing of the plantation site.

The people are also concerned about grazing areas inside the sanctuary and demanding de notification of sanctuary so that their traditional right could be protected in nearby areas.



## CHAPTER-6

### CONSTRAINTS AND SUGGESTIONS

The constraints faced by the officials of the Himachal Pradesh Forest Department during the establishment of plantation and aftercare in the state of Himachal Pradesh are described as below:

#### 6.1 Constraints:

- The major constraints faced during plantation and aftercare were, forest fire occurred in summer months, grazing pressure, damage of the plants by wild animals like Deer, Porcupine, Ghoral, Sambhar, Nilgai and wild pigs.
- The factors like moderate to steep slope, shallow soil depth and low moisture retention capacity also contributed towards moderate survival.
- The insufficient provision of funds, non availability of labour, debris thrown from new road construction during and after plantation.
- Drought conditions during summer months also causing mortality in some of the planted species.
- The damage caused by stray animals and minimum cooperation of local peoples for protection of the plantation.
- Transportation shock during transportation of plants from distant nursery also affected the survival of the planted species.
- In some plantation sites naturally of *Lantana camara* and other bushes was a hindrance in carrying out the plantation activities and it also affects the growth of planted species.
- In some of the sites frequent movement of the local people through the plantation sites damages the plantation considerably.
- The carrying of the fencing material, bush cutting during preparation of site plantation and after the plantation.



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- The damage caused by landslides in some of the plantation sites is also the reason for low survival.
- In some sites Deodar was planted on exposed sites, which was below its natural zone and resulted into mortality.
- In some of the areas, naked root plants did not respond well to the planted sites.
- In Kinnaur forest division, dieback of plants due to frost, glaciers, lack of irrigation facility were major constraints faced during plantation and aftercare work.
- In some plantation sites people were reluctant to spare area for plantations due to reduction of grazing area for their animals.
- In the higher altitude areas nomadic people keep their horses and sheep in the nearby area of the plantation.
- Plantations have already been carried out by the Himachal Pradesh Forest Department in most of the good, suitable & fertile sites. Now therefore, the areas available for carrying out the plantation are mostly refractory sites and are less fertile.
- The low cost model of the plantation is also one of the factors behind less survival in the some of the areas.
- The plantations are carried out in rainfed conditions in the entire state of Himachal Pradesh without having any irrigation facilities. Therefore, because of erratic pattern of the rainfall during monsoon and winter season, survival of the plantations was effected.

### 6.2 Suggestions for Improvement:

Some of the suggestions which can be taken care for better survival and establishment of the plantations in the state of Himachal Pradesh are given as below:



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- The plant species proposed for plantations should commensurate with the site and site should be selected keeping in view the purpose behind the plantation scheme and requirements of the local people.
- There should be a provision of budget for preparation of site, which includes, removal of shrubs, bushes viz., *Lantana camara*, *Ageratina adenophora* and other invasive species before carrying out the plantation and in regular interval till establishment of plantations.
- In the plantation sites having steep slope, shallow soil depth and low moisture retention capacity, contour plantation can be adopted for better survival with introduction of concept of social fencing.
- To ensure success of the plantation, long term protection of plantation like provision for watch and ward is required.
- The provision of funds should be made well in advance for timely completion of the field planting and maintenance operations.
- Besides fencing, temporary nursery should be established near the plantation site in order to avoid the transportation damage to the plants.
- In some of the sites naked-root planting stock not responded well, hence plantation of naked root stock should be avoided in stress sites.
- The plantation should be done from the healthy planting stock raised from best genotypes to get good survival of the species.
- Some of the plantation sites having steep slope, rocky area so these types of areas should not be selected for plantation purpose.
- Use of artificial inoculation of seedlings with suitable mycorrhizal fungi can further improve the establishment and growth parameters of seedlings.
- The opinion of the local people should be taken under consideration during the selection of species for plantation.



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- It is also suggested that mixed plantation may be preferred than going for pure *Cedrus deodara* plantation in some refractory sites.
- There should be irrigation facility for getting the better survival in Kinnaur forest division.
- The species of fodder, fruit and medicinal value and other species of economic importance should be included in plantation programme.
- Local people also needs to be educated towards forestry programmes and about the benefits of the plantation for better coordination and thereby protecting plantations from domestic animals in far flung sites.
- In protected areas, the passage of migratory grazers may be shifted outside the sanctuary area.
- In areas having more slopes, it is suggested that in future, for better results, development of contours, introduction of concept of bigger pits with tall planting stock or gunny bag raised seedling should be followed.
- It is also suggested that in harsh and drought prone sites mixing of FYM in pits during plantation and mulching before dry months should be done to get better results.



## **SUMMARY**

The evaluation of plantations carried out by Himachal Pradesh Forest Department during the years 2016-17, 2017-18 and 2018-19 under various schemes i.e. Compensatory Afforestation, Catchment Area Treatment Plan, NPV plantation and Soil & Water Conservation in 35 Forest divisions and 05 Wildlife divisions was conducted by Himalayan Forest Research Institute as per standard methodology. In the state of Himachal Pradesh, total plantation area under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV plantation and Soil & Water Conservation was 3179.49 ha, 2589 ha, 3445 ha and 09 ha respectively.

The area taken for evaluation under various schemes i.e. Compensatory Afforestation, CAT Plan, NPV plantation and Soil & Water Conservation was 1987.43 ha, 990.8 ha, 1824.1 ha and 09 ha respectively. Under **Compensatory Afforestation**, area evaluated during 2016-17, 2017-18 and 2018-19 was 775.19 ha, 745.44 and 466.80, respectively. Whereas, under the scheme **CAT PLAN** area evaluated during 2016-17, 2017-18 and 2018-19 was 461 ha, 322.63 ha and 207.17, respectively. Similarly, under **NPV** plantation area evaluated was 652 ha, 425.6 and 746.5 ha for these years respectively. Under the scheme **Soil & Water Conservation** scheme 09 ha plantation area was evaluated during 2016-17.

Total number of plantation sites for the entire state, which were evaluated under various schemes i.e. Compensatory Afforestation, CAT PLAN, NPV plantation and Soil & Water Conservation was 187, 169, 152 and 02, respectively. Under **Compensatory Afforestation**, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 71, 68 and 48, respectively. Whereas, under **CAT PLAN**, number of plantation sites evaluated during 2016-17, 2017-18 and 2018-19 was 70, 60 and 39, respectively. Similarly, under **NPV** plantations numbers of plantation sites evaluated were 48, 28 and 76 for these three years, respectively. Under **Soil & Water Conservation** scheme, 02 number of plantation sites were evaluated during the year 2016-17.



The plantation sites were selected randomly and all the forest blocks were covered where plantations have been done. Sampling intensity was minimum 30% of plantation sites by number and 25% by total area of plantations of a particular year was adopted. In 5% of the plantations raised in various schemes, 100% physical verification with respect to number of plants planted and survival was also done. The survival percentage of plants in all the Divisions as well as for the entire State was classified into different categories viz., Below Average (0-30%), Average (31-50%), Good (51-70%) and Very Good (71-100%). Weighted average survival percentage was also calculated for all the Forest Divisions and has been described for lower zone, higher zone and cumulatively for the entire State for every component of plantations for each year.

### **Survival and Growth Performance:**

In the **LOWER ALTITUDE** areas i.e. Forest Divisions of Bilaspur, Hamirpur, Nahan and Solan Forest Circles, under the **Compensatory Afforestation (CA)** plantations raised during 2016-17, survival in 25.0%, 50.0% and 25.0% plantation sites was good, average and below average respectively. During the year 2017-18, survival in 5.26%, 47.37%, 10.53% and 36.84% plantation sites was very good, good, average and below average respectively. During 2018-19, survival in 66.67% and 33.33% plantation sites was average and below average, respectively. Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during the year 2016-17, survival in 100% plantation sites was average. During the year 2017-18, survival in 11.11%, 66.67% and 22.22% plantation sites was good, average and below average, respectively. During 2018-19, survival in 100% plantation sites was average.

Under the **NPV** plantations raised during the year 2016-17, survival in 22.22%, 22.22% and 55.56% plantation sites was good, average and below average, respectively. During the year 2017-18, survival in 14.29, 14.29%, 42.86% and 28.57% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 28.57% and 71.43% plantation sites was good and below average, respectively. Under the **Soil & Water Conservation (S & WC)** plantations raised during the year 2016-17, survival in one plantation site was below average. The above details are being given in the following **Table-7.1**.



**Table-7.1: Details of number of sampled sites under different survival categories in various schemes in Lower Altitude Areas of Himachal Pradesh**

Sl. No.	Year of Plantation	Percentage of Sites under different survival category				Total Sites Sampled
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1.	2016-17	25.00%	50.00%	25.00%	NA	<b>12</b>
2.	2017-18	38.84%	10.53%	47.37%	05.26%	<b>19</b>
3.	2018-19	33.33%	66.67%	-	-	<b>03</b>
<b>B.</b>	<b>CAT PLAN</b>					
1.	2016-17	NA	100%	NA	NA	<b>01</b>
2.	2017-18	22.22%	66.67%	11.11%	NA	<b>09</b>
3.	2018-19	NA	100%	NA	NA	<b>01</b>
<b>C.</b>	<b>NPV</b>					
1.	2016-17	55.56%	22.22%	22.22%	NA	<b>09</b>
2.	2017-18	28.57%	42.86%	14.29%	14.29%	<b>07</b>
3.	2018-19	71.43%	NA	28.57%	NA	<b>07</b>
<b>D].</b>	<b>Soil &amp; Water Conservation</b>					
1.	2016-17	100%	NA	NA	NA	<b>01</b>

In the lower altitude areas, under **Compensatory Afforestation** plantations, weighted average survival per cent during the year 2016-17, 2017-18 and 2018-19 was 47.66%, 42.02% and 40.96, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 36.06%, 36.54% and 34.46%, respectively. In plantations raised during 2016-17, 2017-18 and 2018-19 under **NPV** the weighted average survival per cent was 25.29%, 41.51% and 34.76, respectively. Whereas, under the scheme **S&WC**, during the period 2016-17 the weighted average survival per cent was 33.17% (Table-7.2).

**Table-7.2: Weighted average survival under various schemes in Lower Altitude Area**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1	Compensatory Afforestation	47.66	42.02	40.96





2	CAT PLAN	36.06	36.54	34.46
3	NPV	25.29	41.51	34.76
4	Soil & Water Conservation	33.17	NA	NA

The growth performance of the species viz., *Acacia auriculiformis*, *Acacia catechu*, *Acacia nilotica*, *Albizia lebbeck*, *Azadirachta indica*, *Bauhinia variegata*, *Bombax ceiba*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Diospyros* sp., *Grevillea robusta*, *Grewia optiva*, *Jacaranda mimosifolia*, *Mangifera indica*, *Melia azedarach*, *Morus alba*, *Olea cuspidata*, *Phyllanthus emblica*, *Pinus roxburghii*, *Prosopis juliflora*, *Prunus cerasoides*, *Psidium guajava*, *Punica granatum*, *Pyrus pashia*, *Quercus floribunda*, *Quercus oblongata*, *Syzygium cumini*, *Tectona grandis*, *Terminalia bellirica*, *Terminalia arjuna*, *Terminalia tomentosa*, *Thamnocalamus spathiflorus* and *Toona ciliata* was better in most of the plantation sites.

#### **Plant Species Not Performed Well in Plantation Sites:**

The plant species viz., *Acacia catechu*, *Acacia nilotica*, *Aegle marmelos*, *Aesculus indica*, *Albizia lebbeck*, *Anogeissus latifolia*, *Azadirachta indica*, *Bambusa vulgaris*, *Bauhinia variegata*, *Bombax ceiba*, *Butea monosperma*, *Cassia glauca*, *Casia siamea*, *Cassia fistula*, *Cassia siamea*, *Cedrus deodara*, *Dalbergia sissoo*, *Delonix regia*, *Dendrocalamus strictus*, *Eryobotrya japonica*, *Ficus religiosa*, *Grevillea robusta*, *Grewia optiva*, *Leucaena leucocephala*, *Mangifera indica*, *Melia azedarach*, *Moringa oleifera*, *Morus alba*, *Olea glandulifera*, *Phyllanthus emblica*, *Pinus roxburghii*, *Pongamia pinnata*, *Salix* sp., *Sapindus mukorossi*, *Syzygium cumini*, *Tecoma* sp., *Tectona grandis*, *Terminalia bellerica*, *Terminalia arjuna*, *Terminalia chebula*, *Toona ciliata* and *Zizypus* sp. did not respond well in some of the plantation sites.

The low survival percentage in some of the sites was due to damage caused by fire, wild animals, monkeys and grazing. The land which are generally available for plantations are mostly refractory sites and less fertile. The better and fertile areas are used either for growing the agriculture or the horticulture crops or have already been used for carrying out plantations in the past. Plantations carried out by forest department are completely dependent on rainfall. The survival percentage is



affected due to dry season, low rainfall and erratic pattern of the rainfall during monsoon and winter season. In some plantation sites heavy infestation of *Lantana camara* and other bushes & weeds also affects the growth and survival of the planted species. The factors like steep slope, shallow soil depth, low moisture retention capacity and use of naked root plants for plantations also responsible for mortality of plants and thereby contributed towards low to moderate survival.

**In the higher altitude areas i.e.** Forest Divisions of Chamba, Dharamshala, Kullu, Mandi, Rampur, Shimla, Wildlife Shimla (S), Wildlife Dharamshala (N) Circles and GHNP Shamshi under the **Compensatory Afforestation (CA)** plantations raised during the year 2016-17, survival in 16.22%, 10.81%, 43.24% and 29.73% plantations was very good, good, average and below average, respectively. During the year 2017-18, survival in 16.0%, 23.0%, 45.0%, and 16.0% plantation sites was very good, good, average and below average, respectively. During the year 2018-19, survival in 07.0%, 33.0%, 44.0% and 15.0%, plantation sites was very good, good, average and below average, respectively.

Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during the year 2016-17, survival in 10.0%, 48.0%, and 42.00% plantation sites was good, average and below average, respectively. During the year 2017-18, survival in 16.0%, 38.0% and 46.0% plantation sites was good, average and below average, respectively. During the year 2018-19, survival in 13.04%, 47.83% and 39.13% plantation sites was good, average and below average, respectively.

Under the **NPV** plantations raised during the year 2016-17, survival in 08.33%, 16.67%, 50.0% and 25.0% plantation sites was very good, good, average and below average, respectively. During the year 2017-18, survival in 7.14%, 42.86% and 50.0% plantation sites was good, average and below average, respectively. During the year 2018-19, survival in 12.07%, 37.93%, 37.93% and 12.07% plantation sites was very good, good, average and below average, respectively. The above details are being given in the **Table-7.3**.



**Table-7.3:Details of number of sampled sites under different survival categories in various schemes in Higher Altitude Areas of Himachal Pradesh**

Sl. No.	Year of Plantation	Percentage of sites under different survival category				Total Sites Sampled
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
<b>1</b>	2016-17	29.73%	43.24%	10.81%	16.22%	<b>37</b>
<b>2</b>	2017-18	16.00%	45.0%	23.00%	16.0%	<b>31</b>
<b>3</b>	2018-19	15.00%	44.00%	33.00%	07.00%	<b>27</b>
<b>B].</b>	<b>CAT PLAN</b>					
<b>1</b>	2016-17	42.00%	48.00%	10.00%	NA	<b>48</b>
<b>2</b>	2017-18	46.00%	38.00%	16.00%	NA	<b>37</b>
<b>3</b>	2018-19	39.13%	47.83%	13.04%	NA	<b>23</b>
<b>C].</b>	<b>NPV</b>					
<b>1</b>	2016-17	25.0%	50.0%	16.67%	8.33%	<b>24</b>
<b>2</b>	2017-18	50.0%	42.86%	07.14%	NA	<b>14</b>
<b>3</b>	2018-19	12.07%	37.93%	37.93%	12.07%	<b>58</b>

In the **HIGHER ALTITUDE** areas, under **Compensatory Afforestation** plantations, weighted average survival per cent during the year 2016-17, 2017-18 and 2018-19 was 35.63%, 46.33% and 43.03%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 32.75%, 34.23% and 34.21%, respectively. Plantations raised under **NPV** schemes, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 30.99%, 36.0% and 43.84%, respectively (**Table-7.4**).



**Table-7.4: Weighted average survival under various schemes in Higher Altitude Area**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1	Compensatory Afforestation	35.63	46.33	43.03
2	CAT PLAN	32.75	34.23	34.21
3	NPV Plantation	30.99	36.0	43.84

#### **Plant Species Performed Better in Plantation Sites:**

The growth performance of the species viz., *Acacia catechu*, *Aesculus indica*, *Albizia lebbeck*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Cinnamomum tamala*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Ficus racemosa*, *Grevillea robusta*, *Grewia optiva*, *Juglans regia*, *Melia azedarach*, *Morus abla*, *Olea cuspidata*, *Olea paniculata*, *Phyllanthus emblica*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus mira*, *Psidium guajava*, *Punica granatum*, *Pyrus pashia*, *Quercus ilex*, *Quercus oblongata*, *Rhododendron arboreum*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Syzygium cummni*, *Terminalia arjuna*, *Toona ciliata*, *Ulmus wallichiana* etc. was better in most of the plantation sites.

The medicinal plants like *Aconitum heterophyllum*, *Angelica glauca*, *Arnebia benthami*, *Hedychium acuminatum*, *Picrorhiza kurroa*, *Polygonatum chirifolium*, *Rheum australe*, *Saussurea costus*, *Selinum vaginatum*, *Valeriana jatamansi*, *Viola serpens* etc. was better in some of the plantation sites.

#### **Plant Species Not Performed Well in Plantation Sites:**

The planted species like, *Abies pindrow*, *Acacia catechu*, *Aesculus indica*, *Ailanthus altissima*, *Alnus nitida*, *Angelica glauca*, *Bauhinia variegata*, *Cassia fistula*, *Cedrus deodara*, *Dalbergia sissoo*, *Diospyros kaki*, *Eucalyptus sp.*, *Grevillea robusta*, *Grewia optiva*, *Hedychium spicatum*, *Hippophae rhamnoides*, *Juglans regia*, *Juniperus polycarpus*, *Leucaena leucocephala*, *Melia azedarach*, *Morus alba*, *Phyllanthus emblica*, *Picrorhiza kurroa*, *Prunus armeniaca*, *Prunus cerasoides*, *Prunus cornuta*, *Prunus domestica*, *Prunus mira*, *Psidium guajava*,



*Punica granatum*, *Pterospermum acerifolium*, *Quercus ilex*, *Quercus oblongata*, *Robinia pseudoacacia*, *Sapindus mukorossi*, *Saussurea costus*, *Syzygium cumini*, *Taxus wallichiana*, *Tectona grandis*, *Terminalia bellirica* and *Terminalia chebula* etc. did not performed well in some of the plantation sites.

In the plantation sites where grasses were planted under the scheme improvement of alpine pasture, the biomass of grasses inside the plantation area was more than that of outside the plantation area.

The low survival percentage in some of the sites was due to damage caused by snow, wild animal, grazing, monkeys, debris of road construction and fire incidences. Some of the plantation sites were fully burnt by forest fire having nil or very less survival. The less survival in some of the plantation sites was also due to the reason that land which are generally available for plantations are mostly refractory sites and less fertile. The better and fertile areas are mostly used either for growing the agriculture or the horticulture crops or have already been used for carrying out plantations in the past. Plantations carried out by forest department are completely dependent on rainfall. The survival percentage is affected due to dry season, low rainfall and erratic pattern of the rainfall during monsoon and winter season. In some plantation sites heavy infestation of bushes & weeds also affects the growth and survival of the planted species. The factors like steep slope, shallow soil depth and use of naked root plants for plantations also responsible for mortality of plants and thereby contributed towards low to moderate survival.

At the State level, under the **Compensatory Afforestation (CA)** plantations raised during 2016-17, survival in 12.24%, 12.24%, 44.90% and 30.61% and plantation site was very good, good, average and below average, respectively. During 2017-18, survival in 12.0%, 30.0% , 34.00% and 24.0% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 06.67%, 26.67%, 50.0% and 16.67% plantation sites was very good, good, average and below average, respectively.

Under the **Catchment Area Treatment Plan (CAT Plan)** plantations raised during 2016-17, survival in 10.20%, 48.98% and 40.82% plantation sites was good, average and below average, respectively. During 2017-18, survival in 17.0%,



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46.00% and 37.0% plantation sites was good, average and below average, respectively. During 2018-19, survival in 12.0%, 46.0% and 42.0% plantation sites was good, average and below average, respectively.

Under the **NPV** plantations raised during 2016-17, survival in 06.0%, 18.0%, 39.0% and 36.0% plantation sites was very good, good, average and below average respectively. During 2017-18, survival in 5.0%, 9.0%, 43.0 and 43.0% plantation sites was very good, good, average and below average, respectively. During 2018-19, survival in 11.0%, 37.0%, 34.0% and 18.0% plantation sites was good, average and below average, respectively.

Under the **Soil & Water Conservation (S & WC)** plantations raised during 2016-17, survival in one plantation site was below average. The above details are being given in the **Table-7.5**.

**Table-7.5: Details of number of sampled sites under different survival categories in various schemes in the State of Himachal Pradesh**

Sl. No.	Year of Plantation	Percentage of sites under different survival category				Total Sites Sampled
		0-30% (Below Average)	31-50% (Average)	51-70% (Good)	71-100% (Very Good)	
<b>A].</b>	<b>Compensatory Afforestation</b>					
1	2016-17	30.61%	44.90%	12.24%	12.24%	<b>49</b>
2	2017-18	24.00%	34.00%	30.00%	12.00%	<b>50</b>
3	2018-19	16.67%	50.00%	26.67%	06.67%	<b>30</b>
<b>B].</b>	<b>CAT PLAN</b>					
1	2016-17	40.82%	48.98%	10.0%	NA	<b>49</b>
2	2017-18	37.00%	46.00%	17.00%	NA	<b>46</b>
3	2018-19	42.00%	46.00%	12.00%	NA	<b>24</b>
<b>C].</b>	<b>NPV</b>					
1	2016-17	36.0%	39.00%	18.00%	06.00%	<b>33</b>
2	2017-18	43.00%	43.00%	9.00%	05.00%	<b>21</b>
3	2018-19	18.00%	34.00%	37.00%	11.00%	<b>65</b>
<b>D].</b>	<b>Soil &amp; Water Conservation</b>					
1	2016-17	100%	NA	NA	100%	<b>01</b>



In the state level, weighted average survival per cent of the plantations raised under **Compensatory Afforestation** during the year 2016-17, 2017-18 and 2018-19 was 38.30%, 45.04% and 42.62%, respectively. Whereas, under **CAT PLAN**, weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 33.02%, 34.56% and 34.23%, respectively. The weighted average survival per cent for the plantations raised under **NPV** schemes for the year 2016-17, 2017-18 and 2018-19 was 28.54%, 38.0% and 40.81, respectively. The plantations raised under **S & WC** schemes, weighted average survival per cent during the year 2016-17 was 33.17% (**Table-7.6**).

**Table-7.6: Weighted average survival under various schemes in Himachal Pradesh**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	38.30	45.04	42.62
2.	CAT PLAN	33.02	34.56	34.23
3.	NPV	28.54	38.0	40.81
4.	Soil & Water Conservation	33.17	-	-

While comparing the weighted average survival per cent among the various forest divisions of the state, maximum weighted average survival per cent of the plantations raised under Compensatory Afforestation during the year 2016-17, 2017-18 and 2018-19 was 75.22% (Nurpur Forest Division), 66.92% (Chamba Forest Division) and 54.04% (Joginder Nagar), respectively. Whereas, under CAT plan, maximum weighted average survival per cent for the year 2016-17, 2017-18 and 2018-19 was 58.62% (Rampur Forest Division), 59.02% (Dalhousie Forest Division) and 57.56% (Rampur), respectively.

The maximum weighted average survival per cent for the plantations raised under NPV schemes for the year 2016-17, 2017-18 and 2018-19 was 47.57% (Una), 69.73% (Hamirpur Forest Division) and 61.64% (Nurpur), respectively. The plantations raised under S & WC schemes, maximum weighted average survival



per cent during the year 2016-17 was 33.17% in Kunihar Forest Division respectively (**Table-7.7**).

**Table-7.7: Maximum weighted average survival under various schemes in Himachal Pradesh**

Sl. No.	Name of Scheme	Weighted Average Survival (%)		
		2016-17	2017-18	2018-19
1.	Compensatory Afforestation	75.22 (Nurpur)	66.92 (Chamba)	54.04 (Joginder Nagar)
2.	CAT PLAN	58.62 (Rampur)	59.02 (Dalhousie)	57.56 (Rampur)
3.	NPV Plantation	47.57 (Una)	69.73 (Hamirpur)	61.64 (Nurpur)
4.	Soil & Water Conservation	33.17 (Kunihar)	NA	NA

The survival and growth performance of the plantation commensurate with the topography and site conditions in most of the sites. The site selected for plantation was suitable for the species planted by the Department.

In lower as well higher altitude, the most of the plantation sites were well fenced however, in some sites fencing was damaged, burnt by fire or partially erected. The some of the plantation sites were not fenced because they were either falling in the Wildlife Sanctuary areas and also there was no provision of fencing under NPV scheme. The plantation journals of most of the plantation sites were properly maintained by the Forest Department.

## **7.2 Socioeconomic Impacts:**

The main objective of carrying out the socioeconomic survey was to assess the impact of the plantation for upliftment of the socioeconomic status of the residents of adjoining villages. Accordingly, socio-economic survey of nearby villages of the plantation sites was carried out. The people of the surveyed villages were of the opinion that plantation activities will benefit the general public in the times to come. The plantation will definitely result in meeting out the requirements of the fuel, fodder, timber and will also help in soil conservation, recharging the water resources and maintenance of environment in general. It was the general perception





of the people that there must be some provision for aftercare of plants because it was generally seen that lots of plantation campaigns are being executed by the Government through various agencies but the results are not so encouraging keeping in view the survival percentage. In some of the Forest Divisions, people of adjoining villagers are of the opinion that plantations activities and fencing of the area has reduced the grazing ground for the cattle. The people are also concerned about grazing areas inside the sanctuary and demanding de-notification of sanctuary so that their traditional right could be protected in nearby areas.

The analysis of the perceived impacts of plantations under CAMPA reveals that substantial upliftment of the socio-economic status of the community/ surrounding villages should be the main concern while executing the plantation activities. There is need to foresee the benefits of the plantation to the local people in term of diversified goods and services such as timber, fuel-wood, fodder, non-timber forest products, water, wildlife protection and potential to reduce the human wildlife conflict. Therefore, during selection of species for planting, the opinion of local people should be considered beforehand and fruit-bearing species should also be planted to tackle monkey and wild animals menace. More number of fodder and fuel wood species needs to be included in forest plantations those directly benefiting rural masses. The area having infestation of Lantana and other weeds should be eradicated from the bushes before carrying out the plantation and during the maintenance of the plantation. People were also benefited by grass production due to fencing of the plantation site. Local people should be given awareness training on various forestry and environment issues. There is a need to make the provision for after care of the plantation so that the main objectives of the plantation can be achieved.

It was the general perception of the people that during species selection for planting in fringe forests, the opinion of local population should be considered beforehand. The people were also concerned about survival in forest plantations and suggested intensive aftercare in plantation areas at least for three years for better results and more number of fodder and fuel wood species needs to be included in forest plantations for directly benefiting rural masses requiring those items for additional income generation. People's view should be taken in to consideration for selection



of species. Forest department should convince people to participate in protection. Participatory approach of protection of plantation will increase chance of more survival of species planted.

### 7.3 Constraints:

- ✓ The main constraint during and after plantation include forest fires, grazing and damage by wild animal. Accidental or intentional forest fires by local people during the month of summers results in irreparable damage especially to new plantations. People set on fire in the area with the intension to get new green grass for their cattle, goat and sheep. Grazing pressure of livestock also results in damage of plantation. Trampling and browsing damages seedling results into mortality and lower survival of plantation. Similarly, browsing by wild animals also damage the seedlings. The porcupine damages the seedlings of oak by cutting it at collar height. In many plantation area monkey has done lot of damage especially to the pine seedlings, they broken the top of the seedlings which hamper its height. Besides, other wild animal like Deer, Ghoral, Neelgai, Wild pigs, Rodents also damage and harm the planted seedlings.
- ✓ As per the statement of the concerned forest officials, major constrained encountered during plantation work is shortage of labour to carry out plantation, reluctance of people to spare area for plantation (at some site), unavailability of complete blank areas for afforestation, difficulties in carrying of planting material.
- ✓ Sometimes, it has been also observed that fund for carrying out plantations is not received in time, because of these plantations are not carried out in proper time.
- ✓ The forest officials were also concerned about the lack of provision of aftercare and watch and ward.
- ✓ In the most of area, there is minimum cooperation of local peoples for protection of the plantation.
- ✓ The land which are generally available for plantations are mostly refractory sites and less fertile. The better and fertile areas are used either for growing the agriculture or the horticulture crops or have already been used for carrying out plantations in the past. The survival of plantation in such harsh sites is also a big challenge. Therefore, plantation in such sites has less survival rate.



- ✓ The climatic conditions prevailing during planting seasons are also responsible for lesser survival of the plantations. Almost all the plantations carried out by forest department is completely dependent on rainfall. The survival percentage is affected due to dry season, low rainfall and erratic pattern of the rainfall during monsoon and winter season.
- ✓ The landslides in some plantation areas also damaged the planted seedlings, which ultimately resulted in lesser survival rate of the planted species. In Kinnaur district it was observed that frost, avalanche of glaciers resulted in mortality of the seedlings in some of the plantations.
- ✓ In some plantation sites heavy infestation of *Lantana camara* and other bushes & weeds was a hindrance in carrying out the plantation activities and it also affects the growth and survival of the planted species. Lantana is regarded as one of the worst weeds because of its invasiveness, potential for spread and economic and environmental impacts. Lantana forms dense, impenetrable thickets that take over native forests and pastures. It competes for resources and reduces the productivity of, pastures and forestry plantations.
- ✓ The selection of site is first and important step to ensure the success of plantation. However, sometimes sites having very steep slopes, shallow soil depth, rocky sites and low moisture retention capacity are selected for carrying out the plantation activities. The adverse site conditions coupled with harsh climatic conditions are also responsible for lesser survival of the plantation.
- ✓ The nurseries of species to be planted are located far away from the plantation sites. Many species such as Deodar are sensitive for shock. Therefore, transportation shock to seedlings also resulted in damage and lesser survival of planted species.
- ✓ In the higher altitude areas nomadic people keep their horses, cattle and sheep in the nearby area of the plantation. The movement of livestock by nomadic people through plantation areas has damaged some plantation sites.
- ✓ The selection of particular species for plantation is also important criterion for success of the plantation. Many factors such as species natural zone, aspect, slopes were not taken into consideration for planting a species. It was observed that in some areas deodar was planted in exposed site and below its



natural zone of occurrence. Therefore, plantation of species in unsuitable sites resulted in lesser survival of the many species.

- ✓ In some of the areas, naked root plants did not respond well to the planted sites because some of the plantation sites were refractory, less fertile having shallow soil depth, low moisture retention capacity thereby causing the mortality of the plants.

#### **7.4 Suggestions for Improvement:**

- ❖ The selection of suitable site is important and prerequisite for making any plantation a success. The efforts should be made to select sites with good site conditions. The selection of species for plantation in particular area is also very important. Therefore, species proposed for planting should commensurate with site conditions. The people have specific choice for species and they mostly interested to plant the species which meet out fodder, fuel-wood and small timber requirement. Hence, opinion of local people should be taken under consideration during selection of species for plantation. Besides, it is also suggested that species of economic importance like medicinal plant tree species and wild fruit tree species should be planted.
- ❖ The forest department may adopt the concept of planting the tall plants so that the plantations can be established in a lesser time and without much damage due to adverse conditions. The plantation of naked root stock should be avoided in stress sites.
- ❖ Plantations raised under CAMPA do not have provision of watch and ward. It becomes very difficult for concerned officials of forest department to look after the plantations regularly as they have to discharge other official duties from time to time. Without proper aftercare provisions plantations are being damaged by trespassers, grazers, fire, wild animals, etc. Therefore, to ensure success of the plantation, long term protection of plantation like provision for watch and ward at least for 4 to 5 years after plantation is required.
- ❖ In NPV plantation, there is no provision of barbed wire fencing; as a result plantation areas are prone to grazing pressure. Therefore, it is suggested that plantation areas should be fenced with barbed wire fencing.



- ❖ The many plantation sites are located far away from permanent nurseries of the forest department, which resulted in increased transportation cost and damage of planting materials. Therefore, temporary nursery should be established near the plantation site in order to avoid the transportation damage to the plants and also to reduce the transportation cost.
- ❖ Use of artificial inoculation of seedlings with suitable mycorrhizal fungi can further improve the establishment and growth parameters of seedlings. The seedlings tailored through artificial ecto-mycorrhizal inoculation are expected to grow faster and survive better after transplantation. Mycorrhizae play a significant role in plant nutrition, growth improvement, successful afforestation, reforestation, bio-control of pathogens and land reclamation programmes. Ectomycorrhiza (EM) occurs in trees belonging to the Pinaceae (Pine, Spruce), Fagaceae (Oak, Chestnut), Betulaceae (Alder and Birch), Salicaceae (Poplar and Willow), Myrtaceae (Eucalyptus). Some tree genera such as *Alnus*, *Eucalyptus*, *Cupressus*, *Juniperus*, *Ulmus* form both ectomycorrhizae and endomycorrhizae depending on soil conditions and tree's age. Nursery bags can be artificially inoculated with culture during seed sowing and it will reduce pressure to bring forest soil as mycorrhizal inoculum. The inoculated seedlings will have better growth, survival and establishment after transplantation. It will also help to reduce the nursery to field transplantation period, while raising the tall planting stock.
- ❖ The quality of planting material, which is being grown in the nursery should be improved. The healthy planting stock raised from superior genotypes should only be used for plantation. This will ensure that plantation can survive in the adverse conditions prevailing in the plantation sites and thereby help in achieving the better survival rate in the field.
- ❖ There should be a provision of budget for preparation of site, which includes, removal of shrubs, bushes viz., *Lantana camara*, *Ageratina adenophora* and other invasive species before carrying out the plantation and in regular interval till establishment of plantations.
- ❖ To counteract the incidences of occurrence of forest fires in Chir-pine forests, broadleaved species need to be mixed with the species to act as natural barriers within the Chir-pine zone. Fire line should be created and maintained properly throughout the year. There should be separate provision



for deployment of watch guards for the better management of fire occurrence and wild animals induced damage to plantation.

- ❖ Some of the plantation sites having steep slopes, shallow soil depth, drought conditions and low moisture retention capacity thereby resulted into lesser survival rate of planting seedlings of various tree species. In such sites, contour plantation should be carried out for better soil & water conservation and increasing the survival of plantation. The concept of bigger pit size with imported loamy soil should be introduced for better survival in harsh sites. The hardened/conditioned nursery stock need to be planted for better out planting success under un-favorable conditions. The need based construction of check dams in plantation sites for improving the site moisture regime and utilizing the water bodies for irrigation purposes during initial years of establishment of plantations will increase the survival rate.
- ❖ Local people also needs to be educated towards forestry programmes and about the benefits of the plantation for better coordination and thereby protecting plantations from domestic animals in far flung sites and also from fire incidences.
- ❖ In areas having more slopes, it is suggested that in future, for better results, development of contours, introduction of concept of bigger pits with tall planting stock or gunny bag raised seedling should be followed. Fire lines should be made in plantation areas well in advance of fire incidences period in fire prone areas. Fodder species should be included in plantation programmes as per people need and demand. Views of local should be considered in species as well as site selection before taking up plantation activities.
- ❖ In most of the plantation sites, fencing is damaged; hence repair of fencing is urgently required.
- ❖ CAMPA grant should be released well in advance i.e. before planting season for ensuring timely completion of the field planting and maintenance operations.
- ❖ The utmost care shall be taken in selection of sites for carrying out the compensatory afforestation. The views of local residents shall be taken in selection of sites and species. The plantation areas where bush growth is



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vigorous, it is suggested that bushes especially around the plants should be removed to ensure fast growth of species planted.

- ❖ To ensure success of the plantation, long term protection of plantation is required. It is urgently required to introduce and follow the concept of social fencing.
- ❖ The forest department shall organize awareness programme with respect to fire and grazing control among local residents. People shall be sensitized about the importance of plantation, biodiversity and environment. The sense of ownership shall be inculcated in them. They shall be made realized that it is their own plantation. The efforts should be made to involve youth, *mahila mandals*, etc. in protection of plantation.
- ❖ It is also suggested that in harsh and drought prone sites mixing of FYM in pits during plantation and mulching before dry months should be done to get better results.
- ❖ The wherever possible, the provision of irrigation from nearby water source should be made to achieve good growth and better outcome.



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**PLATE-1**

## Rajgarh Forest Division



**General View of the Plantation Site**



*Cedrus deodara*



*Quercus floribunda*



Measurement of *Bauhinia variegata*



**Fencing at Plantation Site**





**Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA**

**PLATE-2**

**Rajgarh Forest Division**



**Fencing at Plantation Site**



*Phyllanthus emblica*



*Syzygium cumini*



*Olea galindulifera*



*Pterospermum acerifolium*



**Measurement during Monitoring**



*Bauhinia variegata*



**Fencing at Plantation Site**



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**PLATE-3**

## Nahan Forest Division

			
<b>General View of Plantation Site</b>		<b>Fencing at the Plantation Site</b>	
			
<b><i>Syzygium cumini</i></b>		<b><i>Psidium guajava</i></b>	<b>Measurement of Plant</b>
			
<b><i>Dendrocalamus strictus</i></b>		<b><i>Morus alba</i></b>	



**Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-4**

**Solan Forest Division**



**General View of Plantation Site**



***Syzygium cumini***

***Pinus roxburghii***



***Phyllanthus emblica***



**Fencing at Plantation Site**



# Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-5

## Bilaspur Forest Division



General View of Plantation Site



*Dendrocalamus strictus*



*Acacia catechu*



*Pinus roxburghii*



*Phyllanthus emblica*



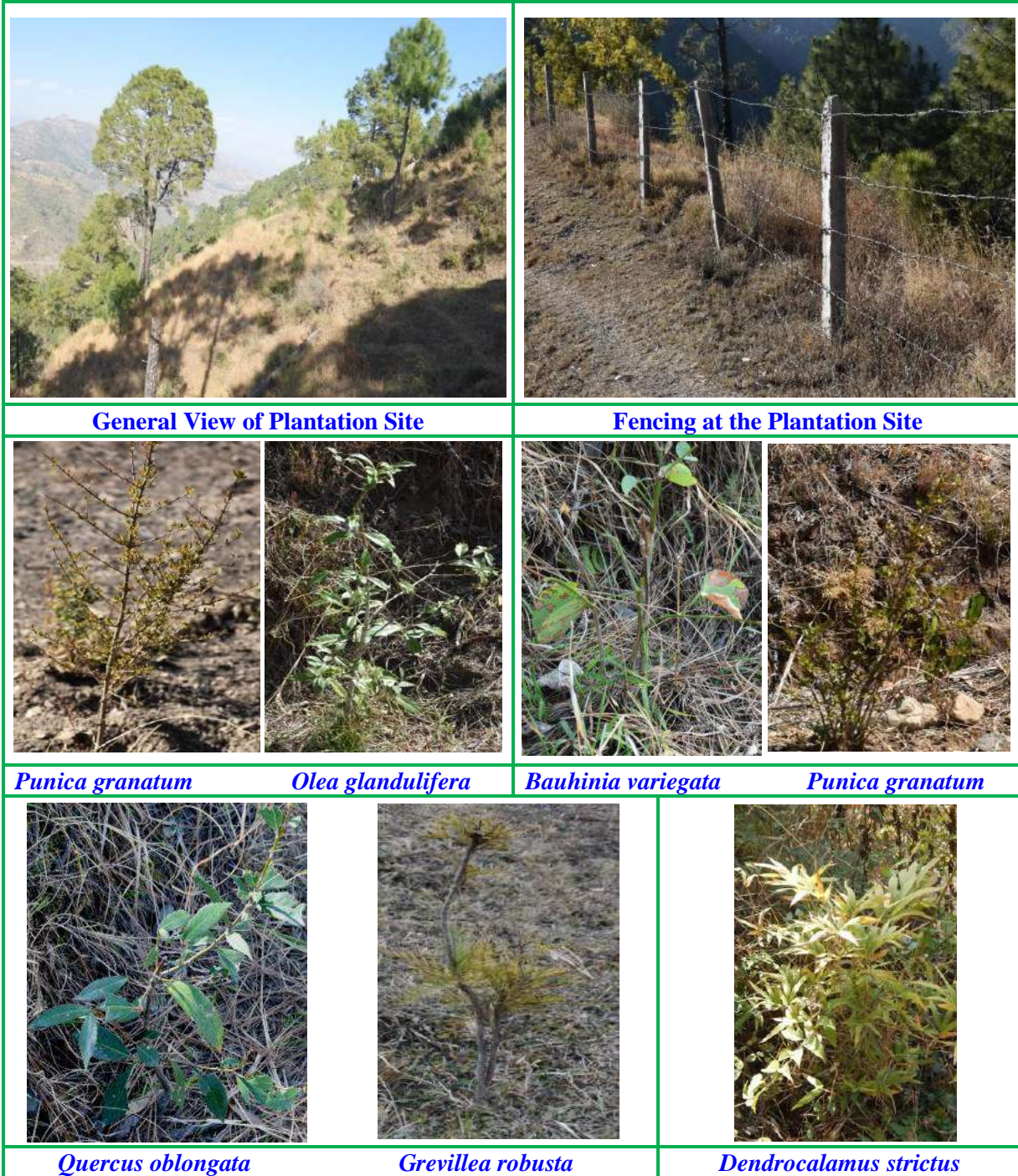
Wooden Fencing with Barbed Wire



# Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-6

## Kunihar Forest Division





**Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-7**

**Hamirpur Forest Division**



**General View of Plantation Site**



**Fencing at the Plantation Site**



***Dalbergia sissoo***



***Bauhinia variegata***



***Syzygium cumini***



***Dendrocalamus strictus***



# Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-8

## Una Forest Division



General View of Plantation Site



*Dalbergia sissoo*



*Dalbergia sissoo*



*Dendrocalamus strictus*



*Phyllanthus emblica*



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

**PLATE-9**

### Bharmaur Forest Division



**General View of Plantation Site**



*Cedrus deodara*



**Measuring Height and Diameter**



**Fencing at Plantation Site**





Report on Monitoring & Evaluation of the Plantations Raised  
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PLATE-10

Bharmaur Forest Division



General View of Plantation Site



*Cedrus deodara*



*Aesculus indica*



*Aesculus indica*



*Pinus wallichiana*



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

**PLATE-11**

### Dalhousie Forest Division



**General View of Plantation Site**



*Cedrus deodara*



**Measurement of Height and Diameter**



*Dendrocalamus strictus*



**Fencing at Plantation Site**



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-12

### Churah Forest Division



General View of Plantation Site



*Sapindus mukorossi*



Measurement of the plant



Fencing at Plantation Site



# Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

**PLATE-13**

## Chamba Forest Division



**General View of Plantation Site**



*Cedrus deodara*



*Dalbergia sissoo*



*Quercus oblongata*



**Fencing at Plantation Site**



**Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA**

**PLATE-14**

**Dharamshala Forest Division**



**General View of Plantation Site**



*Quercus oblongata*



*Cedrus deodara*



*Syzygium cumini*



**Fencing at Plantation Site**



**Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-15**

**Nurpur Forest Division**



**General View of Plantation Site**



*Tectona grandis*



*Bauhinia variegata*



*Dendrocalamus strictus*



*Dalbergia sissoo*



**Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA**

**PLATE-16**

**Palampur Forest Division**



**General View of Plantation Site**



**Fencing at Plantation Site**



*Quercus oblongata*



*Cedrus deodara*



# Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-17

## Kullu Forest Division



General View of Plantation Site



*Aesculus indica*



*Cedrus deodara*



Fencing at Plantation Site











Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA

PLATE-18

Seraj Forest Division

	
<i>Punica granatum</i>	<i>Quercus oblongata</i>
	
<i>Cedrus deodara</i>	Measurement of Planted Species
	
<i>Aesculus indica</i>	Fencing at Plantation Site



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PLATE-19

Lahaul Forest Division



General View of Plantation Site



*Salix sp.*



*Salix sp.*



*Juniperus polycarpus*



*Hippophae salicifolia*



Stone Fencing at Plantation Site



Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA

PLATE-20

Parvati Forest Division



General View of Plantation Site



Fencing of Plantation Site



*Cedrus deodara*



*Quercus leucotrichophora*



*Punica granatum*









*Aesculus indica*



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**PLATE-21**

**Mandi Forest Division**

	
<b>General View of Plantation Site</b>	<b>Fencing of Plantation Site</b>
	
<i>Syzygium cumini</i>	<i>Quercus Oblongata</i>
	
<i>Quercus ilex</i>	<i>Cedrus deodara</i>



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**PLATE: 22**

**Karsog Forest Division**



**General View of Plantation Site**



***Quercus oblongata***



**Measurement of Height and Diameter**



***Rhododendron arboreum***



**Fencing at the Plantation Site**



Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-23**

**Suket Forest Division**



**General View of Plantation Site**



*Punica granatum*

*Quercus oblongata*



**Fencing at Plantation Site**



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**PLATE-24**

**Joginder Nagar Forest Division**



**General View of Plantation Site**



**Fencing of Plantation Site**



*Quercus oblongata*



*Phyllanthus emblica*



*Punica granatum*



*Terminalia arjuna*



Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-25**

**Nachan Forest Division**



**General View of Plantation Site**



*Prunus cerasoides*



*Cedrus deodara*



*Dendrocalamus strictus*



*Quercus oblongata*












Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-26**

**Rampur Forest Division**

			
<b>General View of Plantation Site</b>	<b>Fencing at the Plantation Site</b>		
			
<i>Cedrus deodara</i>	<i>Dalbergia sissoo</i>		
			
<i>Prunus armeniaca</i>	<i>Prunus cerasoides</i>	<i>Abies pindrow</i>	



Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-27

Kinnaur Forest Division



General View of Plantation Site



*Cedrus deodara*



*Pinus gerardiana*



*Dioscorea sp.*



*Populus sp.*



Fencing at Plantation Site



Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA

**PLATE-28**

**Ani Forest Division**



**General View of Plantation Site**



*Albizia sp.*



*Quercus oblongata*



*Pyrus pashia*



*Syzygium cumini*



Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA

**PLATE-29**

**Shimla Forest Division**



**General View of Plantation Site**



*Punica granatum*



*Psidium guajava*



*Grevillea robusta*



*Cedrus deodara*



**Fencing at Plantation Site**



Report on Monitoring & Evaluation of the Plantations Raised  
under H.P. State CAMPA

PLATE-30

Rohru Forest Division



General View of Plantation Site



*Cedrus deodara*



*Aesculus indica*



*Juglans regia*



Fencing at Plantation Site



Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-31

Chopal Forest Division



General View and Fencing at Plantation Site



*Quercus oblongata*



*Cedrus deodara*



Measurement during Monitoring



Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

PLATE-32

Theog Forest Division



General View of Plantation Site



*Cedrus deodara*



Data recording at Plantation site



Fencing at Plantation Site



Report on Monitoring & Evaluation of the Plantations Raised  
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**PLATE-33**

**Wildlife Division Shimla**



**Fencing at Plantation Site**



***Prunus cerasoides***



**Measurement of Planted Species**



***Syzygium cumini***



***Pyrus pashia***





Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

**PLATE-34**

**Wildlife Division Sarahan**



**General View of Plantation Site**



***Juniperus polycarpus***



***Cedrus deodara***



**Measurement of the Plant**



**Fencing at Plantation Site**



Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

**Annexure: I-A**

**Format for Collection of Plantation Data**

1.	Plantation Year				
2.	Sector under which the plantation has been raised (CAT/ CA/ S&WC)				
3.	Name of the Forest Division				
4.	Name of Forest Range				
5.	Name of Forest Block				
6.	Name of Beat				
7.	Type of plantation (Afforestation/ Enrichment/ Energy/ NTFP/ Pasture etc.)				
8.	Name of Plantation Site				
9.	GPS Coordinates of the plantation site	Altitude	Latitude	Longitude	Aspect
10.	Name of the species planted and number of plant planted (species wise)				
11.	Month/Season (Monsoon/Winter)/ Year of Plantation				
12.	Number of plants per Ha required to be planted as per applicable plantation model				
13.	Number of plants per Ha planted (as per record)				
14.	Area of Plantation Raised	As per record			
		As calculated on spot by GPS			
15.	Irrigated or Rainfed				



## Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

16.	Site Description (Soil condition/ rock/ slope/ natural water source & surroundings)	
17.	No. of surviving plants as per sampling done	
18.	Survival percentage of plantation	
19.	Method of plantation (Pits or patches)	
20.	Pit size adopted during plantation	
21.	Plantation Spacing	
22.	Type of planting stock used (Poly plant/naked root/ post planting/ tall planting/ cuttings etc)	
23.	Assessment of regeneration/ rehabilitation status of degraded lands (as per visual observation)	
24.	Availability of biomass and biodiversity (name of species i.e. Trees, Shrubs & Herbs, etc. & their number) in sample plot	
25.	Quality and condition of fencing provided (Whether with concrete Fence posts, or wooden fence posts or Stone wall and number of strands of fencing)	
26.	Growth of the planted species i.e. Height & Diameter (to be recorded in the separate register)	
27.	Whether the record of the plantation have been	



Report on Monitoring & Evaluation of the Plantations Raised under H.P. State CAMPA

	maintained properly or not (Plantation Journal) ?	
28.	Cost norm applicable for the plantation model	
29.	Expenditure incurred on plantation (indicate whether includes plant cost and M&S inputs or not if not capture them separately)	
30.	What are the intended benefits/purpose of this plantation (Opinion of HPFD staff) ?	
31.	Constraints encountered by HPFD staff in raising this plantation	
32.	Opinion of HFRI staff whether the intended results are deliverable. If not why?	
33.	Comments of HPFD staff with regard to constraints in achieving the intended benefits.	
<p><b>Name &amp; Signature of the Data Recorder</b></p>		<p><b>Name &amp; Signature(with designation) of HPFD Officer/ Official</b></p>
<p><b>Countersignature of the Team Leader</b></p>		



Report on Monitoring & Evaluation of the Plantations Raised  
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**Annexure- IB**

**Format for Collection of Socioeconomic Data**

**Impact on quality of life of people living in the villages adjacent to plantation site**

(Preferably Panchayat Pradhan/Ward member/ or representatives of NGOs may be interviewed for gathering the information in question)

1.	Name of the Forest Division	:	
2.	Name of Forest Range	:	
3.	Name of Forest Block	:	
4.	Name of Beat	:	
5.	Name of Plantation Site	:	
6.	Name of stake holder Villages	:	
7.	Number of Household in the Village	:	
8.	Total Population of the Village	:	
9.	Name & Address of the person interviewed	:	
10.	Phone/ Mobile No., if any	:	
11.	How are the people of the area benefitted from the plantation raised?	:	
12.	Whether the availability of fodder increased due to plantation activity?	:	
13.	Is there any change observed in water resources and soil conservation due to plantations?	:	
14.	Are you getting fuel-wood from this plantation?	:	
15.	Is there any impact on environment due to the plantation?	:	



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16.	Whether the socioeconomic condition of the local people have improved due to the coming of this plantation?	:	
17.	Whether the plantation has affected local population adversely in any way? (loss of grazing ground/access to fodder etc)		
18.	How does the villagers perceive this plantation?		
19.	Suggestions, for improvement of the Scheme	:	
20.	Observations of recorder with respect to the people's perception? (What actually are the real issues?)	-	
<b>Name &amp; Signature of the Data Recorder</b>			<b>Countersignature of the Team Leader</b>