

**REPORT ON  
"MONITORING AND EVALUATION OF  
PLANTATION RAISED UNDER CAMPA  
IN THE STATE OF UTTARAKHAND"**

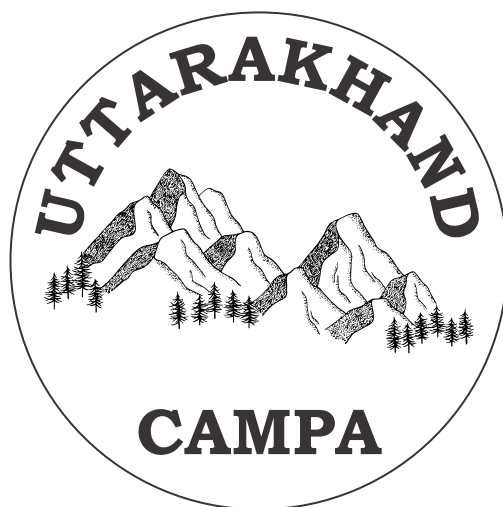


**SUBMITTED BY  
SILVICULTURE & FOREST  
MANAGEMENT DIVISION**

**FOREST  
RESEARCH  
INSTITUTE,  
DEHRADUN**



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# FOREWORD

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Uttarakhand State is rich in forest wealth. The State has reported extent of recorded forest area (RFA) 38,000 sq km which is 71.05% of its geographical area. The reserved, protected and un-classed forests are 69.86%, 26.01% and 4.13% of the recorded forest area in the State respectively. The forests of Uttarakhand are distributed in extensive forest types from tropical, sub-tropical to temperate and alpine forests. Uttarakhand Compensatory Afforestation Fund Management and Planning Authority (Uttarakhand CAMPA) was constituted in November, 2009. Two schemes are implemented in Uttarakhand i.e. NPV and CA under CAMPA project. The function of UK-CAMPA is funding, overseeing and promoting compensatory afforestation done in lieu of diversion of forest land for non forest use under Forest Conservation Act, 1980. The CAMPA plantations in Uttarakhand were undertaken on all types of vacant forest lands. The schemes have been implemented in 38 Forest Divisions of Uttarakhand State.

Plantations require proper monitoring and evaluation in order to achieve the objectives of CAMPA successfully. Evaluation of plantation performance at each stage is important to ensure uninterrupted growth and expected results. Department of forest, Government of Uttarakhand has sanctioned third party monitoring and evaluation of different components under CAMPA plantations for 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 years to Forest Research Institute, Dehradun. Under concurrent monitoring of Uttarakhand CAMPA plantations, 100 percent of the plantation sites were surveyed and 10 percent of the plantation area was sampled for data collection in all forest divisions of Uttarakhand. Monitoring and evaluation is also necessary as it provides the evidence that the investments into the project are worthwhile or alternative approaches need to be considered to improve effectiveness.

Recommendations and observations of different sites in the report could be useful in maintenance and management of CAMPA plantations.

I believe that the present report would be useful to the forest department.

**A.S. Rawat**  
Director



# PREFACE

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Uttarakhand lies on the southern slope of the Himalaya range, and the climate and vegetation vary greatly with elevation, from glaciers at the highest elevations to subtropical forests at the lower elevations. The rich biodiversity of Uttarakhand provides fuel, fodder, timber and water supply to the vast population of north India besides providing ecological stability of fragile Hills of Himalaya.

The State Forest Department has been implementing massive afforestation drives through different schemes and programs of Govt. of India including plantation activities taken up under Compensatory Afforestation Management and Planning Authority (CAMPA) in view of development works such as erection of dams, mining, and construction of industries or road widening etc. in the State which involves diversion of forest areas. CAMPA plantations have been initiated in the State by the Forest Department since 2010. The plantation works under UKCAMPA have been carried out at 2,358 plantation sites covering more than 15,000 ha area spread across 38 forest divisions in the State of Uttarakhand. These plantations were carried out for the period from 2012-13 to 2016-17.

The third-party monitoring and evaluation of these CAMPA plantations was entrusted to Forest Research Institute, Dehradun in the year 2017 by Uttarakhand Forest Department. Silviculture and Forest Management Division of FRI took up this project and initiated survey of plantation sites for field data collection in April 2018 and completed the same in Feb 2021. The data collection was interrupted due to COVID-19 restrictions during 2020-21, however, the teams successfully managed to complete the monitoring works as soon as the conditions improved in the State. Efforts have been made to make the monitoring report more informative by including data on different aspects of plantations based on format designed by MoEF&CC, Govt. of India and suggestions received from the nodal officer UK-CAMPA.

I appreciate the efforts put in by the survey teams of FRI and express my gratitude to the officers and staff of Uttarakhand Forest Department for all the help rendered during field data collection from difficult terrains despite the extreme weather conditions. I sincerely hope that the recommendations given in this report will be useful for the forest managers as well as the field staff for planning subsequent plantation activities in the State.

**Arti Chaudhary**

Head, Silviculture & Forest Management Division

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# EXECUTIVE SUMMARY

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Various development and industrial projects such as dams, mining, and construction of industries or roads may require diversion of forest land mainly for non- forestry purposes. A project proponent, of the nature of government or private, must apply for clearance of the project from the Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India before the start of the project, in case it requires a part of forest land as per the project design. A proposal for the diversion of such forest land is to be submitted through the Nodal Officer, Forest Conservation, Uttarakhand, for land transfers under Forest Department of the State Government. If clearance is given, then compensation for the lost forest cover and the forest land is also to be decided by the ministry and the regulator. The money so collected is utilized for carrying out Compensatory Afforestation and other activities as stipulated in the land transfer proposals or otherwise directed by the MoEF&CC under the arrangements of Ad hoc CAMPA, made after the decision of Honorable Supreme Court of India in 2006.

As per the recent development, the Ministry of Law & Justice, Government of India had notified the new **Compensatory Afforestation Fund (CAF) Act, 2016** in compliance of the Honorable Supreme court order of 2004 and 2006, to streamline the collection and utilization of Compensatory Afforestation fund at the central, as well as, at the State/Union territories' level. For the purpose of this Act, the Government of India has also notified the **Compensatory Afforestation Fund (CAF) Rules, 2018**. The CAF Act, 2016 has been implemented all over the country w.e.f. 30<sup>th</sup> September, 2018. Various committees earlier functional under the adhoc framework of CAMPA have now been re-framed as per the Act and subsequent implementation of all yearly activities are taking place as per the rules notified for the purpose of this Act after 30<sup>th</sup> September, 2018.

The Government of India issued detailed guidelines for establishment of State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA), dated 02-07-2009. These guidelines were intended to assist the States in setting up the requisite mechanism in consonance with the directions of the Hon'ble Supreme Court. Based on this, the Uttarakhand Compensatory Afforestation Fund Management and Planning Authority (Uttarakhand CAMPA) was constituted vide Government of Uttarakhand Office Order no. 3495/x-2-2009-7(6)/2004 dated 10 November, 2009.

Uttarakhand CAMPA was registered on 18 September 2010 as a Society under the Societies Registration Act 1860 in compliance of the Government of Uttarakhand letter no. 75/x-2-2010-7(6)/2004 TC dated 31 August, 2010. However, later on Uttarakhand CAMPA was reconstituted as an Authority in follow up of the directions issued in the ad hoc CAMPA, GoI letter no. 1-20/2006-CAMPA dated 15 February, 2012 and Government of Uttarakhand Notification number 1922/x-2-2012-7(6)/2004 TC dated 08 November, 2012 superseding

the earlier Government of Uttarakhand's Office Order number 75/x-2-2010-7(6)/2004 dated 31 August, 2010. This was the adhoc arrangement made in follow up of the Hon'ble Supreme Court's order of 2006 and guidelines issued by GoI in 2009.

Further, as per the new development under the provisions of CAF Act, 2016, creation of '**The Uttarakhand Compensatory Afforestation Fund Management and Planning Authority**' has been notified by Govt. of India vide its Notification dated 14 August, 2018.

### **Area of Operation**

The area of operation of Uttarakhand CAMPA extends to the entire State of Uttarakhand. At field level it operates through the divisional offices and other offices of the Forest Department of Uttarakhand.

### **Aims, Objectives and Functions of Uttarakhand CAMPA**

As per Central Government Guidelines formulated and circulated on 02 July, 2009, the aims and objectives of 'The Uttarakhand Compensatory Afforestation Fund Management and Planning Authority' shall be to promote:

- Conservation, protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Environmental services, which include:-
  - Provision of goods such as wood, non-timber forest products, fuel, fodder and water, and provision of services such as grazing, tourism, wildlife protection and life support;
  - Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes;
  - Non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational and symbolic; and
  - Supporting such other services necessary for the production of ecosystem services, biodiversity, nutrient cycling and primary production.
  - Research, Training and Capacity Building.

### **Functions of Uttarakhand CAMPA**

The following are the functions of Uttarakhand CAMPA as envisaged in the GoI guidelines issued for the constitution of State Authorities:

- Funding, overseeing and promoting compensatory afforestation done in lieu of diversion of forest land for non -forest use under Forest Conservation Act, 1980.
- Overseeing forest and wild life conservation and protection works within forest areas undertaken and financed under the programme.
- Maintaining separate account in respect of funds received for conservation and protection of protected areas.

- Creating transparency for the programme, mobilization of citizen support and promoting a voluntary movement of youth and students to protect and improve the natural environment including forest, lakes, rivers and wild life.
- Earmarking up to 2% of the funds for Monitoring and Evaluation

Plantations require proper monitoring and evaluation in order to achieve the objectives of scheme successfully. Evaluation of plantation performance at each stage is important to ensure uninterrupted growth and expected results. At each stage of monitoring, impediments and constraints are identified which require careful attention and appropriate remedial measures and should be initiated for the potential growth and development of plants. Monitoring and evaluation will help policy planners for decision making and future management. Department of forest, Government of Uttarakhand has sanctioned third party monitoring and evaluation of different components under CAMPA plantations for 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 years to Forest Research Institute, Dehradun. The first concurrent monitoring annual report for 2018 in 11 forest divisions of Uttarakhand was submitted in December 2018. Second concurrent monitoring annual report for 2019 in 11 forest divisions of Uttarakhand was submitted in December 2019. The current report from January 2020 to February 2021 contained 940 sites of 24 Forest divisions and an area of 7346.309 ha has been monitored by the teams of FRI. However, the field visits were interrupted from March 2020 to August 2020 due to COVID-19. The tours were resumed from September 2020 to February 2021. Under concurrent monitoring, 100 percent of the plantation sites were surveyed for area verification and 10 percent of the plantation area was sampled for data collection. The data were collected from 50% of the sample sites. The GIS maps of the sampled sites were also prepared and presented in the annual reports.

The detailed observations have been made regarding survival percentage, choice of species, biotic pressure in the area, fencing type etc. in the report. The overall average survival of the plantations under UK- CAMPA is calculated as **33.51%** which varied from division to division within a range from **16.30% to 67%** in the state. During the monitoring of plantations, no serious and specific symptoms indicating infestation by insects and pests have been observed in the planted areas. The spacing of plants were found to be irregular and congested on slopes of the hills but in the plains, proper spacing were maintained. The implementation of cultural operations were found missing like singling, weeding, pruning, watering and soil working etc. in most of the plantations although prescribed. Stone wall fencing was created in most of the mountainous areas which were not found effective to control movement of wild/domestic animals in the plantation areas. Anthropological pressure was observed in plantation areas due to collection of fuel wood and fodder as there was indication of lopping and grazing in the area. In some sites, plants were succumbed to forest fires. The growth and survival of plants can be improved if tending and cultural operations are carried out timely in the planted areas. The Division wise average survival percentage in 38 forest divisions of Uttarakhand is given below.

| Sl.No.                                             | Forest Division                              | Average Survival (%) |
|----------------------------------------------------|----------------------------------------------|----------------------|
| 1.                                                 | Uttarkashi Soil Conservation Forest Division | 51.29                |
| 2.                                                 | Uttarkashi Forest Division                   | 28.66                |
| 3.                                                 | Tehri Forest Division                        | 38.23                |
| 4.                                                 | Tehri Dam II Forest Division                 | 32.44                |
| 5.                                                 | Narendra Nagar Forest Division               | 30.28                |
| 6.                                                 | Tons Forest Division                         | 27.97                |
| 7.                                                 | Badrinath Forest Division                    | 27.57                |
| 8.                                                 | Alaknanda Soil Conservation Division         | 24.75                |
| 9.                                                 | Pauri Civil Soyam Forest Division            | 19.55                |
| 10.                                                | Kalsi Soil Conservation Division             | 16.22                |
| 11.                                                | Kalsi Forest Division                        | 35.23                |
| 12.                                                | Bageshwar Forest Division                    | 25.01                |
| 13.                                                | Civil & Soyam Forest Division, Almora        | 25.46                |
| 14.                                                | Pithoragarh Forest Division                  | 26.91                |
| 15.                                                | Champawat Forest Division                    | 38.24                |
| 16.                                                | Haldwani Forest Division                     | 35.72                |
| 17.                                                | Tarai East Forest Division                   | 48.76                |
| 18.                                                | Tarai West Forest Division                   | 48.71                |
| 19.                                                | Ramnagar Forest Division                     | 40.44                |
| 20.                                                | Ramnagar Soil Conservation Division          | 34.46                |
| 21.                                                | Ranikhet Soil Conservation Division          | 33.25                |
| 22.                                                | Nainital Forest Division                     | 26.96                |
| 23.                                                | Nainital Soil Conservation Division          | 26.00                |
| 24.                                                | Soil Conservation, Lansdowne Forest Division | 22.12                |
| 25.                                                | Mussoorie Forest Division                    | 31.94                |
| 26.                                                | Binog Wildlife Sanctuary                     | 37.48                |
| 27.                                                | Chakrata Forest Division                     | 29.26                |
| 28.                                                | Upper Yamuna Barkot Forest Division          | 25.30                |
| 29.                                                | Haridwar Forest Division                     | 40.60                |
| 30.                                                | Dehradun Forest Division                     | 24.29                |
| 31.                                                | Lansdowne Forest Division                    | 42.21                |
| 32.                                                | Gangotri National Park                       | 67.00                |
| 33.                                                | Kedarnath Wildlife Division                  | 26.92                |
| 34.                                                | Nanda Devi Forest Division                   | 44.98                |
| 35.                                                | Rudraprayag Forest Division                  | 26.44                |
| 36.                                                | Almora Forest Division                       | 31.62                |
| 37.                                                | Garhwal Forest Division                      | 33.38                |
| 38.                                                | Tehri Dam I Forest Divison                   | 47.78                |
| <b>Total Average Survival of Uttarakhand CAMPA</b> |                                              | <b>33.51</b>         |

### 1.0

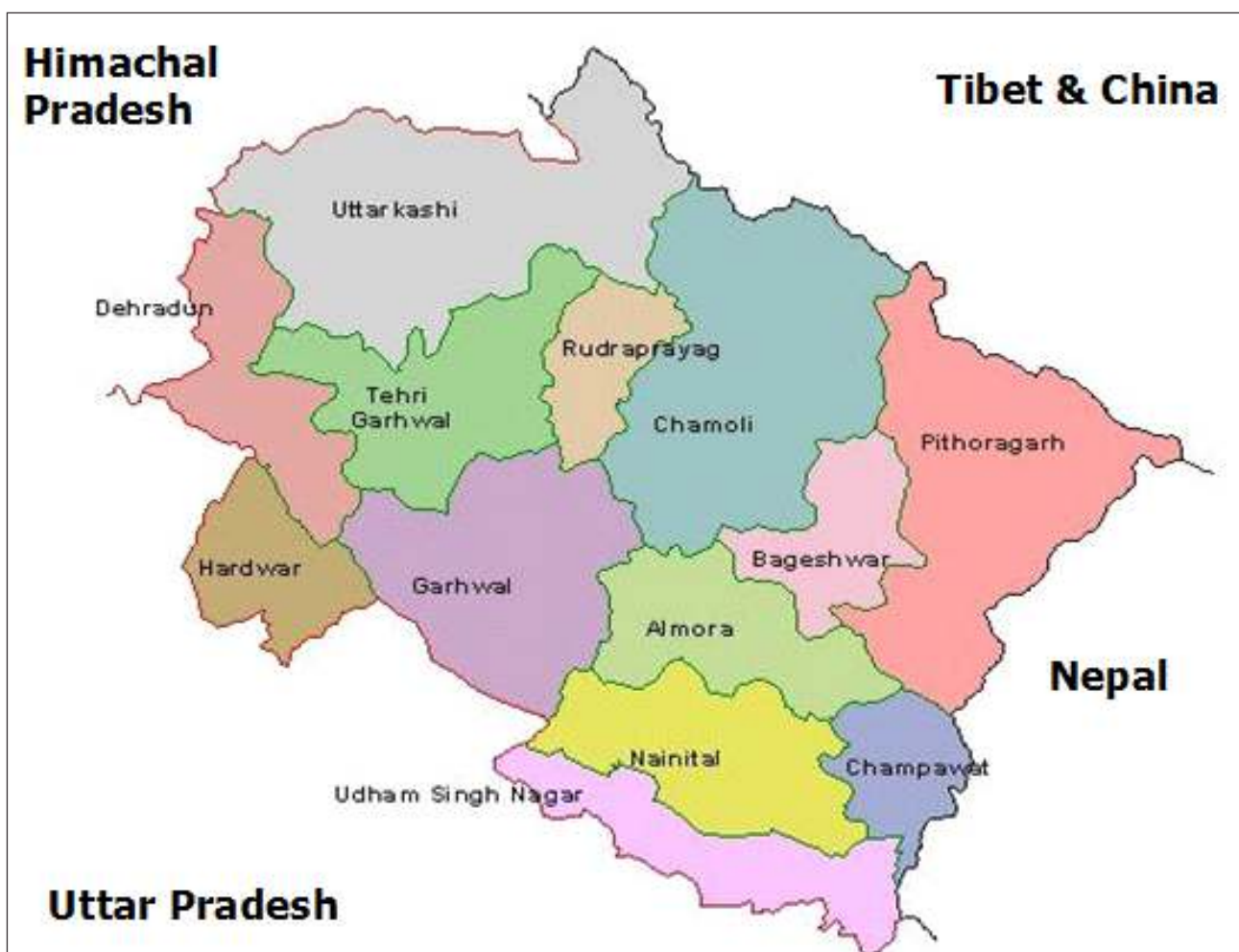
# Introduction

Uttarakhand the 27<sup>th</sup> state of Republic of India lies between 28° 44' and 31° 28' N Latitude and 77° 35' and 81° 01' E longitude. The geographical area of the state is 53,483 sq km and the terrain and topography of the State is largely hilly with large areas under snow cover and steep slopes. Uttarakhand State comprises of 02 regions 13 districts, 78 Tehsils and 95 community development blocks. The districts lying in Garhwal Region are Uttarkashi, Chamoli, Pauri, Rudraprayag, Tehri, Dehradun and Haridwar and the remaining 06 in Kumaon Region are Udham Singh Nagar, Nainital, Almora, Pithoragarh, Champawat and Bageshwar. The human population of the State is 1.01 crore (2001) compared to 25.18 lacs in 1951 and that of livestock is 50.22 lacs in 2012 as compared to 41.68 lacs (1993) (Uttarakhand Biodiversity Board, 2020).

The Garhwal Himalaya along with Kumaon and a part of Himachal Pradesh has unique characteristics as it has Tibet in the north, Upper Gangetic Plain in the south and Eastern Himalayan provinces in the east. Physiographically, Uttarakhand represents a cross-section of the Himalaya on the basis of its evolutionary history, namely the Trans-Himalaya, Greater Himalaya or Himadri, Lesser Himalaya, Shiwalik Ranges, Foothills and Terai and the Plains of Dehradun, Haridwar and Udham Singh Nagar. Major portion of the State is mountainous and these mountains (Himalaya) are one of the youngest mountain systems of the world and therefore ecologically very fragile and relatively much more susceptible to earthquakes and landslides. Shiwalik formations are one of the most important eco-region due to their endemism and past geological history.

### 1.1 Geology

Uttarakhand Himalaya has wide range of intra regional variations in respect of topography, geology and texture of soil. The region is characterized by mountains broken by valleys and deep gorges. It consists of faulted and folded mainly sedimentary rocks. The region has abundance of various kinds of minerals such as limestone, dolomite, phosphorite, magnetite etc. There is predominance of boulders and gravels in Bhabhar and marshy tract containing fertile soil with good water retention capacity in Terai.



**Figurer 1.1** Political map of Uttarakhand (not to the scale)

The highest peak is Nanda Devi (7,817m) in the Chamoli district. The other important peaks include Gauri Parvat, Kamet, Trishul, Chaukhamba, Dunagiri, Panchchuli and Nanda Kot. Gaumukh, Pindari and Milam are the major glaciers in the State. Starting from the foothills in the South it extends to snow clad mountains in the North. Nature has endowed this land with so much beauty and spiritual bliss that it is also known as “Dev Bhoomi” – the Abode of God.

As per preliminary report of Census 2011, Uttarakhand has literacy rate of 79.63% which is above the national average of 74.04%. Total 6,997,433 people were found literate in Uttarakhand during the last Census, out of the total literate population, 3,930,174 were males with a percentage of 88.33 while remaining 3,067,259 were female with 70.70 percent. These averages of literacy in overall and among male and female have increased since Census 2001, where the male and female literacy rates were recorded as 81.02% and 63.36% respectively. The population of the districts in Uttarakhand varies considerably. Four of the 13 districts, namely Dehradun, Haridwar, Udham Singh Nagar and Nainital account for 61.5 % of the state's total population. On adding Tehri Garhwal, Pauri Garhwal and Almora, this accounts for nearly 81%. This clearly shows that the concentration of population is quite high in the mid and foothills as compared to the remaining six districts of high hills (table 1.1).

**Table 1.1** Population percentage and Sex ratio of Uttarakhand

| Districts          | Total Population<br>(Census 2011) | % of population | Sex Ratio  |
|--------------------|-----------------------------------|-----------------|------------|
| Uttarkashi         | 329686                            | 3.26%           | 959        |
| Chamoli            | 391114                            | 3.87%           | 1021       |
| Rudraprayag        | 236857                            | 2.34%           | 1120       |
| Tehri Garhwal      | 616409                            | 6.09%           | 1078       |
| Dehradun           | 1698560                           | 16.79%          | 902        |
| Pauri Garhwal      | 686527                            | 6.79%           | 1103       |
| Pithoragarh        | 485993                            | 4.80%           | 1021       |
| Bageshwar          | 259840                            | 2.57%           | 1093       |
| Almora             | 621927                            | 6.15%           | 1142       |
| Champawat          | 259315                            | 2.56%           | 981        |
| Nainital           | 955128                            | 9.44%           | 933        |
| Udham Singh Nagar  | 1648367                           | 16.29%          | 919        |
| Haridwar           | 1927029                           | 19.05%          | 879        |
| <b>UTTARAKHAND</b> | <b>1011675</b>                    | <b>-</b>        | <b>963</b> |

The density of population according to the 2011 census is 189 persons per square kilometre, higher than the 2001 census figure of 150. District-wise, there is enormous variation in the density of population with Haridwar, US Nagar and Dehradun having a high density of 817, 648, and 550 persons per square km respectively; while on the other hand there are districts like Uttarkashi, Chamoli and Pithoragarh the population density is quite low with average of 41, 49, and 69 persons per square km. On the other hand, the villages with higher percentage of population are Garhwal, Almora, Pithoragarh, Champawat and Uttarakashi while foot hills districts are having lower population (table 1.2).

**Table 1.2** Sizes of the Villages with Population

| Districts   | Village with<br>Population | Villages with population<br>501-2000 (%) | Villages with population<br>> 2000 (%) |
|-------------|----------------------------|------------------------------------------|----------------------------------------|
| Uttarakashi | 75.7                       | 23.2                                     | 1.1                                    |
| Pithoragarh | 87.9                       | 11.5                                     | 0.6                                    |
| Rudraprayag | 8.8                        | 20.8                                     | 0.4                                    |
| Tehri       | 82.4                       | 17.3                                     | 0.3                                    |
| Garhwal     | 94.6                       | 4.9                                      | 0.5                                    |
| Almora      | 86.7                       | 13.2                                     | 0.1                                    |
| Bageshwar   | 86                         | 13.5                                     | 0.5                                    |
| Champawat   | 84.8                       | 14.3                                     | 0.9                                    |
| Dehradun    | 76.9                       | 24.3                                     | 8.8                                    |
| Nainital    | 75.3                       | 23.2                                     | 1.5                                    |
| US Nagar    | 30.6                       | 52.1                                     | 17.3                                   |
| Haridwar    | 19.2                       | 45.9                                     | 34.9                                   |
| Chamoli     | 85.2                       | 14.6                                     | 0.2                                    |

(Source : <http://www.ukhfws.org/>)

Uttarakhand is a predominantly rural State with 16,826 rural settlements, of which 12,699 or 81% have a population of less than 500. In most of the districts, more than 75-85 % of rural settlements have a population of less than 500. Only 17 % of the rural settlements have a population ranging between 500-1999 and the villages with population of 2000 or more are very rare (2.7 %). The small size of settlements and their widespread distribution is a formidable challenge for service delivery in the state of Uttarakhand with such a high percentage of small and scattered hamlets mainly in the tough geographic conditions.

The Himalayas greatly influence the climate of the State. They are the youngest mountain system in the world having the most fragile geo-morphological formations. Rains occur from July to September due to South-West monsoon. In winter months, there are occasional rains in the plains and snowfall in the higher reaches due to Western disturbances. Within the Himalayas, climate varies with the elevation and location. Climate ranges from sub-tropical in the southern foothills, with average summer temperature of about 30°C and average winter temperature of about 18°C. Warm temperate conditions prevail in the Middle Himalayan valleys, with average summer temperature 25° C with cool winters. A cold alpine climate is observed at higher elevation where summers are cool and winters are severe. There are mainly three prominent seasons, viz., Winter, Summer and Rainy, while a short period for autumn and spring is noticeable. The State is rich in forest wealth. It has approx. 64.79% of its geographical area under forest with a forest cover of 46% (Table 1.3). The major forest types found in the state are sub-tropical, temperate and alpine forests.

The Himalayas form three parallel zones: the Great Himalayas, the Middle Himalayas and the Sub-Himalayas which includes the Shiwalik range in foothills and the Tarai. The Greater Himalayas is the highest zone consisting of snowy peaks with an average elevation of 6100 m. These are the source of great northern rivers which flow down to form fertile plain. Some high valleys in the Great Himalayas are occupied by small clustered settlements. Extremely cold winters and a short growing season limit the farmers to practice few crops per year. These mountains have got high passes through which trade was prevalent with Tibet till Indo-China war. The Middle Himalayas have an altitude between 1800 and 3050 m amsl. It consists of high ranges both within and outside of the Great Himalayan range. All the major hill stations like Mussoorie, Pauri, Almora etc. lie in this zone. The regions are moderately populated. The Sub-Himalayas forms the southernmost and the lowest zone, bordering the Great Plains. It comprises of Shiwalik range and the Tarai forests. Characteristic feature of the sub-Himalayas is the large number of long, flat-bottomed valleys known as duns.

## **1.2 Forestry Scenario**

Uttarakhand is rich in forest resources. As per the Champion & Seth Classification of Forest Types (1968), the forests in Uttarakhand belong to nine Forest Type Groups, which are further divided into 43 Forest Types. The human and livestock population is largely dependent on forests due to agrarian economy and pastoralism. *Van Panchayats* in Uttarakhand are unique institutions of community forest management which came into existence in 1921. At present there are 12,167 *Van Panchayats* in the State which manage an area of 7,32,688 hectares of forest. Occurrence of forest fires at regular intervals is a major problem in the State.

Recorded Forest Area (RFA) in the State is 38,000 sq km of which 26,547 sq km is Reserved Forest, 9,885 sq km is Protected Forest and 1,568 sq km is Unclassed Forests. In Uttarakhand, during the period 1st January 2015 to 5th February 2019, a total of 2,850.87

hectares of forest land was diverted for non-forestry purposes under the Forest Conservation Act, 1980 (MoEF & CC, 2019). Six National Parks, seven Wildlife Sanctuaries and four Community Reserves constitute the Protected Area network of the State covering 3.24% of its geographical area. The Corbett National Park is located in the State.

Based on the interpretation of IRS Resourcesat-2 LISS III satellite data of the period Oct 2017 to Oct 2018, the Forest Cover in the State is 24,303.04 sq km which is 45.44 % of the State's geographical area. In terms of forest canopy density classes, the State has 5,046.76 sq km under Very Dense Forest (VDF), 12,805.24 sq km under Moderately Dense Forest (MDF) and 6,451.04 sq km under Open Forest (OF). Forest Cover in the State has increased by 8.04 sq km as compared to the previous assessment reported in ISFR 2017 (FSI, 2019).

**Forest Cover inside and outside Recorded Forest Area (or Green Wash):** The State has reported extent of recorded forest area (RFA) 38,000 sq km which is 71.05% of its geographical area. The reserved, protected and unclassed forests are 69.86%, 26.01% and 4.13% of the recorded forest area in the State respectively. However as the digitized boundary of forest area from the State covers 24,303 sq km and the analysis of forest cover inside and outside this area is given below:

**Table 1.3** Forest cover inside and outside recorded forest area

| Forest cover inside recorded forest area (sq. km) |        |        |        | Forest cover outside recorded forest area (sq. km) |        |        |       |
|---------------------------------------------------|--------|--------|--------|----------------------------------------------------|--------|--------|-------|
| VDF                                               | MDF    | OF     | Total  | VDF                                                | MDF    | OF     | Total |
| 4,261                                             | 9,269  | 3,260  | 16,790 | 786                                                | 3,536  | 3,191  | 7513  |
| 25.38%                                            | 55.20% | 19.42% | 100%   | 10.46%                                             | 47.07% | 42.47% | 100%  |

**Table 1.4** District Wise Forest Cover

| District           | Geographical Area (GA) | Very Dense Forest | Mod. Dense Forest | Open Forest     | Total            | Scrub         |
|--------------------|------------------------|-------------------|-------------------|-----------------|------------------|---------------|
| Almora             | 3,144                  | 199.00            | 837.00            | 683.14          | 1,719.14         | 6.00          |
| Bageshwar          | 2,241                  | 162.39            | 761.61            | 338.69          | 1,262.69         | 1.0           |
| Chamoli            | 8,030                  | 443.00            | 1,580.00          | 686.43          | 2,709.43         | 1.0           |
| Champawat          | 1,766                  | 367.00            | 593.00            | 265.55          | 1,225.55         | 7.00          |
| Dehradun           | 3,088                  | 659.77            | 601.56            | 347.36          | 1,608.69         | 86.28         |
| Garhwal            | 5,329                  | 574.26            | 1,902.03          | 918.70          | 3,394.99         | 95.97         |
| Haridwar           | 2,360                  | 74.74             | 276.42            | 234.09          | 585.25           | 6.00          |
| Nainital           | 4,251                  | 773.06            | 1,728.93          | 539.57          | 3,041.56         | 9.63          |
| Pithoragarh        | 7,090                  | 505.00            | 965.00            | 609.80          | 2,079.80         | 39.00         |
| Rudraprayag        | 1,984                  | 252.00            | 580.00            | 310.17          | 1,142.17         | 9.00          |
| Tehri Garhwal      | 3,642                  | 272.71            | 1,084.08          | 709.19          | 2,065.98         | 97.44         |
| Udham Singh Nagar  | 2,542                  | 149.16            | 188.75            | 93.88           | 431.79           | 3.85          |
| Uttarkashi         | 8,016                  | 614.67            | 1,706.86          | 714.47          | 3,036.00         | 21.00         |
| <b>Grand Total</b> | <b>53,483</b>          | <b>5,046.76</b>   | <b>12,805.24</b>  | <b>6,451.04</b> | <b>24,303.04</b> | <b>383.17</b> |

(Source-FSI, 2019)

**Forest Types:** Uttarakhand has 8 different type Groups which are divided into 43 Forest Types of forests and one plantation type/TOF based on local edaphic situation (table 1.5).

**Table 1.5** Forest Types of Uttarakhand

| Sl.No. | Forest Types                                                              | % of forest cover |
|--------|---------------------------------------------------------------------------|-------------------|
| 1.     | 3C/C2a Moist Siwalik Sal Forest                                           | 14.05             |
| 2.     | 3C/C2c Moist Tarai Sal Forest                                             | 1.56              |
| 3.     | 3C/C2d (i) Western Light Alluvium Plains Sal Forest                       | 0.62              |
| 4.     | 3C/DS1 Moist Sal Savannah                                                 | 0.02              |
| 5.     | 3C/C3a West Gangatic Moist Mixed Deciduous Forest                         | 4.04              |
| 6.     | 4C/FS2 Submontane Hill-Valley Swamp Forest                                | 0.00              |
| 7.     | 5B/C1a Dry Siwalik Sal Forest                                             | 1.57              |
| 8.     | 5B/C1b Dry Plains Sal Forest                                              | 0.04              |
| 9.     | 5B/C2 Northern Dry Mixed Deciduous Forest                                 | 3.59              |
| 10.    | 5/DS1 Dry Deciduous Scrub                                                 | 0.16              |
| 11.    | 5/1S2 Khair-Sissu Forest                                                  | 0.97              |
| 12.    | 9/C1a Lower Or Siwalik Chir Pine Forest                                   | 0.18              |
| 13.    | 9/C1b Upper Or Himalayan Chir Pine Forest                                 | 27.97             |
| 14.    | 9/DS1 Himalayan Subtropical Scrub                                         | 1.61              |
| 15.    | 9/DS2 Subtropical Euphorbia Scrub                                         | 0.11              |
| 16.    | 12/C1a Ban Oak Forest (Q.incana)                                          | 13.86             |
| 17.    | 12/C1b Moru Oak Forest (Q.dilatata)                                       | 0.47              |
| 18.    | 12/C1c Moist Deodar Forest (Cedrus)                                       | 1.55              |
| 19.    | 12/C1d Western Mixed Coniferous Forest<br>(Spruce, Blue Pine, Silver Fir) | 5.01              |
| 20.    | 12/C1e Moist Temperate Deciduous Forest                                   | 0.79              |
| 21.    | 12/C1f Low-Level Blue Pine Forest (P. wallichiana)                        | 0.09              |
| 22.    | 12/C1/DS1 Oak Scrub                                                       | 0.14              |
| 23.    | 12/C1/DS2 Himalayan Temperate Secondary Scrub                             | 0.06              |
| 24.    | 12/C2a Kharsu Oak Forest (Q. semecarpifolia)                              | 3.08              |
| 25.    | 12/C2b West Himalayan Upper Oak/Fir Forest                                | 5.49              |
| 26.    | 12/C2c (Moist Temperate Deciduous Forest)                                 | 0.79              |
| 27.    | 12/DS2 Himalayan Temperate Parkland                                       | 0.03              |
| 28.    | 12/DS3 Himalayan Temperate Pastures                                       | 0.16              |
| 29.    | 12/1S1 Alder Forest                                                       | 0.03              |
| 30.    | 12/2S1 Low Level Blue Pine Forest                                         | 0.09              |
| 31.    | 13/C2b Dry Deodar Forest (Cedrus)                                         | 0.73              |
| 32.    | 13/C5 West Himalayan Dry Juniper Forest (J. macropoda)                    | 0.02              |
| 33.    | 13/1S1 Hippophae / Myricaria Scrub                                        | 0.26              |
| 34.    | 14/C1a West Himalayan sub-Alpine Birch/Fir Forest (Betula/Abies)          | 0.71              |

|              |                                             |            |
|--------------|---------------------------------------------|------------|
| 35.          | 14/C1b West Himalayan Sub-Alpine Fir Forest | 2.06       |
| 36.          | 14/1S1 Hippophae / Myricaria Brakes         | 0.08       |
| 37.          | 14/1S2 Deciduous Sub-Alpine Scrub           | 0.16       |
| 38.          | 14/DS1 Sub-Alpine Pastures                  | 0.82       |
| 39.          | 15/C1 Birch/Rhododendron Scrub Forest       | 0.45       |
| 40.          | 15/E1 Dwarf Rhododendron Scrub              | 0.06       |
| 41.          | 15/C3 (Alpine Pastures)                     | 5.54       |
| 42.          | 16/C1 Dry Alpine Scrub                      | 0.01       |
| 43.          | 16/E1 Dwarf Juniper Scrub                   | 0.12       |
| 44.          | Plantation/ TOF                             | 0.85       |
| <b>Total</b> |                                             | <b>100</b> |

Ever since the looming environmental threats like Global Warming and Climate Change, Desertification, Drinking Water Crisis, Air and Water pollution, Loss of Bio-diversity etc. have assumed enormous proportion and existence of human civilization is under peril, priorities of National Governments have shifted to conserve their forests for ecological security and preserving bio-diversity rather to harvest timber and other products for meeting various needs of growing population. Efforts are also made at the country level to minimize the rate of deforestation and at the same time increase afforestation/reforestation yearly, so that at least a net increase of forest area can be achieved.

The forests of Uttarakhand are the source of ecosystem services. The rich biodiversity of Uttarakhand provides fuel, fodder, timber and water supply to the vast population of north India besides providing ecological stability of fragile Hills of Himalaya. The forests are also source of wildlife habitat, source of income generating activities like ecotourism, national parks, wetland areas and wild life sanctuaries. Forests in Uttarakhand have witnessed severe degradation due to climate change, forest fires, invasive species, natural calamities and anthropological factors. This region has abundant plant species and magnificent forest types (Kumar et al. 2019). In the recent past, loss of biodiversity is being taken place due to massive developmental activities of the state.

The State Forest Department is therefore implemented massive afforestation drive through convergence of NAP with other National Missions, programs and schemes including Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Compensatory Afforestation Management and Planning Authority (CAMPA), National Rural Livelihood Mission, Integrated Watershed Management Program, Programs of Ministry of New and Renewable of Energy, National Rainfed Area Authority etc.

Uttarakhand Compensatory Afforestation Fund Management and Planning Authority (Uttarakhand CAMPA) was constituted vide Government of Uttarakhand Office Order no. 3495/x-2-2009-7(6)/2004 dated 10 November, 2009. The CAMPA guidelines were issued by Uttarakhand Forest Department in March 2010. Accordingly, Uttarakhand forest department initiated plantations in all the forest divisions under CAMPA schemes since 2010. Third party monitoring and evaluation of CAMPA plantation was entrusted to Forest Research Institute, Dehradun in the year 2017. Teams were constituted by Silviculture and Forest Management Division of FRI for carrying out monitoring in all forest divisions of Uttarakhand.

# Uttarakhand CAMP A

The Government of India issued detailed guidelines for establishment of State Compensatory Afforestation Fund Management and Planning Authority (State CAMP A), dated 02-07-2009. These guidelines were intended to assist the States in setting up the requisite mechanism in consonance with the directions of the Hon'ble Supreme Court. Based on this, the Uttarakhand Compensatory Afforestation Fund Management and Planning Authority (Uttarakhand CAMP A) was constituted vide Government of Uttarakhand Office Order no. 3495/x-2-2009-7(6)/2004 dated 10 November, 2009. Uttarakhand forest department issued these guidelines in March 2010 (**Appendix-2.1**).

As per the recent development, the Ministry of Law & Justice, Government of India had notified the new **Compensatory Afforestation Fund (CAF) Act, 2016** in compliance of the Honorable Supreme court order of 2004 and 2006, to streamline the collection and utilization of Compensatory Afforestation fund at the central, as well as, at the State/Union territories' level. For the purpose of this Act, the Government of India has also notified the **Compensatory Afforestation Fund (CAF) Rules, 2018 (Appendix-2.2)**. The CAF Act, 2016 has been implemented all over the country w.e.f. 30<sup>th</sup> September, 2018. Various committees earlier functional under the ad hoc framework of CAMP A have now been reframed as per the Act and subsequent implementation of all yearly activities are taking place as per the rules notified for the purpose of this Act after 30<sup>th</sup> September, 2018.

Further, as per the new development under the provisions of CAF Act, 2016, creation of '**The Uttarakhand Compensatory Afforestation Fund Management and Planning Authority**' has been notified by Govt. of India vide its Notification dated 14 August, 2018.

### 2.1 Area of Operation

The area of operation of Uttarakhand CAMP A extends to the entire State of Uttarakhand. At field level, it operates through the divisional offices and other offices of the Forest Department of Uttarakhand.

### 2.2 Aims, Objectives and Functions of Uttarakhand CAMP A

As per Central Government Guidelines formulated and circulated on 02 July, 2009, the aims and objectives of 'The Uttarakhand Compensatory Afforestation Fund Management and Planning Authority' are:

- Conservation, protection, regeneration and management of existing natural forests;
- Conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
- Compensatory Afforestation;
- Ecosystem services, which include:-
  - **Provisioning Services:** These services include wood, non-timber forest products, fuel, fodder and water, grazing, tourism, wildlife protection and life support;
  - **Regulatory Services:** Climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes;
  - **Spirituals Services:** Non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational and symbolic; and
  - **Supportive Services:** Services necessary for the production of ecosystem services, biodiversity, nutrient cycling and primary production.
- Research, Training and Capacity Building.

### 2.3 Functions of Uttarakhand CAMPA

The following are the functions of Uttarakhand CAMPA as envisaged in the GOI guidelines issued for the constitution of State Authorities:-

- Funding, overseeing and promoting compensatory afforestation done in lieu of diversion of forest land for non forest use under Forest Conservation Act, 1980.
- Overseeing forest and wild life conservation and protection works within forest areas undertaken and financed under the programme.
- Maintaining separate account in respect of funds received for conservation and protection of protected areas.
- Creating transparency for the programme, mobilization of citizen support and promoting a voluntary movement of youth & students to protect and improve the natural environment including forest, lakes, rivers & wild life.
- Earmarking up to 2 % of the funds for Monitoring and Evaluation.

Plantations require proper monitoring and evaluation in order to achieve the objectives of CAMPA successfully. Evaluation of plantation performance at each stage is important to ensure uninterrupted growth and expected results. At each stage of monitoring, impediments and constraints are identified which require careful attention and appropriate remedial measures and should be initiated for the potential growth and development of plants. Monitoring and evaluation will help policy planners for decision making and future management.

Department of forest, Government of Uttarakhand has sanctioned third party monitoring and evaluation of different components under CAMPA plantations for 2013-14, 2014-15, 2015-16 and 2016-17 years to Forest Research Institute, Dehradun.

So far, FRI has submitted annual reports of concurrent monitoring of the following forest divisions for the years 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 to CEO, CAMPA, Uttarakhand.

### 3.0

# Monitoring Evaluation Process

#### 3.1 Study Sites

Collection of field data was initiated from April 2018 and completed in Feb 2021 by the various teams of Silviculture and Forest Management Division of FRI. The data collection in the year 2020-21 was interrupted due to COVID-19. The plantation works under UK-CAMPA (2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 was carried out in all 38 forest divisions of 4 circles by the Uttarakhand Forest Department. Survey for monitoring of plantations was carried out in 1,580 sampled sites covering more than 15,000 ha plantation area under UK-CAMPA. The details of the sites taken up for monitoring in UK-CAMPA under each division of all the circles of Uttarakhand are enumerated in the following tables.

#### 3.2. Evaluation and Process

**3.2.1. Methodology:** Monitoring and evaluation works under afforestation schemes have been carried out by selecting sample plots in each site of forest range considered as a unit. Moreover, the size of plots and category of plantations was also taken into consideration for representation of all units. The random sampling strategy was adopted for the selection of sample plots in all study Forest Divisions. The selected plantation sites were traversed and area of the plantations were verified by recording the GPS locations. GPS points of each sample plot in the sites are recorded and presented in the formats of annual reports. Fifty percent of the sites were selected for monitoring of the total plantation sites and 10% of the plantation's area of each sample site was selected for data collection. However, more than 10% area was also selected depending on the sample size. The area of all plantations' sites were surveyed for verification of actual area with the help of GPS. The difference in the area is shown in the division's tables in chapter-5. In each patch up to size of 5 ha, five sample plots of 0.1 ha were laid, in patch of 10 ha, ten plots of 0.1 ha were laid, in case of patch with area 15 ha, 15 samples plots, and for 20 ha size, patch a total of 20 sample plots were laid for monitoring. If the plantation is carried out in rows or strips along the roads or canals, a row of 100 m length of plantation was treated as a one sample plot. The sample plots were randomly selected as follows:

1. The sample plots proportionately allocated into each division so as to cover the scheme and its components.
2. Selected plantation area or site was examined for area accuracy with the help of GPS by way of traversing around the boundary of the plantation.
3. Within the plantation patches plots of 0.10 hectare size 31.62m x 31.62m were laid in rectangular or square shape as per field convenience to assess survival and growth parameters of plants as per format.
4. In small plantation area up to 5 hectares, five plots of size 0.10 hectare were laid at designated places.
5. In selected area of 10 ha, ten plots were laid out at designated places. The selection of 2<sup>nd</sup> patch was randomized to avoid biasness.
6. For plots of 20 ha, 20 plots were laid out at designated places. The selection of patches were randomized to avoid biasness.
7. If the plantation is carried out in rows or strips along the roads or canals, a row of 100 m length of plantation was treated as a one sample plot.

### **3.2.2. Indicators for Monitoring and Evaluation:**

For the monitoring and evaluation of the plantations under the project an indicator framework was developed in consultation with the CEO, CAMPA, Uttarakhand State Forest Department. These indicators were simple, measurable yardsticks for assessing the plantations in terms of their effectiveness, relevance and sustainability. Also these indicators were finalized in concordance with the needs for output, outcome and impacts of the scheme in the plantation sites with respect to biodiversity conservation. By using these indicators, the information pertaining to various parameters such as plantation scheme, species selection, plantation methodology, health and vitality of plantations, survival rate and other were generated during the field sampling in the sampled plantation patches.

The major Indicators for data collection are provided below:

1. Plantation scheme and its components
2. Choice of species in the sites
3. Selection of the planting site
4. Planting methods
5. Size of the pits/trenches including earth work done
6. Spacing of the pits
7. Time of planting
8. Health of the plants
9. Cultural operations (Hoeing, weeding, soil working etc.)
10. Protection status of the plantation
11. Management of plantations (causality replacement, watering, pruning, thinning etc.)
12. Growth and survival of plants

### **3.2.3. Collection of field data**

The data were collected for plantation work carried out under UK-CAMPA and its components viz., NPV and CA during the period from April 2018 to February 2021. The parameters used for assessing the plantation works were choice of species with respect to the requirement of sites, local communities need/perception about the species, readiness of planting such as cleaning and preparation of sites, advance pitting for proper weathering, temporary arrangement for storage of seedlings and arrangement for irrigation before planting, soil working and weeding immediately after planting and causality replacement of plant if required. In addition to above the ecological aspects such as soil and water conservation activities undertaken under the scheme in different plantations sites were also observed to understand their impact at these sites. Efforts were also made to understand the socio-economic issues in terms of fuel and fodder supply and improvement in water table by interacting with local people. Biodiversity aspect of the plantation activities were also recorded by conducting vegetation analysis in plantation sites and presence of wild fauna during the survey. The data for the monitoring and evaluation of the plantation sites were collected by a multidisciplinary team with experts from disciplines such as Silviculture, Ecology, Soil science etc as per requirement of the site. The collected data were compiled, tabulated and then analyzed for the preparation of the final report.

### **3.2.4. Compilation and analysis of field data**

The data collected from different teams of FRI were compiled and tabulated. The field data of each site was compiled range wise. The survival of plants were calculated by using data on number of plants of each species planted from the plantation's journals to the actual number of plants observed in the fields. The average height and diameter of each species are compiled for observation of growth of plants.

### 4.0

# Performance Assessment

#### 4.1. Relevance

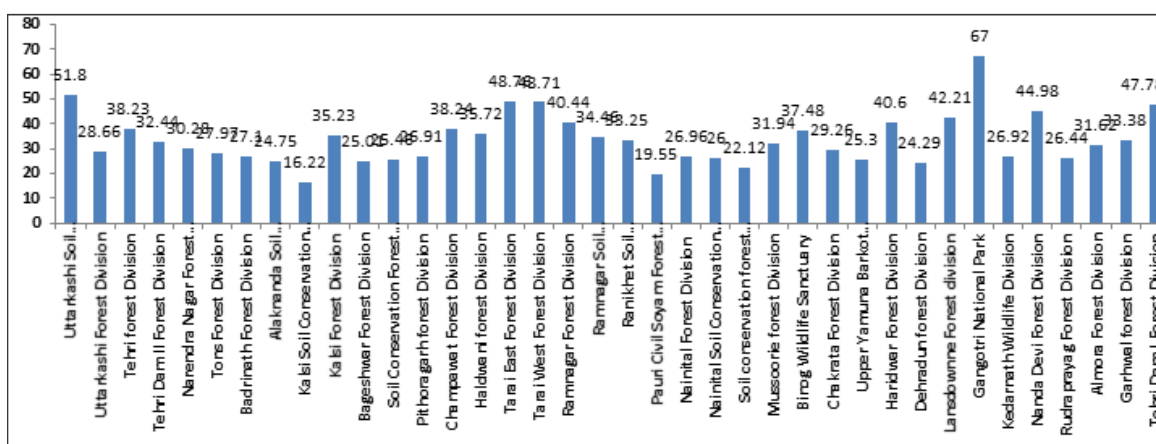
The investment in the plantation and afforestation activities in Uttarakhand State under the CAMPA was both relevant to and consistent with the policies and plans of the state and central government. The central and state government viewed plantation activities as critically important for the restoration of degraded lands, biodiversity conservation, increasing green cover and also a source of employment and income for a large segment of the population living in the rural areas and forest fringes. The scheme CAMPA provided a long-term finance for investment for the plantation activities which was not readily available from other sources. The project is very much relevant to the mission and vision of the Uttarakhand State Forest Policy as its implementation was likely to result in enhancement of forest cover, improvement of quality of existing forested areas, biodiversity conservation, rehabilitation of degraded lands and livelihood generation for the local communities.

The majority of the plantations were carried out near village and forest areas and low nutrient lands, which were owned by government and institutions. It is quite evident from the fact that majority of the plantations were undertaken on Government land for the restoration of degraded forests under the scheme. Hence, the project intent was consistent with the state government and forest department priorities, i.e. to increase green cover and to rehabilitate degraded lands in the state under CAMPA scheme. However, a major component related to socio-economic upliftment of the forest dependent communities could have increased the relevance of the project which is over and above plantation and afforestation practices.

#### 4.2. Effectiveness

The project outputs and outcomes and their actual achievements are shown in the following divisional reports of chapter-5. The reports were prepared based on the collection of primary data collected during the field surveys in all selected sites distributed in different forest divisions, where plantations were carried out under UK-CAMPA. The primary data were collected in well prepared formats (**Appendix-4.1**). The average survival of plants were found

maximum (67%) in Gangaotri National park followed by Uttarkashi Soil Conservation Division (51.8%). Tarai East and Tarai West Forest Divisions have almost equal average survival (48%). While Kalsi Forest Division has shown the minimum survival of 16% (figure 4.1). On an average the survival of plants under CAMPA plantation in Uttarakhand is calculated as 33%. The average of more than 20 different plant species were found planted in all the sites. It is also observed that few exotic species were also planted which could have been avoided. The soil and water conservation activities were not quite evident since there were few sites where soil and water conservation activities were carried out. Appropriate methods and techniques for soil conservation on the slopes should have been applied and damaged structures should have been repaired.



**Figure 4.1** Average survival % of CAMPA plantation in Forest Divisions of Uttarakhand

## 5.0

## Forest Division wise Monitoring and Evaluation

### 5.1 Tehri Dam II Forest Division

Tehri Dam II forest division comprised of 4 forest ranges of viz., Nagungad, Kamand, Dasgigad and Khurmolagad. A total of 54 plantation sites with 396.7 hectare area were surveyed for monitoring and evaluation of CAMPA plantations. The average survival of plants at Division level is 32.46%. The following table (5.1) below shows species planted in the division. The terrain is hilly with and distributions of forest types are sub-tropical to temperate. The natural vegetation is consisted of Banj, Burans, and Chirpine and on the upper reaches, Deodar is mixed with Chir.

**Table 5.1** Species planted under CAMPA in Tehri Dam II Forest Division

| Sl. No. | Name of species                 | Local Name |
|---------|---------------------------------|------------|
| 1.      | <i>Bauhinia variegata</i>       | Kachnar    |
| 2.      | <i>Bauhunia retusa</i>          | Semla      |
| 3.      | <i>Cedrela toona</i>            | Toon       |
| 4.      | <i>Cedrus deodara</i>           | Deodar     |
| 5.      | <i>Dalbergia sissoo</i>         | Shisham    |
| 6.      | <i>Dendrocalamus strictus</i>   | Bans       |
| 7.      | <i>Emblica officinalis</i>      | Amla       |
| 8.      | <i>Ougenia oojenesis</i>        | Sandan     |
| 9.      | <i>Quercus leucotrichophora</i> | Banj       |
| 10.     | <i>Tecoma stans</i>             | Tecoma     |

**Table 5.2** Range wise sites, area and survival of plants in Tehri Dam II Forest Division

| Name of Forest Range | Sample Sites                       | Plantation Year | Area in Journal | Area marked (ha) | Survival of plants by(%) GPS(ha) |
|----------------------|------------------------------------|-----------------|-----------------|------------------|----------------------------------|
| Nagungad Range       | Kausal Gaujyana                    | 2015-16         | 10              | 7.1              | 47.6                             |
|                      | Saundan Soyam                      | 2014-15         | 10              | 5.26             | 31.8                             |
|                      | Van Panchayat Kausal               | 2013-14         | 5               | 5.00             | 36.4                             |
|                      | Rangoli Soyam Paniyara Namytok     | 2014-15         | 10              | 7.00             | 52.8                             |
|                      | Rangoli Banadi Soyam               | 2014-15         | 10              | 4.60             | 36.6                             |
|                      | Kansi Soyam                        | 2013-14         | 5               | 3.00             | 9.0                              |
|                      | Kyari                              | 2012-13         | 5               | 5.00             | 24.0                             |
|                      | Kansi Soyam                        | 2013-14         | 7               | 3.00             | 24.47                            |
|                      | Ghiyakoti                          | 2015-16         | 5               | 3.00             | 23.00                            |
|                      | Roldhar Kawakot Jamni              | 2015-16         | 5               | 5.00             | 31.6                             |
|                      | Gair Soyam Mundkholi Tok           | 2015-16         | 5               | 5.00             | 37.60                            |
| Kamand Range         | Idiyan Soyam                       | 2012-13         | 5               | 5.00             | 19.00                            |
|                      | Model Plantation Nananu Soyam      | 2013-14         | 10              | 10.00            | 54.19                            |
|                      | Koti Kumharo Ki                    | 2015-16         | 10              | 10.00            | 28.00                            |
|                      | Neri Soyam                         | 2014-15         | 10              | 7.00             | 24.80                            |
|                      | Tikhon Soyam                       | 2013-14         | 4.70            | 4.70             | 36.00                            |
|                      | Barnu Charagah Vikas Van Panchayat | 2013-14         | 5               | 5.00             | 20.00                            |
|                      | Barnoli Soyam                      | 2015-16         | 5               | 5.00             | 55.00                            |
|                      | Van Panchayat Dang Gussai          | 2013-14         | 5               | 4.00             | 13.00                            |
|                      | Raidoni Soyam Saskiya Tok          | 2014-15         | 10              | 10.00            | 44.80                            |
|                      | Idiyan Soyam                       | 2015-16         | 10              | 10.00            | 28.40                            |
| Dasgigad Range       | Kaithogi Soyam                     | 2014-15         | 10              | 10.00            | 34.00                            |
|                      | Kathkhet Soyam                     | 2015-16         | 10              | 10.00            | 38.00                            |
|                      | Tipri Soyam                        | 2015-16         | 10              | 10.00            | 41.00                            |
|                      | Chilot Soyam                       | 2013-14         | 10              | 10.00            | 34.00                            |
|                      | Kaprada Soyam                      | 2013-14         | 4               | 4.00             | 30.38                            |
|                      | Kawata Van Panchayat               | 2013-14         | 5               | 5.00             | 36.00                            |
|                      | Tarakot Soyam                      | 2013-14         | 5               | 5.00             | 27.60                            |
|                      | Dharkot Van Panchayat              | 2015-16         | 5               | 5.00             | 28.36                            |
|                      | Tipra Soyam                        | 2014-15         | 10              | 10.00            | 24.09                            |
|                      | Van Panchayat Kumarkot Soyam       | 2012-13         | 5               | 5.00             | 18.00                            |
|                      | Tarakot Van Panchayat              | 2013-14         | 2               | 2.00             | 30.00                            |
|                      | Badethi Soyam                      | 2013-14         | 10              | 10.00            | 40.40                            |
|                      | Chiniyali                          | 2015-16         | 5               | 5                | 30.73                            |
|                      | Van Panchayat Badethi              | 2012-13         | 5               | 5.00             | 18.00                            |
|                      | Tipra Soyam (Ragi jugyar Tok)      | 2014-15         | 10              | 10.00            | 40.40                            |
|                      | Rikhnar gaon Soyam                 | 2015-16         | 10              | 10.00            | 34.40                            |
| Khurmolagad Range    | Dunda Compartment No. 8A           | 2014-15         | 10              | 10.00            | 31.00                            |
|                      | Dunda Soyam                        | 2014-15         | 10              | 8.11             | 48.80                            |
|                      | Chinakholi Soyam                   | 2013-14         | 10              | 7.19             | 33.0                             |
|                      | Barsali Soyam                      | 2014-15         | 10              | 8.50             | 18.80                            |
|                      | Barsali Soyam                      | 2013-14         | 10              | 5.80             | 7.36                             |
|                      | Nakuri Soyam                       | 2015-16         | 5               | 5.00             | 36.60                            |
|                      | Jugaldi Soyam                      | 2013-14         | 5               | 3.73             | 26.60                            |
|                      | Kharwa Soyam                       | 2015-16         | 10              | 10               | 36.82                            |
|                      | Kharwa Soyam                       | 2015-16         | 5               | 5.00             | 43.80                            |
|                      | Patara Soyam                       | 2014-15         | 10              | 10.00            | 36.60                            |
|                      | Olya Soyam                         | 2015-16         | 10              | 10.00            | 45.55                            |
|                      | Jaspur Soyam                       | 2013-14         | 4               | 2.89             | 31.25                            |
|                      | Junga Soyam                        | 2015-16         | 5               | 5.00             | 31.82                            |

|                           |         |              |               |              |
|---------------------------|---------|--------------|---------------|--------------|
| Junga Soyam               | 2012-13 | 5            | 5.00          | 17.20        |
| Junga Soyam               | 2015-16 | 5            | 5.00          | 34.40        |
| Junga Soyam Van Panchayat | 2013-14 | 5            | 5.00          | 43.00        |
| Gujgad Soyam              | 2014-15 | 10           | 10.00         | 47.20        |
| <b>Total</b>              |         | <b>396.7</b> | <b>355.88</b> | <b>32.46</b> |

## 5.2 Tehri Forest Division

The CAMPA plantations for 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 were undertaken in total sites of 92 in 5 forest ranges of Tehri Forest Division. Sampling for plantation monitoring were done in 61 plantation's sites. Range wise and site wise area of plantation, area verified during field survey and survival of plants are shown in table 5.4. Table 5.3 below shows species planted in different sites.

**Table 5.3** Species planted under CAMPA in Tehri Forest Division

| Sl. No. | Name of species                 | Local Name |
|---------|---------------------------------|------------|
| 1.      | <i>Aesculus indica</i>          | Pangar     |
| 2.      | <i>Alnus nitida</i>             | Utis       |
| 3.      | <i>Arundinaria falcata</i>      | Ringal     |
| 4.      | <i>Bauhinia variegata</i>       | Kachnar    |
| 5.      | <i>Bauhinia retusa</i>          | Semla      |
| 6.      | <i>Cedrela toona</i>            | Toon       |
| 7.      | <i>Cedrus deodara</i>           | Deodar     |
| 8.      | <i>Cinnamomum tamala</i>        | Tejpat     |
| 9.      | <i>Dalbergia sissoo</i>         | Shisham    |
| 10.     | <i>Dendrocalamus strictus</i>   | Bans       |
| 11.     | <i>Emblica officinalis</i>      | Amla       |
| 12.     | <i>Fraxinus micrantha</i>       | Anga       |
| 13.     | <i>Grevillia robusta</i>        | Silver oak |
| 14.     | <i>Jacaranda mimosifolia</i>    | Jacaranda  |
| 15.     | <i>Myrica esculenta</i>         | Kafal      |
| 16.     | <i>Ougeinia oogeinensis</i>     | Sandan     |
| 17.     | <i>Prunus armeniaca</i>         | Chullu     |
| 18.     | <i>Prunus cerasoides</i>        | Padam      |
| 19.     | <i>Pyrus pashia</i>             | Mehal      |
| 20.     | <i>Quercus leucotrichophora</i> | Banj       |
| 21.     | <i>Rhododendron arboreum</i>    | Buransh    |
| 22.     | <i>Syzygium cumini</i>          | Jamun      |
| 23.     | <i>Taxus baccata</i>            | Thuner     |
| 24.     | <i>Terminalia bellirica</i>     | Baheda     |

**Table 5.4** Range wise sites, area and survival of plants in Tehri Forest Division

| Name of Forest Range | Sample sites                 | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Pokhal Range         | GadoliaC.No. 3 B             | 2013-14         | 10                   | 3.86                    | 9.70                   |
|                      | Asena Civil                  | 2014-15         | 6.022                | 3.27                    | 36.52                  |
|                      | DhoungKhavogi Motor Marg     | 2015-16         | 2.50                 | 1.35                    | 31.05                  |
|                      | VanchuriC.No. 1 B            | 2015-16         | 10                   | 10                      | 18.40                  |
|                      | KhandBhaniyada Motor Marg    | 2016-17         | 9.272                | 6                       | 40.90                  |
|                      | GhouldaniSoyam               | 2016-17         | 2.345                | 1.42                    | 61.19                  |
| Bhilagana Range      | Margoan C.No. 3              | 2012-13         | 10                   | 10                      | 40.10                  |
|                      | Margoan C. No.5              | 2013-14         | 10                   | 10                      | 42.20                  |
|                      | Margoan C. No. 4             | 2014-15         | 10                   | 10                      | 38.60                  |
|                      | GevaliC. No. 10              | 2014-15         | 5                    | 5                       | 44.80                  |
|                      | Ghansali C. No. 3            | 2014-15         | 2                    | 1.14                    | 69                     |
|                      | Devling Soyam                | 2015-16         | 9.672                | 7.32                    | 14.36                  |
|                      | Chaily Soyam                 | 2015-16         | 5                    | 5                       | 39.20                  |
|                      | Gevali C. No. 8              | 2015-16         | 10                   | 8.77                    | 51.40                  |
|                      | Lome Soyam                   | 2016-17         | 5.844                | 3.81                    | 64.23                  |
|                      | Quedang Soyam                | 2016-17         | 1.654                | 1.654                   | 55.53                  |
|                      | Saund Civil                  | 2016-17         | 6.858                | 5.30                    | 44.54                  |
| Balganga Range       | Agar Civil                   | 2012-13         | 7.224                | 4.15                    | 5.14                   |
|                      | Bhattgoan Civil              | 2012-13         | 13.25                | 13.25                   | 18.54                  |
|                      | Saup Civil                   | 2013-14         | 2.80                 | 2                       | 39.52                  |
|                      | Pinswad C. No.5 B            | 2013-14         | 3.53                 | 2.00                    | 41.33                  |
|                      | Kangda C.No.6 A              | 2013-14         | 7                    | 7                       | 50.89                  |
|                      | Gongarh C.No.7               | 2014-15         | 11.31                | 8.67                    | 42.28                  |
|                      | Jakhana Civil                | 2016-17         | 10                   | 4.50                    | 21.27                  |
|                      | GongarhC.No. 9               | 2015-16         | 10                   | 10                      | 46.40                  |
|                      | Sandul Civil                 | 2015-16         | 6.0524               | 3.1                     | 52.96                  |
|                      | Dalla Civil                  | 2015-16         | 5.6122               | 5.6122                  | 31.44                  |
|                      | Banoli Civil                 | 2016-17         | 3.68                 | 2.80                    | 43.03                  |
|                      | KundiBadasu Civil            | 2016-17         | 4                    | 4                       | 42.05                  |
|                      | Chamolgoan Civil-I           | 2016-17         | 4                    | 4                       | 49.55                  |
| Lamgoan Range        | Pratap nagar C. No. 1        | 2012-13         | 10                   | 5.52                    | 20.45                  |
|                      | Jalkurgarh C.No. 5           | 2013-14         | 8.29                 | 2.37                    | 8.36                   |
|                      | JalkurgarhC.No. 38           | 2014-15         | 10                   | 5.57                    | 29.80                  |
|                      | Deval Soyam                  | 2016-17         | 4.006                | 3                       | 48.40                  |
| Tehri Range          | KoudiyaC.No. 10 B            | 2012-13         | 2.5                  | 1.36                    | 35                     |
|                      | Lohitaal C.No. 13            | 2012-13         | 10                   | 6.81                    | 20.70                  |
|                      | SevalipatalC.No. 5 Part-I    | 2013-14         | 10                   | 10                      | 42.60                  |
|                      | Sevali patal C.No. 5 Part-II | 2013-14         | 15                   | 7.15                    | 43.93                  |
|                      | Mandkhal C. No. 4            | 2013-14         | 14.584               | 14.584                  | 40.45                  |
|                      | Sarjula C.No. 3              | 2013-14         | 5                    | 5                       | 57.60                  |
|                      | NagungarhC.No. 13            | 2013-14         | 10                   | 10                      | 46.55                  |
|                      | GunogiSoyam-I                | 2014-15         | 10                   | 8.85                    | 23.70                  |
|                      | GunogiSoyam-II               | 2014-15         | 10.71                | 6                       | 29.28                  |
|                      | TinokhNeriSoyam              | 2014-15         | 3.091                | 2.51                    | 25.47                  |
|                      | HadamSoyam                   | 2014-15         | 4.844                | 4.844                   | 22.18                  |
|                      | SarjulaC.No. 3 A             | 2014-15         | 10                   | 6.26                    | 46.40                  |
|                      | LohitaalC.No. 13 A           | 2014-15         | 10                   | 10                      | 41.40                  |
|                      | SarjulaC. No 6               | 2014-15         | 5                    | 5                       | 40                     |
|                      | ITI Thouldhar                | 2016-17         | 1.5                  | 1.5                     | 58                     |
|                      | Sevali patal C. No. 6 A      | 2014-15         | 15                   | 15                      | 31.45                  |
|                      | Danoli Soyam                 | 2014-15         | 11.007               | 7.44                    | 25.62                  |
|                      | Gwalana Soyam                | 2015-16         | 5.518                | 5.518                   | 7.13                   |
|                      | Sevali patal C.No. 8         | 2015-16         | 10                   | 10                      | 48.20                  |
|                      | Sevali patal C.No. 7         | 2015-16         | 7.50                 | 7.50                    | 37.01                  |

|                     |         |               |               |              |
|---------------------|---------|---------------|---------------|--------------|
| Langadiyadhar Block | 2015-16 | 15            | 15            | 42.27        |
| Kaudiya C. No. 1    | 2015-16 | 15            | 11.5          | 42.13        |
| Pata Soyam          | 2015-16 | 10            | 5.1           | 42           |
| Jagdhar Soyam       | 2016-17 | 4             | 4             | 58.86        |
| Kotdwara Soyam      | 2016-17 | 4.34          | 4.34          | 46.29        |
| Nakot Soyam         | 2016-17 | 6.44          | 6.44          | 45.14        |
| Ghon Soyam          | 2016-17 | 2.87          | 2.87          | 39.37        |
| <b>Total</b>        |         | <b>465.83</b> | <b>376.01</b> | <b>38.23</b> |

It is cleared from the above table that there was shortage of 90 ha area as compared to the recorded area when the area was surveyed with GPS. The survival was 38.23%.

### 5.3 Narendra Nagar Forest Division

Narendra Nagar Forest Division comprised of 5 forest ranges. Monitoring and evaluation of CAMPA plantations were carried out in 30 sampled sites in 5 forest ranges. The forest types of the plantation areas are tropical and sub-tropical and forest composition comprised of kanju (*Holoptelea integrifolia*), shisham (*Dalbergia sissoo*), khair (*Acacia catechu*), bakli (*Anogeissus latifolia*), amaltas (*Cassia fistula*), haldu (*Adina cordifolia*) and sal (*Shorea robusta*) in tropical forests and chir (*Pinus roxburghii*) and banj (*Quercus leucotrichophora*) in sub-tropical forests. List of species planted in different sites are presented in table 5.5 and range wise and site wise area planted, area verified during survey and survival of plants are shown in table 5.6.

**Table 5.5** Species planted under CAMPA in Narendra Nagar Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aegle marmelos</i>           | Bel        |
| 2.     | <i>Albizia lebbbeck</i>         | Siras      |
| 3.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 4.     | <i>Bauhinia retusa</i>          | Semla      |
| 5.     | <i>Cedrela toona</i>            | Toon       |
| 6.     | <i>Cedrus deodara</i>           | Deodar     |
| 7.     | <i>Dalbergia sissoo</i>         | Shisham    |
| 8.     | <i>Dendrocalamus strictus</i>   | Bans       |
| 9.     | <i>Emblica officinalis</i>      | Amla       |
| 10.    | <i>Grevillia robusta</i>        | Silver oak |
| 11.    | <i>Holoptelea integrifolia</i>  | Kanju      |
| 12.    | <i>Leucaena leucocephala</i>    | Su-babul   |
| 13.    | <i>Mangifera indica</i>         | Aam        |
| 14.    | <i>Morus alba</i>               | Shahtut    |
| 15.    | <i>Myrica esculenta</i>         | Kafal      |
| 16.    | <i>Prunus armeniaca</i>         | Chullu     |
| 17.    | <i>Prunus cerasoides</i>        | Padam      |
| 18.    | <i>Pyrus pashia</i>             | Mehal      |
| 19.    | <i>Quercus leucotrichophora</i> | Banj       |
| 20.    | <i>Rhododendron arboreum</i>    | Burans     |
| 21.    | <i>Sapindus mukorossi</i>       | Ritha      |
| 22.    | <i>Syzygium cumini</i>          | Jamun      |
| 23.    | <i>Taxus baccata</i>            | Thuner     |
| 24.    | <i>Terminalia bellirica</i>     | Baheda     |
| 25.    | <i>Terminalia chebula</i>       | Harad      |
| 26.    | <i>Terminalia tomentosa</i>     | Sain       |

**Table 5.6** Range wise sites, area and survival of plants in Narendra Nagar Forest Division

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Kirtinagar Range     | Durogi Civil                   | 2016-17         | 5                    | 2.73                    | 31.82                  |
|                      | Pujar Gaon Civil               | 2013-14         | 9                    | 6.1                     | 25.28                  |
|                      | Pujar Gaon Civil               | 2013-14         | 5                    | 5                       | 31.64                  |
|                      | Molta Civil                    | 2016-17         | 5                    | 5                       | 26.55                  |
|                      | Maletha Mawana Tok             | 2013-14         | 10                   | 5.65                    | 33.03                  |
|                      | Choradi Civil                  | 2013-14         | 8                    | 4.82                    | 30.16                  |
|                      | Lachmoli Tok                   | 2013-14         | 5                    | 2.21                    | 34.45                  |
| Maniknath Range      | Badiyargarh Compartment No. 10 | 2013-14         | 5                    | 5                       | 40.05                  |
|                      | Sirsheth Civil                 | 2016-17         | 4                    | 4                       | 49.55                  |
|                      | Palethi Civil                  | 2016-17         | 8                    | 8                       | 21.65                  |
|                      | Palethi Civil                  | 2016-17         | 10                   | 10                      | 36.09                  |
|                      | Taliya Tok Civil               | 2016-17         | 4                    | 4                       | 41.93                  |
|                      | Naithana Civil                 | 2016-17         | 5                    | 5                       | 42.18                  |
|                      | Gawana Civil                   | 2016-17         | 5                    | 3.27                    | 39.13                  |
| Saklana Range        | Aarakot Civil Part I           | 2016-17         | 9                    | 9                       | 22.73                  |
|                      | Aarakot Civil Part II          | 2016-17         | 9                    | 5.96                    | 22.53                  |
|                      | Khuret Lodhi Namy Tok Civil    | 2016-17         | 5                    | 2.28                    | 42.18                  |
|                      | Gaind Compartment 5A           | 2016-17         | 7                    | 3.25                    | 50.49                  |
|                      | Gaind Compartment 5A           | 2016-17         | 5                    | 3.32                    | 38.00                  |
|                      | Gaind Compartment 6A           | 2013-14         | 15                   | 8.70                    | 9.72                   |
|                      | Kasmoli Compartment 2          | 2015-16         | 10                   | 4.03                    | 21.91                  |
|                      | Kasmoli Compartment 4          | 2013-14         | 10                   | 4.71                    | 26.32                  |
| Shivpuri Range       | Singtali Compartment 5         | 2013-14         | 10                   | 6.34                    | 19.31                  |
|                      | Shivpuri Compartment 2         | 2013-14         | 10                   | 8.71                    | 20.40                  |
|                      | Gular Gad Compartment 17       | 2012-13         | 20                   | 20                      | 18.17                  |
|                      | Ghighud Compartment 8          | 2012-13         | 8                    | 8                       | 14.01                  |
|                      | Bhaiswada Sampoon              | 2013-14         | 10                   | 3.86                    | 46.82                  |
|                      | Gann                           | 2015-16         | 10                   | 7.02                    | 43.12                  |
| Narendra Nagar Range | Timli Soyam                    | 2013-14         | 4                    | 3                       | 9.75                   |
|                      | Kaljoti Soyam                  | 2013-14         | 5                    | 3.63                    | 19.40                  |
| <b>Total</b>         |                                |                 | <b>235</b>           | <b>172.59</b>           | <b>30.28</b>           |

It is observed from table 5.6 that an area of 62 ha was found shorter than the recoded area. The survival of plants is 30.28%.

#### 5.4 Tons Forest Division

Monitoring and evaluation of plantation under CAMPA scheme in 5 Ranges of Tons Forest Division viz. Purola, Singtur, Sandra, Devta and Kotigad Range have been conducted. A total of 27 plantation sites covering 146.41 hectare and 45 km area were surveyed. The species planted at different sites under CAMPA plantation is shown in table 5.7 below. The forests of the division are distributed from Tropical, Sub-Tropical and Temperate zones. The native tree species at plantation sites were *Pinus roxburghii* (Chir), *Quercus leucotrichophora* (Banj) and *Rhododendron arboreum* (Buransh). The species were planted as per forest distribution.

**Table 5.7** Species planted under CAMPA in Tons Forest Division

| Sl.No. | Name of species                 | Local Name    |
|--------|---------------------------------|---------------|
| 1.     | <i>Acacia mollissima</i>        | Wattle        |
| 2.     | <i>Albizia lebbeck</i>          | Siras         |
| 3.     | <i>Alstonia scholaris</i>       | Alstonia      |
| 4.     | <i>Bauhinia variegata</i>       | Kachnar       |
| 5.     | <i>Callistemon viminalis</i>    | Bottle brush  |
| 6.     | <i>Cedrus deodara</i>           | Deodar        |
| 7.     | <i>Chukrasia velutina</i>       | Chuckrassia   |
| 8.     | <i>Cupressus torulosa</i>       | Surai         |
| 9.     | <i>Delonix regia</i>            | Gulmohar      |
| 10.    | <i>Emblica officinalis</i>      | Amla          |
| 11.    | <i>Fraxinus micrantha</i>       | Anga          |
| 12.    | <i>Ficus infectoria</i>         | Dhudhi        |
| 13.    | <i>Ficus virens</i>             | Pilkhan       |
| 14.    | <i>Grevellia robusta</i>        | Silver oak    |
| 15.    | <i>Hibiscus rosa chinensis</i>  | Gudhal        |
| 16.    | <i>Jacaranda mimosifolia</i>    | Jacaranda     |
| 17.    | <i>Juglans regia</i>            | Akhrot        |
| 18.    | <i>Melia azadirachta</i>        | Bakain        |
| 19.    | <i>Mimusops elengi</i>          | Moulshree     |
| 20.    | <i>Morus alba</i>               | Shahtut       |
| 21.    | <i>Pinus roxburghii</i>         | Chir          |
| 22.    | <i>Prunus cerasoides</i>        | Padam         |
| 23.    | <i>Pterospermum acerifolium</i> | Kanak champa  |
| 24.    | <i>Putranjiva roxburghii</i>    | Putranjiva    |
| 25.    | <i>Pyrus pashia</i>             | Mehal         |
| 26.    | <i>Quercus lamellosa</i>        | Manipuri banj |
| 27.    | <i>Quercus leucotrichophora</i> | Banj          |
| 28.    | <i>Rhododendron arboreum</i>    | Burans        |
| 29.    | <i>Salix tetrasperma</i>        | Salix         |
| 30.    | <i>Sapindus mukorossi</i>       | Ritha         |
| 31.    | <i>Syzygium cumini</i>          | Jamun         |
| 32.    | <i>Tecoma stans</i>             | Tecoma        |

**Table 5.8** Range wise sites, area and survival of plants in Tons Forest Division

| Name of Forest Range | Sample sites                             | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Purola Range         | Rama-3 A                                 | 2012-13         | 7                    | 7                       | 25.97                  |
|                      | Karada-1 A                               | 2012-13         | 3                    | 3                       | 34.62                  |
|                      | Sunali to Jarmola Road Side Plantation   | 2014-15         | 15 km                | 15 km                   | 35.56                  |
|                      | Karada-1B                                | 2015-16         | 5                    | 5                       | 30.55                  |
|                      | Raun-1 A                                 | 2015-16         | 5                    | 5                       | 14.65                  |
|                      | SwielSoyam                               | 2016-17         | 6.50                 | 4                       | 28.43                  |
|                      |                                          |                 |                      |                         |                        |
| Singtur Range        | Nanai 5 B                                | 2012-13         | 5.31                 | 5.31                    | 15.45                  |
|                      | Jarmola to Kharsari Road Side Plantation | 2014-15         | 8 km                 | 8 km                    | 42.80                  |
|                      | Khadsari to Mori Road Side Plantation    | 2014-15         | 10                   | 10                      | 31.21                  |
|                      | Aura 1 B                                 | 2015-16         | 10                   | 9                       | 28.91                  |
|                      | Pasa-7                                   | 2015-16         | 7.80                 | 7.80                    | 27.72                  |
|                      | Aura-6                                   | 2015-16         | 5                    | 5                       | 19.64                  |
|                      | Siya Pindari Tok Soyam                   | 2016-17         | 14                   | 12                      | 20.06                  |
|                      |                                          |                 |                      |                         |                        |
| Sandra Range         | Mori to LunagadMotar Marg Plantation     | 2014-15         | 4 km                 | 4 km                    | 58.52                  |
|                      | Salara C.No. 2                           | 2015-16         | 5                    | 5                       | 21.82                  |
|                      | Mautad C. No. 3                          | 2015-16         | 5                    | 5                       | 41.27                  |
| Kotigad Range        | Aula-2 A                                 | 2012-13         | 10                   | 9                       | 25.45                  |
|                      | Gamri to Bhutanu Motar Marg Plantation   | 2013-14         | 5 km                 | 5 km                    | 18.62                  |
|                      | Chiba-1                                  | 2015-16         | 10                   | 7.17                    | 21.64                  |
|                      | Arakot-2                                 | 2015-16         | 5                    | 2.50                    | 19.27                  |
|                      | Jabarale Block                           | 2015-16         | 5                    | 5                       | 42.18                  |
|                      | Sekal-1                                  | 2015-16         | 5                    | 4                       | 17.45                  |
|                      |                                          |                 |                      |                         |                        |
| Devta Range          | Thali-2                                  | 2012-13         | 12.80                | 5                       | 30.01                  |
|                      | Bhasala to Lunagad Road Side Plantation  | 2014-15         | 3                    | 3                       | 46.00                  |
|                      | Kukreda-5                                | 2015-16         | 5                    | 5                       | 25.45                  |
|                      | Bagiyar-2                                | 2015-16         | 5                    | 5                       | 23.64                  |
|                      | Kukreda Soyam                            | 2016-17         | 10                   | 6                       | 08.18                  |
| <b>Total</b>         |                                          |                 | <b>159.41</b>        | <b>134.78</b>           | <b>27.97</b>           |

Table 5.8 shows that an area of 24.63 ha was found lesser than the recorded area of plantation in the division. The average survival of plants are 27.97% which is found to be

### 5.5 Uttarkashi Forest Division

The CAMPA plantation in Uttarkashi Forest Division was carried out in 6 forest ranges namely; Dunda, Gangotri, Taknor, Badahat, Mukhem and Dharasu. A total of 56 plantation sites with 451.45 hectare area have been covered in Uttarkashi Forest Division. The forests are widely distributed in tropical zone of lower Himalaya to sub-tropical, temperate and alpine zones. The native species in the forests of Uttarkashi consist of kanju, shisham, khair, chir, banj, moru, kharsu, deodar, mahel, pangar, fir and spruce are pre-dominated with associated species of trees, shrubs and herbs. The species planted under CAMPA plantations in 6 forest ranges are given below (table 5.9).

**Table 5.9** Species planted under CAMPA in Uttarkashi Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Arundinaria falcata</i>      | Ringal     |
| 3.     | <i>Bauhinia purpurea</i>        | Kachnar    |
| 4.     | <i>Bauhinia retusa</i>          | Semla      |
| 5.     | <i>Cedrela toona</i>            | Toon       |
| 6.     | <i>Cedrus deodara</i>           | Deodar     |
| 7.     | <i>Corylus colurna</i>          | Kapasi     |
| 8.     | <i>Pyracantha crenulata</i>     | Gingararu  |
| 9.     | <i>Dalbergia sissoo</i>         | Shisham    |
| 10.    | <i>Fraxinus micrantha</i>       | Anga       |
| 11.    | <i>Euonymus lacerus</i>         | Anga       |
| 12.    | <i>Juglans regia</i>            | Akhrot     |
| 13.    | <i>Prunus armeniaca</i>         | Chullu     |
| 14.    | <i>Prunus cerasoides</i>        | Padam      |
| 15.    | <i>Pyrus pashia</i>             | Mehal      |
| 16.    | <i>Quercus dilatata</i>         | Moru       |
| 17.    | <i>Quercus leucotrichophora</i> | Banj       |
| 18.    | <i>Rhododendron arboreum</i>    | Burans     |
| 19.    | <i>Salix tetrasperma</i>        | Salix      |
| 20.    | <i>Sapindus mukorossi</i>       | Ritha      |
| 21.    | <i>Syzygium cumini</i>          | Jamun      |
| 22.    | <i>Tecoma stans</i>             | Tecoma     |
| 23.    | <i>Terminalia chebula</i>       | Harad      |

Range wise sites and area of plantation's sites are shown in table 5.10. The table also shows the area measured by GPS and survival of plants.

**Table 5.10** Range wise sites, area and survival of plants in Uttarkashi Forest Division

| Name of Forest Range | Sample sites                          | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|---------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Dharasu Range        | Nagungad Compartment No. 8 B Part II  | 2014-15         | 5                    | 5                       | 33.60                  |
|                      | Nagungad Compartment No. 8 B Part I   | 2014-15         | 5                    | 3.42                    | 28.80                  |
|                      | Nagungad Compartment No. 6 B          | 2014-15         | 10                   | 7.72                    | 49.00                  |
|                      | Nagungad Compartment No. 8 B Part III | 2014-15         | 10                   | 8.49                    | 45.20                  |
|                      | Nagungad Compartment No. 5 AB Part II | 2014-15         | 5                    | 5                       | 39.60                  |
|                      | Banadi Soyam                          | 2015-16         | 3                    | 3                       | 21.82                  |
|                      | Dharkot Soyam                         | 2015-16         | 2                    | 2                       | 24.55                  |
|                      | Bangaon Soyam                         | 2016-17         | 2.30                 | 1.18                    | 37.94                  |
|                      | Suri Ramoli Soyam Ist                 | 2015-16         | 9                    | 5                       | 19.70                  |
|                      | Junga Soyam Tok Silyana               | 2013-14         | 10                   | 6.90                    | 36.20                  |
|                      | Khurmola Compartment No. 13           | 2012-13         | 10                   | 10                      | 47.38                  |
|                      | Matholi Soyam                         | 2016-17         | 2.15                 | 2.15                    | 15.91                  |
|                      | Jaulkhand Ist                         | 2016-17         | 7                    | 5                       | 37.92                  |
|                      | Jaulkhand IInd                        | 2016-17         | 7                    | 7                       | 33.12                  |
|                      | Bagodi Soyam                          | 2015-16         | 3                    | 3                       | 25.45                  |
|                      | Tachiyen Compartment No.2             | 2013-14         | 10                   | 5.55                    | 15.35                  |

|                |                                |         |               |               |              |
|----------------|--------------------------------|---------|---------------|---------------|--------------|
| Gangotri Range | Harshil Compartment No. 8      | 2012-13 | 10            | 10            | 21.00        |
|                | Gangotri Compartment No. 5A    | 2015-16 | 10            | 7.11          | 21.18        |
| Taknaur Range  | Laata Soyam                    | 2013-14 | 10            | 4.8           | 18.80        |
|                | Gorshali Soyam                 | 2013-14 | 20            | 20            | 22.85        |
|                | Kujjan Soyam                   | 2014-15 | 10            | 6.76          | 10.50        |
|                | Tihar Compartment No. 7        | 2015-16 | 15            | 6             | 19.13        |
|                | Raithal Compartment No.1       | 2014-15 | 12            | 12            | 26.13        |
|                | Raithal Compartment No.1       | 2012-13 | 10            | 6.55          | 29.38        |
|                | Tihar Compartment No.1         | 2015-16 | 10            | 4.72          | 25.80        |
|                | Raithal Compartment No. 6A     | 2016-17 | 5             | 5             | 26.55        |
| Badahat Range  | Nald 4 A                       | 2012-13 | 5             | 3.43          | 35.60        |
|                | Nald Compartment No.1          | 2016-17 | 10            | 8.1           | 38.09        |
|                | Nald Civil                     | 2014-15 | 5             | 5             | 24.00        |
|                | Nald Compartment No. 2         | 2015-16 | 10            | 7.55          | 34.50        |
|                | Uttraun Compartment No.2       | 2012-13 | 8             | 4.97          | 19.77        |
|                | Basunga Civil                  | 2014-15 | 6             | 4.4           | 25.50        |
|                | Seku Civil                     | 2013-14 | 5             | 3.78          | 25.30        |
|                | Gavana Civil                   | 2014-15 | 10            | 6.67          | 26.25        |
|                | Paata Civil                    | 2015-16 | 3             | 3             | 36.36        |
| Mukhem Range   | Aleth Soyam Tok Ghandiyaldhar  | 2014-15 | 10            | 10            | 30.60        |
|                | Aleth Soyam Tok Kathiyan       | 2014-15 | 10            | 4.63          | 34.20        |
|                | Chamkot Soyam                  | 2013-14 | 10            | 10            | 27.10        |
|                | Dhanpur Aleth Soyam            | 2013-14 | 10            | 6.55          | 28.45        |
|                | Badagaddi Compartment No. 5    | 2012-13 | 5             | 2.10          | 30.64        |
|                | Dikholi Soyam                  | 2015-16 | 3             | 1.27          | 31.82        |
|                | Saur Soyam                     | 2015-16 | 2             | 2             | 42.27        |
|                | Bhityara Soyam                 | 2015-16 | 1             | 1             | 28.18        |
|                | Jalkurgad Compartment No. 15 A | 2016-17 | 11            | 5.26          | 32.31        |
| Dunda Range    | Gavana Soyam                   | 2013-14 | 10            | 6.20          | 22.85        |
|                | Dhanari Compartment No. 7 B    | 2012-13 | 5             | 2             | 30.75        |
|                | Astal Soyam                    | 2014-15 | 13            | 9.50          | 20.31        |
|                | Athali Soyam Plot 1            | 2013-14 | 10            | 6.49          | 23.70        |
|                | Athali Soyam Plot 2            | 2013-14 | 10            | 5.30          | 22.30        |
|                | Dunda Soyam                    | 2014-15 | 10            | 6.11          | 24.50        |
|                | Sigot Compartment No. 8        | 2015-16 | 10            | 6.07          | 36.27        |
|                | Sigot Compartment No.7         | 2016-17 | 10            | 6.34          | 34.09        |
|                | Sigot Compartment No. 7        | 2014-15 | 10            | 6.70          | 36.30        |
|                | Nakuri Soyam                   | 2014-15 | 8             | 5.88          | 13.94        |
|                | Ranu Ki Gad- 3 B               | 2015-16 | 15            | 15            | 28.27        |
|                | Panchangaon Soyam Tok Dhuldhar | 2015-16 | 4             | 4             | 27.05        |
| <b>Total</b>   |                                |         | <b>451.45</b> | <b>332.65</b> | <b>28.64</b> |

It is evident from the table that survival of plants in Uttarkashi Forest Division is very low (28.64%). An area of 118.80 ha found deficit as compared with recorded area after verifying area with GPS.

## 5.6 Uttarkashi Soil Conservation Division

A total of 5 ranges of Uttarkashi Soil Conservation Division have been covered in this report viz. Indravati, Jamak, Jalkurgad I, Jalkurgad II and Dhanarigad. A total of 19 plantation sites with 94 hectare area were covered under CAMPA monitoring in Uttarkashi Soil Conservation Division. The slopes of the hills are intense in most of plantation's sites. The following species were found planted on sites (table 5.11).

**Table 5.11** Species planted under CAMPA in Uttarkashi Soil Conservation Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Arundinaria falcata</i>      | Ringal     |
| 3.     | <i>Bauhinia purpurea</i>        | Kachnar    |
| 4.     | <i>Bauhinia retusa</i>          | Semla      |
| 5.     | <i>Cedrela toona</i>            | Toon       |
| 6.     | <i>Cedrus deodara</i>           | Deodar     |
| 7.     | <i>Corylus colurna</i>          | Kapasi     |
| 8.     | <i>Pyracantha crenulata</i>     | Gingarua   |
| 9.     | <i>Dalbergia sissoo</i>         | Shisham    |
| 10.    | <i>Emblia officinalis</i>       | Amla       |
| 11.    | <i>Fraxinus micrantha</i>       | Anga       |
| 12.    | <i>Juglans regia</i>            | Akhrot     |
| 13.    | <i>Prunus armeniaca</i>         | Chullu     |
| 14.    | <i>Prunus cerasoides</i>        | Padam      |
| 15.    | <i>Pyrus pashia</i>             | Mehal      |
| 16.    | <i>Quercus dilatata</i>         | Moru       |
| 17.    | <i>Quercus leucotrichophora</i> | Banj       |
| 18.    | <i>Rhododendron arboreum</i>    | Burans     |
| 19.    | <i>Salix tetrasperma</i>        | Salix      |
| 20.    | <i>Sapindus mukorossi</i>       | Ritha      |
| 21.    | <i>Syzygium cumini</i>          | Jamun      |
| 22.    | <i>Tecoma stans</i>             | Tecoma     |
| 23.    | <i>Terminalia chebula</i>       | Harad      |

A total of 19 sites and an area of 94 ha were covered under survey. The area of plantation, name of the sample sites, area verified by GPS and survival of plants are shown in table 5.12 below. The survival of plants was more than 50% (51.81%).

**Table 5.12** Range wise sites, area and survival of plants in Uttarkashi Soil Conservation Forest Division

| Name of Forest Range | Sample sites             | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------|-----------------|----------------------|-------------------------|------------------------|
| Indravati Range      | Tiloth Soyam             | 2013-14         | 12                   | 9.75                    | 35.36                  |
|                      | Athali Soyam             | 2013-14         | 4                    | 4                       | 38.93                  |
| Jamak Range          | Hina Soyam               | 2015-16         | 5                    | 5                       | 33.36                  |
|                      | Jamak Compartment No. 6A | 2015-16         | 5                    | 2.72                    | 51.68                  |
|                      | Maneri Soyam             | 2015-16         | 5                    | 5                       | 29.80                  |
|                      | Hina Soyam               | 2013-14         | 5                    | 5                       | 16.66                  |
| Jalkurgad I Range    | Saudgarh Soyam           | 2015-16         | 5                    | 5                       | 87.33                  |
|                      | Thandi Soyam             | 2015-16         | 5                    | 5                       | 63.05                  |
|                      | Chaudiyat Soyam I        | 2015-16         | 5                    | 5                       | 74.78                  |
|                      | Chaudiyat Soyam II       | 2015-16         | 5                    | 5                       | 75.04                  |
| Jalkurgad II Range   | Bhant Soyam I            | 2015-16         | 5                    | 5                       | 60.42                  |
|                      | Bhant Soyam III          | 2015-16         | 5                    | 5                       | 60.02                  |

|                  |                               |         |           |              |              |
|------------------|-------------------------------|---------|-----------|--------------|--------------|
| Dhanarigad Range | Pani Bhawan Tipra Soyam       | 2015-16 | 5         | 2.42         | 55.36        |
|                  | Rontal Soyam                  | 2015-16 | 5         | 5            | 68.04        |
|                  | Ed Dordhar                    | 2015-16 | 5         | 3            | 27.11        |
|                  | Ed Dordhar Gosai Chari        | 2015-16 | 5         | 5            | 52.38        |
|                  | Garhwalgad Soyam Lingdala Tok | 2013-14 | 8         | 8            | 49.06        |
|                  | Malli Kitudi Soyam            | 2013-14 | 10        | 10           | 67.55        |
|                  | Jasipur Soyam                 | 2015-16 | 5         | 3            | 38.52        |
| <b>Total</b>     |                               |         | <b>94</b> | <b>92.89</b> | <b>51.81</b> |

## 5.7 Badrinath Forest Division

CAMPA plantation in Badrinath Forest Division was carried out in 5 forest ranges namely; Chamoli, Nandprayag, East Pindar Dewal, Centre Pindar Tharali Range and West Pindar Narayanibagad Range. A total of 56 sites comprised of 295.22 ha area were surveyed for monitoring and evaluation of CAMPA plantation. List of species planted is shown in table 5.13 and range wise sites covered, area undertaken for plantation is presented in table 5.14. The plantation's sites are found distributed in sub-tropical to Alpine forests of Himalaya. The forests are characterized by maximum distribution of chir at sub-tropical zone mixed with banj at higher reaches. The temperate zone consisted of deodar, fire, spruce, moru, kharsu, burans as predominant species. While Alpine zone consists of spruce, fir, juniperous etc.

**Table 5.13** List of species planted under CAMPA plantation in Badrinath Forest Division

| Sl.No. | Name of species                 | Local Name   |
|--------|---------------------------------|--------------|
| 1.     | <i>Acrocarpus fraxinifolius</i> | Pink Ceddar  |
| 2.     | <i>Aesculus indica</i>          | Pangar       |
| 3.     | <i>Albizia lebbbeck</i>         | Siras        |
| 4.     | <i>Arundinaria falcata</i>      | Ringal       |
| 5.     | <i>Bauhinia purpurea</i>        | Kachnar      |
| 6.     | <i>Bauhinia retusa</i>          | Semla        |
| 7.     | <i>Callistemon viminalis</i>    | Bottle brush |
| 8.     | <i>Cedrela toona</i>            | Toon         |
| 9.     | <i>Cedrus deodara</i>           | Deodar       |
| 10.    | <i>Celtis australis</i>         | Khadik       |
| 11.    | <i>Citrus sinensis</i>          | Malta        |
| 12.    | <i>Corylus colurna</i>          | Kapasi       |
| 13.    | <i>Pyracantha crenulata</i>     | Gingaru      |
| 14.    | <i>Dalbergia sissoo</i>         | Shisham      |
| 15.    | <i>Dendrocalamus strictus</i>   | Nar bans     |
| 16.    | <i>Emblica officinalis</i>      | Amla         |
| 17.    | <i>Fraxinus micrantha</i>       | Anga         |
| 18.    | <i>Ficus infectoria</i>         | Timla        |
| 19.    | <i>Jacaranda mimosifolia</i>    | Jacranda     |
| 20.    | <i>Juglans regia</i>            | Akhrot       |
| 21.    | <i>Myrica esculenta</i>         | Kafal        |
| 22.    | <i>Ougeinia oojenensis</i>      | Sandan       |

|     |                                 |          |
|-----|---------------------------------|----------|
| 23. | <i>Prunus armeniaca</i>         | Chullu   |
| 24. | <i>Prunus cerasoides</i>        | Padam    |
| 25. | <i>Prunus persica</i>           | Adu      |
| 26. | <i>Psidium guajava</i>          | Amrood   |
| 27. | <i>Pyrus pashia</i>             | Mehal    |
| 28. | <i>Quercus dilatata</i>         | Moru     |
| 29. | <i>Quercus floribunda</i>       | Faliyant |
| 30. | <i>Quercus leucotrichophora</i> | Banj     |
| 31. | <i>Rhododendron arboreum</i>    | Burans   |
| 32. | <i>Robinea pseudoacasia</i>     | Robinea  |
| 33. | <i>Salix tetrasperma</i>        | Salix    |
| 34. | <i>Sapindus mukorossi</i>       | Ritha    |
| 35. | <i>Syzygium cumini</i>          | Jamun    |
| 36. | <i>Tecoma stans</i>             | Tecoma   |
| 37. | <i>Terminalia bellirica</i>     | Baheda   |
| 38. | <i>Terminalia chebula</i>       | Harad    |
| 39. | <i>Thespesia populnea</i>       | Kaula    |

**Table 5.14** Number of sample sites, area covered and actual area under plantation in Badrinath Forest Division

| Name of Forest Range    | Sample sites                        | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|-------------------------|-------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Chamoli Range           | Batula Van Panchayat (Pashyakodi)   | 2014-15         | 3.5                  | 3.5                     | 50.39                  |
|                         | Agthala Van Panchayat (Rubisa)      | 2014-15         | 1.5                  | 1.5                     | 65.76                  |
|                         | Agthala Van Panchayat (RubisaTok)   | 2015-16         | 3.5                  | 3.5                     | 47.12                  |
|                         | NH 58 NO.454.2                      | 2015-16         | 2                    | 2                       | 33.47                  |
|                         | Gadi Van Panchayat                  | 2012-13         | 3                    | 3                       | 36.36                  |
|                         | DasoliVth Compartment No. 17A       | 2012-13         | 10                   | 10                      | 23.55                  |
|                         | Pagna Van Panchayat (Ghana Tok)     | 2013-14         | 11                   | 11                      | 16.94                  |
|                         | Pagna Van Panchayat (Kachula Tok)   | 2013-14         | 10                   | 10                      | 8.42                   |
|                         | Mankhi Van Panchayat                | 2012-13         | 3                    | 3                       | 22.12                  |
|                         | Gawai Van Panchayat (SimarGadera)   | 2016-17         | 5                    | 5                       | 32.04                  |
|                         | Nandprayag Van Panchayat (ThalaTok) | 2015-16         | 5                    | 2.5                     | 26.80                  |
|                         | Ramni Van Panchayat                 | 2015-16         | 5                    | 5                       | 20.40                  |
|                         | Ramni Van Panchayat (KafdaTok)      | 2015-16         | 5                    | 5                       | 25.20                  |
| Nandprayag Range        | Karnprayag Compartment No. 1        |                 | 1                    | 1                       | 41.73                  |
|                         | Hadakoti Civil                      | 2016-17         | 2                    | 2                       | 33.55                  |
|                         | Umarakot Baidanu                    | 2016-17         | 4.5                  | 4.5                     | 35.47                  |
|                         | Langasu Civil                       | 2015-16         | 6                    | 6                       | 28.33                  |
|                         | Devli Bagad Civil                   | 2016-17         | 2                    | 2                       | 35.14                  |
|                         | Kunjakot Vth                        | 2012-13         | 8                    | 5.63                    | 12.73                  |
|                         | Nandakini II Compartment No. 3 A    | 2014-15         | 5                    | 3                       | 35.82                  |
| East Pindar Deval Range | Kail Civil                          | 2016-17         | 6                    | 6                       | 35.76                  |
|                         | Nawali I Compartment No. 2          | 2013-14         | 7                    | 6                       | 13.90                  |
|                         | Nawali I Compartment No. 16         | 2013-14         | 5                    | 5                       | 20.55                  |
|                         | Nawali I Compartment No. 5          | 2012-13         | 5                    | 5                       | 20.18                  |

|              |                                            |         |               |               |              |
|--------------|--------------------------------------------|---------|---------------|---------------|--------------|
|              | Lawani Civil                               | 2015-16 | 1.5           | 1.5           | 39.21        |
|              | Lawani Van Panchayat                       | 2014-15 | 5.5           | 5.5           | 35.14        |
|              | Baank Civil                                | 2016-17 | 7             | 6             | 39.35        |
|              | Pindar Par III Compartment No. 10B Part II | 2013-14 | 5             | 5             | 40.55        |
|              | Wan Van Panchayat                          | 2016-17 | 5             | 5             | 6.40         |
|              | Pindar Par Compartment No. 10B Part I      | 2013-14 | 10            | 10            | 10.18        |
|              | Chaud Van Panchayat                        | 2015-16 | 3.0           | 3.0           | 35.45        |
| Centre       | Tungeshwar Van Panchayat Part I            | 2013-14 | 2.5           | 2.5           | 37.89        |
| Pindar       | Tungeshwar Van Panchayat Part II           | 2013-14 | 8.5           | 8.5           | 10.59        |
| Tharali      | Jaula Civil                                | 2016-17 | 6.5           | 5.5           | 52.46        |
| Range        | Thala Van Panchayat                        | 2015-16 | 5             | 5             | 5.60         |
|              | Thala Civil                                | 2016-17 | 5             | 5             | 9.64         |
|              | Pindar Par II Compartment No. 19           | 2014-15 | 5             | 2.50          | 20.55        |
|              | Pindar Par II Compartment No. 20           | 2015-16 | 8.95          | 8.95          | 30.08        |
|              | Ratagaun Civil                             | 2016-17 | 6.5           | 6.5           | 49.47        |
|              | Pindar Par II Compartment No. 9 Part I     | 2014-15 | 5             | 3             | 24.73        |
|              | Pindar Par II Compartment No. 9 Part II    | 2014-15 | 5             | 5             | 25.09        |
|              | Pindar Par I Compartment No. 23            | 2015-16 | 8.69          | 8.69          | 38.61        |
| West Pindar  | Dungri Van Panchayat                       | 2013-14 | 8             | 8             | 18.98        |
| Narayanbagad | Dungri Van Panchayat (Charagah)            | 2016-17 | 5             | 4             | 36.40        |
| Range        | Simli Van Panchayat (1D) Charagah          | 2016-17 | 5             | 5             | 24.00        |
|              | Bhangota Van Panchayat (1D) Charagah       | 2014-15 | 2.5           | 2.5           | 7.50         |
|              | Bhangota Van Panchayat (1D) Kritim         | 2014-15 | 2.5           | 2.5           | 4.91         |
|              | Gairwaram Van Panchayat (1D) Charagah      | 2015-16 | 5             | 4             | 42.00        |
|              | Hashkoti Civil                             | 2016-17 | 10            | 10            | 7.74         |
|              | Hashkoti                                   | 2016-17 | 5.58          | 2.25          | 24.18        |
|              | Hashkoti Van Panchayat (1D) Charagah       | 2015-16 | 5             | 1.53          | 6.88         |
|              | Pindar Var III Compartment No. 2C          | 2015-16 | 0.5           | 0.5           | 18.18        |
|              | Bamiyala Reserve                           | 2012-13 | 5             | 3             | 14.55        |
|              | Niladi Civil                               | 2016-17 | 1.5           | 1.5           | 43.21        |
|              | Kimoli Van Panchayat                       | 2013-14 | 10            | 10            | 15.82        |
|              | Kimoli Van Panchayat                       | 2013-14 | 7             | 7             | 20.65        |
| <b>Total</b> |                                            |         | <b>295.22</b> | <b>270.05</b> | <b>27.10</b> |

## 5.8 Alaknanda Forest Division

Alaknanda Forest Division consists of 6 forest ranges wherein CAMPA plantation was undertaken. The forest division spreads into varied climatic conditions from tropical, sub-tropical and temperate climates. Therefore, forest compositions have also varied from sal forests to chir, banj and deodar. The associated species in these forests are kanju, khair, shisham, amla, amaltas, kafal, aiyar, mahel, burans etc. The species planted under CAMPA at different sites are given in table 5.15 below.

**Table 5.15** List of species planted under CAMPA plantation in Alaknanda Forest Division

| Sl.No. | Name of species                 | Local Name    |
|--------|---------------------------------|---------------|
| 1.     | <i>Aesculus indica</i>          | Pangar        |
| 2.     | <i>Albizzia lebbeck</i>         | Siras         |
| 3.     | <i>Arundinaria falcata</i>      | Ringal        |
| 4.     | <i>Bougainvillea</i>            | Bougainvillea |
| 5.     | <i>Callistemon viminalis</i>    | Bottle brush  |
| 6.     | <i>Cedrela toona</i>            | Toon          |
| 7.     | <i>Cedrus deodara</i>           | Deodar        |
| 8.     | <i>Cupressus torulosa</i>       | Surai         |
| 9.     | <i>Dendrocalamus strictus</i>   | Nar bans      |
| 10.    | <i>Elaeocarpus ganitrus</i>     | Rudraksh      |
| 11.    | <i>Ficus religiosa</i>          | Pipal         |
| 12.    | <i>Jacaranda mimosifolia</i>    | Jacrandra     |
| 13.    | <i>Lagerstroemia indica</i>     | Savni         |
| 14.    | <i>Pinus wallichiana</i>        | Kail          |
| 15.    | <i>Prunus armeniaca</i>         | Chullu        |
| 16.    | <i>Prunus cerasoides</i>        | Padam         |
| 17.    | <i>Quercus dilatata</i>         | Faliyant      |
| 18.    | <i>Quercus leucotrichophora</i> | Banj          |
| 19.    | <i>Quercus semecarpifolia</i>   | Kharsu        |
| 20.    | <i>Sapindus mukorossi</i>       | Ritha         |
| 21.    | <i>Syzygium cumini</i>          | Jamun         |
| 22.    | <i>Tecoma stans</i>             | Tecoma        |

Area measured by GPS during the survey, recoded area and survival of plants are indicated in table 5.16.

**Table 5.16** Range wise sites, area and survival of plants in Alaknanda Forest Division

| Name of Forest Range | Sample sites                       | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Nandakini Range      | Banjbagad Van                      | 2013-14         | 10                   | 10                      | 12.27                  |
|                      | Panchayat Tok Melthagad            |                 |                      |                         |                        |
|                      | Saitolee Van Panchayat Tok         | 2014-15         | 5                    | 3                       | 23.09                  |
|                      | Kamedapani                         |                 |                      |                         |                        |
|                      | Saitolee Van Panchayat Tok Ranikot | 2016-17         | 8                    | 6                       | 23.25                  |
|                      | Ustolee Van Panchayat Tok Sakola   | 2015-16         | 12                   | 9                       | 25.83                  |
| Aatagad Range        | Malayi Van Panchayat Tok Jhaldunga | 2014-15         | 5                    | 4                       | 32.36                  |
|                      | Malayi Van Panchayat Tok Gairoli   | 2013-14         | 10                   | 9                       | 23.64                  |
|                      | Karanprayag to Gauchar             | 2012-13         | 10                   | 10                      | 11.60                  |
|                      | Taldhari to Panayi                 | 2012-13         | 5                    | 4                       | 14.36                  |
|                      | Bandarkhand to Karanprayag         | 2012-13         | 3                    | 2                       | 21.21                  |
| Pokhari Range        | Kunjasu Van Panchayat Tok          | 2016-17         | 8                    | 4                       | 38.50                  |
|                      | Dhungidhar                         |                 |                      |                         |                        |
|                      | Sinau Van Panchayat Talla Malla    | 2016-17         | 8                    | 4.13                    | 12.00                  |

|                 |                                        |         |            |               |              |
|-----------------|----------------------------------------|---------|------------|---------------|--------------|
|                 | Vishal Van Panchayat Tok Vyapalgonda   | 2013-14 | 5          | 2.61          | 34.73        |
|                 | Nail Sideli Van Panchayat              | 2014-15 | 10         | 5             | 20.60        |
|                 | Jaurasi Van Panchayat Tok Latugair     | 2013-14 | 14         | 10            | 24.29        |
|                 | Bangthal Van Panchayat Tok Kedarkanta  | 2013-14 | 5          | 2.53          | 35.45        |
|                 | Devar Van Panchayat                    | 2015-16 | 12         | 7             | 26.83        |
| Asedsimli Range | Chopta Van Panchayat Tok Chapchyanpani | 2012-13 | 10         | 6             | 12.36        |
|                 | Penty Van Panchayat                    | 2014-15 | 5          | 5             | 40.00        |
| Tharali Range   | Meltha Van Panchayat                   | 2016-17 | 8          | 8             | 39.00        |
| Joshimath Range | Molta Van Panchayat Tok Shayan         | 2013-14 | 13         | 10            | 8.46         |
|                 | Molta Civil Tok Anoti                  | 2012-13 | 13         | 13            | 11.54        |
|                 | Molta Van Panchayat Tok Garpaka        | 2013-14 | 5          | 5             | 23.64        |
|                 | Bhainta civil Tok BanjPatta            | 2014-15 | 10         | 7             | 50.55        |
|                 | Bhangyool Civil Tok Patal              | 2013-14 | 10         | 6             | 37.55        |
|                 | Tolma Civil                            | 2012-13 | 10         | 10            | 15.55        |
| <b>Total</b>    |                                        |         | <b>214</b> | <b>162.27</b> | <b>24.74</b> |

The data from 26 plantation's sites revealed that survival of plants are found very low (24.74%). There is deficit of 51.73 ha of plantation area as measured by GPS by in the fields.

### 5.9 Pauri Civil Soyam Forest Division

CAMPA plantation was also undertaken in Civil and Soyam areas of Pauri Forest Division of Uttarakhand. Sites of plantations were taken up in Civil and Soyam forests of Pauri which is having a separate forest division. These forests are being managed and developed with the help of community participation. The division comprised of 6 forest ranges namely; Bironkhal, Naugaonkhal, Pabau, Srinagar, Pauri and Satpuli ranges. A total of 109 plantation's sites and 873.21 ha of area were surveyed for data collection. A list of species planted at the sites are given in table 5.17 below.

**Table 5.17** List of species planted under CAMPA plantation in Pauri Civil Soyam Forest Division

| Sl.No. | Name of species              | Local Name |
|--------|------------------------------|------------|
| 1.     | <i>Acacia mollissima</i>     | Wattle     |
| 2.     | <i>Aesculus indica</i>       | Pangar     |
| 3.     | <i>Albizzia lebbeck</i>      | Siras      |
| 4.     | <i>Arundinaria falcata</i>   | Ringal     |
| 5.     | <i>Bauhinia purpurea</i>     | Kachnar    |
| 6.     | <i>Cedrela toona</i>         | Toon       |
| 7.     | <i>Cedrus deodara</i>        | Deodar     |
| 8.     | <i>Cinnamomum zeylanicum</i> | Dalkchini  |
| 9.     | <i>Citrus sinensis</i>       | Malta      |
| 10.    | <i>Cupressus torulosa</i>    | Surai      |
| 11.    | <i>Emblica officinalis</i>   | Amla       |
| 12.    | <i>Fraxinus micrantha</i>    | Anga       |
| 13.    | <i>Morus alba</i>            | Shahtoot   |

|     |                                 |         |
|-----|---------------------------------|---------|
| 14. | <i>Prunus armeniaca</i>         | Chullu  |
| 15. | <i>Prunus cerasoides</i>        | Padam   |
| 16. | <i>Pyrus pashia</i>             | Mahel   |
| 17. | <i>Quercus leucotrichophora</i> | Banj    |
| 18. | <i>Quercus semecarpifolia</i>   | Kharsu  |
| 19. | <i>Robinea pseudoacasia</i>     | Robinea |
| 20. | <i>Sapindus mukorossi</i>       | Ritha   |
| 21. | <i>Syzygium cumini</i>          | Jamun   |
| 22. | <i>Tecoma stans</i>             | Tecoma  |
| 23. | <i>Terminalia bellirica</i>     | Baheda  |
| 24. | <i>Terminalia chebula</i>       | Harad   |

**Table 5.18** Range wise sample sites, area and survival of plants Pauri Civil Soyam Forest Division

| Name of Forest Range | Sample sites                  | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Bironkhal Range      | Mohanvakhali Van Panchayat    | 2014-15         | 10                   | 5.14                    | 31.56                  |
|                      | Thabdiya Van Panchayat        | 2016-17         | 2.770                | 2.770                   | 25.93                  |
|                      | Thabdiya Van Panchayat        | 2016-17         | 10                   | 10                      | 20.10                  |
|                      | Thabdiya Van Panchayat        | 2013-14         | 5                    | 5                       | 10.18                  |
|                      | Rangalcha Van Panchayat       | 2013-14         | 10                   | 7.31                    | 16.73                  |
|                      | Jakhani Van Panchayat         | 2014-15         | 10                   | 5.17                    | 9.82                   |
|                      | Jakhani Van Panchayat         | 2015-16         | 5                    | 3                       | 21.82                  |
|                      | Arkandayi Van Panchayat- II   | 2016-17         | 2.610                | 2.610                   | 17.07                  |
|                      | Bharpoor Chota Van Panchayat  | 2013-14         | 10                   | 10                      | 10.20                  |
|                      | Koliunda Van Panchayat - I    | 2014-15         | 4                    | 4                       | 5.68                   |
|                      | Koliunda Van Panchayat- II    | 2014-15         | 4                    | 4                       | 4.77                   |
| Naugaonkhal Range    | Maikholi Van Panchayat        | 2013-14         | 10                   | 10                      | 16.27                  |
|                      | Maikholi Van Panchayat        | 2013-14         | 10                   | 10                      | 7.09                   |
|                      | Aenthi Van Panchayat          | 2014-15         | 10                   | 10                      | 21.55                  |
|                      | Bagwadi Van Panchayat         | 2013-14         | 7                    | 5.11                    | 6.23                   |
|                      | Rauli Van Panchayat           | 2016-17         | 5                    | 3.95                    | 15.36                  |
|                      | Naini Van Panchayat           | 2013-14         | 10                   | 8                       | 17.36                  |
|                      | Kulasu Civil                  | 2016-17         | 10                   | 8.21                    | 18.36                  |
|                      | Amoli Civil                   | 2016-17         | 5                    | 5                       | 18.91                  |
|                      | Sunna Civil                   | 2014-15         | 10                   | 8.28                    | 23.91                  |
|                      | Dalmana Civil                 | 2013-14         | 10                   | 10                      | 20.05                  |
|                      | Gavani Van Panchayat          | 2012-13         | 5                    | 3.25                    | 11.18                  |
|                      | Sasaun Van Panchayat          | 2012-13         | 10                   | 7.13                    | 20.00                  |
|                      | Isoti Van Panchayat           | 2014-15         | 7                    | 4.95                    | 7.79                   |
|                      | Isoti Van Panchayat           | 2016-17         | 10                   | 5.53                    | 13.09                  |
|                      | Palkot Civil                  | 2014-15         | 5                    | 3                       | 28.91                  |
|                      | Bheti Civil                   | 2015-16         | 5                    | 5                       | 17.20                  |
|                      | Mavana Civil                  | 2013-14         | 8                    | 8                       | 8.86                   |
|                      | Panthar Van Panchayat         | 2015-16         | 5                    | 5                       | 18.55                  |
|                      | Churedgaon Van Panchayat      | 2012-13         | 5                    | 5                       | 18.73                  |
|                      | Churedgaon Van Panchayat- Ist | 2013-14         | 5                    | 5                       | 18.10                  |
|                      | Naugaon Malla Civil           | 2014-15         | 5                    | 5                       | 20.91                  |
|                      | Naugaon Malla Civil           | 2014-15         | 10                   | 7.35                    | 22.91                  |

|                   |                                   |         |      |      |       |
|-------------------|-----------------------------------|---------|------|------|-------|
| Pabau<br>Range    | Maroda Van Panchayat- II          | 2013-14 | 10   | 5.36 | 19.73 |
|                   | Maroda Van Panchayat- II          | 2014-15 | 7    | 5.44 | 18.44 |
|                   | Maroda Van Panchayat- I           | 2014-15 | 8    | 5.85 | 21.70 |
|                   | Nisni Van Panchayat- I            | 2012-13 | 5    | 5    | 18.91 |
|                   | Nisni Van Panchayat- II           | 2012-13 | 5    | 5    | 19.45 |
|                   | Budni Van Panchayat               | 2013-14 | 15   | 10.8 | 19.00 |
|                   | Vidoli Van Panchayat              | 2016-17 | 10   | 10   | 19.36 |
|                   | Ghunna Van Panchayat- I           | 2013-14 | 10   | 10   | 22.82 |
|                   | Ghunna Van Panchayat- II          | 2013-14 | 10   | 10   | 20.64 |
|                   | Chaplodi Van Panchayat            | 2015-16 | 10   | 10   | 15.82 |
|                   | Banekh Van Panchayat              | 2014-15 | 8    | 8    | 21.14 |
|                   | Boonga Van Panchayat              | 2014-15 | 10   | 10   | 17.64 |
|                   | Nalayi Van Panchayat- I           | 2012-13 | 5    | 3.37 | 20.10 |
|                   | Manjholi Van Panchayat            | 2016-17 | 10   | 7.86 | 18.27 |
|                   | Taal Van Panchayat                | 2014-15 | 5    | 5    | 22.36 |
|                   | Chaundi Van Panchayat             | 2013-14 | 5    | 3.79 | 13.82 |
|                   | Ratkoti Van Panchayat             | 2015-16 | 5    | 5    | 22.73 |
|                   | Kirsal Van Panchayat              | 2015-16 | 5    | 5    | 22.55 |
| Srinagar<br>Range | Kattakholi Van Panchayat          | 2013-14 | 15   | 15   | 30.47 |
|                   | Farasu Van Panchayat- I           | 2013-14 | 10   | 5.74 | 26.91 |
|                   | Farasu Van Panchayat II           | 2013-14 | 10   | 6.26 | 31.45 |
|                   | Nayalgad Lagga Maso Van Panchayat | 2015-16 | 5    | 3.20 | 31.27 |
|                   | Nayalgad Van Panchayat            | 2016-17 | 10   | 10   | 33.60 |
|                   | Ufalda Civil                      | 2012-13 | 10   | 7.14 | 28.55 |
|                   | Kolta Civil                       | 2016-17 | 10   | 10   | 16.44 |
|                   | Maroda Van Panchayat-I            | 2013-14 | 10   | 8.16 | 27.90 |
|                   | Gairu Van Panchayat               | 2013-14 | 10   | 10   | 17.45 |
|                   | Gavana Van Panchayat- II          | 2013-14 | 15   | 10   | 17.82 |
|                   | Gavana Van Panchayat- I           | 2013-14 | 10   | 8.54 | 21.45 |
|                   | Akhada Van Panchayat              | 2013-14 | 5    | 5    | 18.36 |
|                   | Kanda Van Panchayat- I            | 2013-14 | 10   | 6.95 | 22.09 |
|                   | Rampur Van Panchayat- II          | 2013-14 | 10   | 10   | 30.90 |
|                   | Kanda Van Panchayat- II           | 2013-14 | 10   | 8.05 | 14.70 |
|                   | Rampur Van Panchayat- I           | 2013-14 | 10   | 7    | 20.09 |
|                   | Khadet Van Panchayat              | 2015-16 | 5    | 3.39 | 5.60  |
|                   | Salda Van Panchayat- I            | 2014-15 | 10   | 10   | 15.18 |
|                   | Salda Van Panchayat- II           | 2014-15 | 10   | 10   | 11.18 |
|                   | Dhikwalgaon Van Panchayat         | 2016-17 | 10   | 7    | 21.27 |
|                   | Dhikwalgaon Van Panchayat         | 2014-15 | 10   | 6.84 | 17.64 |
| Pauri<br>Range    | Siroli Van Panchayat              | 2013-14 | 10   | 7    | 26.09 |
|                   | Qwerali Civil                     | 2014-15 | 10   | 10   | 26.64 |
|                   | Pokhari Van Panchayat             | 2012-13 | 5    | 5    | 20.80 |
|                   | Kot Van Panchayat                 | 2012-13 | 5    | 5    | 20.40 |
|                   | Kanda Van Panchayat               | 2015-16 | 10   | 7    | 22.60 |
|                   | Pauri Kandayi Van Panchayat       | 2013-14 | 15   | 11   | 16.30 |
|                   | Gahad (Paidulsyu) Van Panchayat   | 2016-17 | 5.40 | 5.40 | 30.00 |
|                   | Dang Civil                        | 2014-15 | 10   | 10   | 24.55 |
|                   | Paidul Civil                      | 2015-16 | 5    | 5    | 17.82 |
|                   | Gahad Civil-I                     | 2012-13 | 5    | 5    | 11.40 |
|                   | Gahad Civil- II                   | 2012-13 | 5    | 5    | 12.10 |
|                   | Gahad (Paidulsyu) Van Panchayat   | 2013-14 | 10   | 10   | 13.30 |
|                   | Malli Rai Van Panchayat           | 2015-16 | 5    | 5    | 25.20 |
|                   | Chandola Rai Van Panchayat        | 2014-15 | 8    | 8    | 33.52 |

|                  |                                |         |               |               |              |
|------------------|--------------------------------|---------|---------------|---------------|--------------|
|                  | Rawatgaon Van Panchayat        | 2014-15 | 10            | 10            | 17.36        |
|                  | Pauri Kandayi Van Panchayat    | 2015-16 | 5             | 5             | 20.36        |
|                  | Pauri Kandayi Van Panchayat    | 2014-15 | 10            | 10            | 27.55        |
|                  | Thapliyalgaon Van Panchayat    | 2015-16 | 5             | 5             | 16.40        |
|                  | Bainjwadi Van Panchayat        | 2015-16 | 5             | 5             | 19.60        |
|                  | Balodi Van Panchayat           | 2016-17 | 4.61          | 4.61          | 25.46        |
|                  | Pundori Civil Tok Khillu       | 2014-15 | 12            | 9             | 21.89        |
|                  | Gahad Gagvadsyu Van Panchayat  | 2016-17 | 5.13          | 5.13          | 24.37        |
|                  | Gahad Gagvadsyu Van Panchayat  | 2013-14 | 10            | 10            | 32.40        |
|                  | Kadakot Van Panchayat- I       | 2016-17 | 2.842         | 2.842         | 29.97        |
|                  | Siroli Van Panchayat           | 2012-13 | 5             | 3.91          | 7.64         |
|                  | Kevars Van Panchayat           | 2014-15 | 5             | 5             | 21.20        |
| Satpuli<br>Range | Kund Van Panchayat Tok Majheda | 2015-16 | 10            | 10            | 13.55        |
|                  | Panchali Van Panchayat         | 2015-16 | 5             | 5             | 27.09        |
|                  | Naithana Civil                 | 2014-15 | 10            | 10            | 23.09        |
|                  | Kusyan Van Panchayat           | 2014-15 | 10            | 10            | 21.18        |
|                  | Punderi Van Panchayat          | 2014-15 | 10            | 8             | 26.91        |
|                  | Hasudi Van Panchayat           | 2014-15 | 8             | 8             | 15.86        |
|                  | Thanool Van Panchayat          | 2014-15 | 10            | 2.94          | 23.18        |
|                  | Gadkot Van Panchayat           | 2016-17 | 7.55          | 5.86          | 21.47        |
|                  | Naithana Van Panchayat         | 2016-17 | 6.30          | 5.80          | 26.62        |
|                  | Ukhlet Van Panchayat- I        | 2012-13 | 10            | 6.85          | 2.05         |
|                  | Ukhlet Van Panchayat           | 2013-14 | 10            | 7             | 5.55         |
|                  | <b>Total</b>                   |         | <b>873.21</b> | <b>748.84</b> | <b>19.54</b> |

The survival of plants in the division is 19.54% which is very poor. A decrease of 88.37 ha of plantation area is found when the area was measured by GPS in the field (table 5.18).

### 5.10 Soil Conservation Division, Kalsi

CAMPA plantation in Soil Conservation Division, Kalsi was undertaken in 6 forest ranges namely; Kalsi I, Kalsi II, Kuanu, Chakrata, Churani and Barontha. The forests are distributed in tropical, sub-tropical and temperate zones. The predominant species in the natural forests are sal, bakli, chir, banj, deodar, mahel, aiyar, burans, moru etc. The terrain is hilly and rocky with steeper slopes. The data were collected from 39 sample sites and 304 ha area was surveyed. The species planted under CAMPA is shown in table 5.19.

**Table 5.19** List of species planted under CAMPA plantation in Soil Conservation Forest Division, Kalsi

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Bauhinia purpurea</i>        | Kachnar    |
| 2.     | <i>Cedrela toona</i>            | Toon       |
| 3.     | <i>Cedrus deodara</i>           | Deodar     |
| 4.     | <i>Emblica officinalis</i>      | Amla       |
| 5.     | <i>Fraxinus micrantha</i>       | Anga       |
| 6.     | <i>Prunus cerasoides</i>        | Padam      |
| 7.     | <i>Pyrus pashia</i>             | Mahel      |
| 8.     | <i>Quercus leucotrichophora</i> | Banj       |
| 9.     | <i>Robinea pseudoacasia</i>     | Robinea    |
| 10.    | <i>Sapindus mukorossi</i>       | Ritha      |

|     |                               |         |
|-----|-------------------------------|---------|
| 11. | <i>Syzygium cumini</i>        | Jamun   |
| 12. | <i>Terminalia bellerica</i>   | Baheda  |
| 13. | <i>Terminalia chebula</i>     | Harad   |
| 14. | <i>Cedrella toona</i>         | Tun     |
| 15. | <i>Bombax ceiba</i>           | Semal   |
| 16. | <i>Mangifera indica</i>       | Aam     |
| 17. | <i>Dendrocalamus strictus</i> | Bans    |
| 18. | <i>Zizyphus mauritiana</i>    | Ber     |
| 19. | <i>Ficus religiosa</i>        | Pipal   |
| 20. | <i>Ficus benghalensis</i>     | Bargad  |
| 21. | <i>Bauhinia retusa</i>        | Semla   |
| 22. | <i>Ficus virens</i>           | Pilkhan |
| 23. | <i>Artocarpus lacucha</i>     | Dheu    |
| 24. | <i>Cinnamomum tamala</i>      | Tejpat  |

**Table 5.20** Range wise sites, area and survival of plants in Soil Conservation Forest Division, Kalsi

| Name of Forest Range | Sample sites            | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-------------------------|-----------------|----------------------|-------------------------|------------------------|
| Kalsi I Range        | Chapnu                  | 2013-14         | 5                    | 5                       | 38.10                  |
|                      | Panuva                  | 2013-14         | 5                    | 5                       | 45.60                  |
|                      | Samaya Gorna Tok        | 2014-15         | 10                   | 10                      | 40.40                  |
|                      | Samaya Gayadhar         | 2015-16         | 7                    | 7                       | 48.00                  |
|                      | Badnu                   | 2013-14         | 10                   | 10                      | 4.77                   |
|                      | Maletha Tikardhar       | 2013-14         | 7                    | 7                       | 9.84                   |
| Kalsi II Range       | Bhandara Tok            | 2012-13         | 10                   | 10                      | 10.51                  |
|                      | Chamiya Kheda (Ashti)   | 2012-13         | 10                   | 10                      | 9.63                   |
|                      | Powarkheda Tok          | 2014-15         | 10                   | 10                      | 13.48                  |
|                      | Nata Tok                | 2012-13         | 10                   | 10                      | 16.89                  |
|                      | Dungra Tok              | 2014-15         | 10                   | 10                      | 11.94                  |
|                      | Dolan Tok               | 2014-15         | 5                    | 5                       | 0.00                   |
| Kwanu Range          | Suri Ka Kheda           | 2013-14         | 5                    | 5                       | 0.00                   |
|                      | Gudani Kheda (Dhauda)   | 2015-16         | 10                   | 10                      | 6.52                   |
|                      | Chamrai Kheda           | 2012-13         | 10                   | 10                      | 5.41                   |
|                      | Samuadhar               | 2012-13         | 10                   | 10                      | 0.00                   |
|                      | Kyar Kati               | 2012-13         | 10                   | 10                      | 8.58                   |
|                      | DandadharDasau III      | 2014-15         | 5                    | 5                       | 9.02                   |
| Chakrata Range       | Kwarna II               | 2014-15         | 5                    | 5                       | 5.04                   |
|                      | Kwarna I                | 2014-15         | 5                    | 5                       | 21.25                  |
|                      | Behlag Tok (Korva)      | 2014-15         | 10                   | 10                      | 19.73                  |
|                      | Moondhar                | 2013-14         | 5                    | 5                       | 19.32                  |
|                      | Sarlachani              | 2012-13         | 10                   | 10                      | 41.86                  |
|                      | Kotli Khera             | 2013-14         | 10                   | 10                      | 23.58                  |
| Churani Range        | Sawai Tikulakheda       | 2013-14         | 5                    | 5                       | 5.42                   |
|                      | Devadi Dhar Tok (Bisoi) | 2013-14         | 8                    | 2.66                    | 13.83                  |
|                      | Lohari Ghodiya Dhar     | 2013-14         | 5                    | 5                       | 0.00                   |
|                      | Lohan (Kadai That)      | 2014-15         | 5                    | 5                       | 17.16                  |
|                      | Dhiroi Tok              | 2013-14         | 4                    | 4                       | 17.73                  |
|                      | Lakhwad Padikar Tok     |                 |                      |                         |                        |

|                  |                     |         |            |               |              |
|------------------|---------------------|---------|------------|---------------|--------------|
|                  | Lakhwad Padikar Tok | 2014-15 | 5          | 5             | 21.53        |
|                  | Khunna Tok (Khunna) | 2013-14 | 10         | 10            | 23.00        |
|                  | Khunna Tok (Khunna) | 2014-15 | 10         | 10            | 31.62        |
| Brontha<br>Range | Sarsachani          | 2013-14 | 5          | 5             | 0.00         |
|                  | Behlad Khadd        | 2014-15 | 10         | 10            | 7.65         |
|                  | Kandoi Ki Dhar      | 2013-14 | 10         | 10            | 7.09         |
|                  | Tipradhar           | 2013-14 | 5          | 5             | 2.40         |
|                  | Radina Ki Dhar      | 2013-14 | 8          | 8             | 39.23        |
|                  | Tikri Kheda         | 2012-13 | 10         | 10            | 31.84        |
|                  | Thati Tok           | 2014-15 | 10         | 10            | 4.42         |
| <b>Total</b>     |                     |         | <b>304</b> | <b>298.66</b> | <b>16.21</b> |

The survival of plants is very poor (16.21%) in this division.

### 5.11 Kalsi Forest Division

CAMPA plantation in Kalsi Forest Division was undertaken in 2 forest ranges namely; Langha and Timli. The forests are dominated by sal and its associated species in Tropical Moist Deciduous Forest type. Survey for monitoring of plantation was carried out in 5 sites of 2 ranges in an area of 37 ha. The average survival of plants was 35% (table 5.22). The species planted are indicated in table 5.21.

**Table 5.21** List of species planted under CAMPA in Kalsi Forest Division

| Sl.No. | Name of species                | Local Name |
|--------|--------------------------------|------------|
| 1.     | <i>Cordia dichotoma</i>        | Lasoda     |
| 2.     | <i>Dalbergia sissoo</i>        | Shisham    |
| 3.     | <i>Delonix regia</i>           | Gulmohar   |
| 4.     | <i>Dendrocalamus strictus</i>  | Bans       |
| 5.     | <i>Ficus benghalensis</i>      | Bargad     |
| 6.     | <i>Ficus religiosa</i>         | Pipal      |
| 7.     | <i>Ficus virens</i>            | Pilkhan    |
| 8.     | <i>Mallotus philippinensis</i> | Rohini     |
| 9.     | <i>Mangifera indica</i>        | Aam        |
| 10.    | <i>Pongamia pinnata</i>        | Kanji      |
| 11.    | <i>Syzygium cumini</i>         | Jamun      |
| 12.    | <i>Tecoma stans</i>            | Tecoma     |
| 13.    | <i>Terminalia bellirica</i>    | Baheda     |
| 14.    | <i>Terminalia chebula</i>      | Harad      |

**Table 5.22** Range wise sites, area and survival of plants in Kalsi Forest Division

| Name of Forest Range | Sample sites                 | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Timli Range          | Herbatpur Ponta (Marg Block) | 2014-15         | 5                    | 5                       | 23.56                  |
|                      | Dhaura I                     | 2015-16         | 10                   | 10                      | 12.50                  |
| Langha Range         | South Binhar Compartment 8 B | 2015-16         | 5                    | 5                       | 39.44                  |
|                      | North Binhar 1 A             | 2015-16         | 10                   | 10                      | 56.93                  |
|                      | North Binhar Compartment 1 A | 2012-13         | 7                    | 7                       | 43.74                  |
| <b>Total</b>         |                              |                 | <b>37</b>            | <b>37</b>               | <b>35.234</b>          |

## 5.12 Soil Conservation Division, Lansdowne

Monitoring and evaluation of plantation done under CAMPA scheme in 7 forest ranges of Soil Conservation Forest Division Lansdowne viz. Rikhanikhal, Jaiharikhal, Matiyali, Bhmagukhal, Chailusain, Gohri and Taal. A total area of 64 plantation sites covering 626.70 ha area was surveyed. Most of the plantation area is hilly and sloppy. The natural forests consisted of chir as predominant species along with guriyal, banj, burans, kingora, hinsalu etc. The species planted in this division is shown in the table 5.23 below.

**Table 5.23** List of species planted under CAMPA in Soil Conservation Division, Lansdowne

| Sl.No. | Name of species                 | Local Name    |
|--------|---------------------------------|---------------|
| 1.     | <i>Acacia catechu</i>           | Khair         |
| 2.     | <i>Acacia mollissima</i>        | Wattle        |
| 3.     | <i>Adina cordifolia</i>         | Haldu         |
| 4.     | <i>Albizia lebbbeck</i>         | Siras         |
| 5.     | <i>Bauhinia variegata</i>       | Kachnar       |
| 6.     | <i>Cassia fistula</i>           | Amaltas       |
| 7.     | <i>Cedrela toona</i>            | Tun           |
| 8.     | <i>Cedrus deodara</i>           | Deodar        |
| 9.     | <i>Cupressus torulosa</i>       | Surai         |
| 10.    | <i>Dalbergia sissoo</i>         | Shisham       |
| 11.    | <i>Dendrocalamus strictus</i>   | Bans          |
| 12.    | <i>Emblica officinalis</i>      | Amla          |
| 13.    | <i>Eucalyptus hybrid</i>        | Safeda        |
| 14.    | <i>Fraxinus micrantha</i>       | Anga          |
| 15.    | <i>Ficus religiosa</i>          | Pipal         |
| 16.    | <i>Grevillea robusta</i>        | Silver oak    |
| 17.    | <i>Mallotus philippinensis</i>  | Rohini        |
| 18.    | <i>Mangifera indica</i>         | Aam           |
| 19.    | <i>Moringa oleifera</i>         | Sainjhana     |
| 20.    | <i>Pongamia pinnata</i>         | Kanju         |
| 21.    | <i>Prunus cerasoides</i>        | Padam         |
| 22.    | <i>Purtranjiva roxburghii</i>   | Putranjiva    |
| 23.    | <i>Quercus lamellosa</i>        | Manipuri banj |
| 24.    | <i>Quercus leucotrichophora</i> | Banj          |
| 25.    | <i>Sapindus mukrossi</i>        | Ritha         |
| 26.    | <i>Syzygium cumini</i>          | Jamun         |
| 27.    | <i>Terminalia bellirica</i>     | Baheda        |

Range wise number of sample sites and area verified along with over all survival of plants are indicated in the table 5.24 A total of 64 sample sites were surveyed. It is evident from the table 5.24 that an area of 87 ha was found deficit as surveyed with the help of GPS. The survival of plants is also very less (22%).

**Table 5.24** Range wise sites, area and survival of plants in Soil Conservation Division, Lansdowne

| Name of Forest Range | Sample sites     | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------|-----------------|----------------------|-------------------------|------------------------|
| Rikhanikhal Range    | Palligaun        | 2013-14         | 10                   | 7                       | 8.73                   |
|                      | Badsu            | 2013-14         | 12                   | 10                      | 8.41                   |
|                      | Ghotla           | 2013-14         | 7                    | 7                       | 26.23                  |
|                      | Devkhar          | 2013-14         | 12                   | 10                      | 5.98                   |
|                      | Uneri            | 2014-15         | 10                   | 8                       | 11.82                  |
|                      | Valsamalla       | 2014-15         | 10                   | 9                       | 13.64                  |
|                      | Sila Badsu       | 2015-16         | 10                   | 9                       | 10.55                  |
|                      | Valsatalla       | 2015-16         | 10                   | 7.55                    | 12.91                  |
|                      | Sinala           | 2015-16         | 10                   | 10                      | 28.00                  |
|                      | Badsu            | 2016-17         | 8                    | 8                       | 40.57                  |
| Jaiharikhal Range    | Raitpur          | 2012-13         | 10                   | 10                      | 40.60                  |
|                      | Kimar            | 2013-14         | 8                    | 5                       | 12.25                  |
|                      | Raitpur          | 2013-14         | 4                    | 4                       | 12.00                  |
|                      | Kafaldi          | 2013-14         | 12                   | 10                      | 22.88                  |
|                      | Kafaldi          | 2014-15         | 10                   | 10                      | 41.60                  |
|                      | Jaletha          | 2014-15         | 10                   | 10                      | 20.45                  |
|                      | Jaletha          | 2015-16         | 10                   | 10                      | 33.18                  |
|                      | Kimar            | 2015-16         | 7                    | 6                       | 28.71                  |
|                      | Sagwadi          | 2016-17         | 8.20                 | 8.20                    | 14.67                  |
| Matiyali Range       | Jawad            | 2013-14         | 15                   | 15                      | 15.76                  |
|                      | Diusa            | 2013-14         | 10                   | 10                      | 26.45                  |
|                      | Dhari            | 2014-15         | 10                   | 10                      | 40.64                  |
|                      | Plas             | 2014-15         | 10                   | 10                      | 23.91                  |
|                      | Gahad            | 2015-16         | 10                   | 10                      | 34.27                  |
|                      | Soundal          | 2015-16         | 12                   | 12                      | 40.08                  |
|                      | Kafaldi          | 2016-17         | 8                    | 8                       | 31.02                  |
| Bhragukhal Range     | Syalani          | 2012-13         | 10                   | 5.62                    | 22.36                  |
|                      | Kharduni Malli   | 2013-14         | 10                   | 10                      | 11.36                  |
|                      | Dhura Bharpur    | 2013-14         | 12                   | 12                      | 30.76                  |
|                      | Nathukhal        | 2013-14         | 10                   | 7.13                    | 19.40                  |
|                      | Vanchuri-I       | 2013-14         | 9                    | 6                       | 43.64                  |
|                      | Mawasa           | 2014-15         | 10                   | 8                       | 20.73                  |
|                      | Pilkhedi         | 2014-15         | 10                   | 10                      | 20.45                  |
|                      | Nathukhal        | 2015-16         | 10                   | 10                      | 20.36                  |
|                      | Rekheda          | 2015-16         | 10                   | 10                      | 33.09                  |
|                      | Pathola          | 2015-16         | 7                    | 7                       | 36.43                  |
|                      | Narai            | 2016-17         | 10                   | 8                       | 36.27                  |
| Chailusain Range     | Akhor            | 2012-13         | 12                   | 9                       | 13.33                  |
|                      | Sandaniya        | 2012-13         | 10                   | 5                       | 11.27                  |
|                      | Nail             | 2012-13         | 10                   | 8.21                    | 27.18                  |
|                      | Pata             | 2012-13         | 11                   | 10                      | 13.72                  |
|                      | Barsudi          | 2013-14         | 10                   | 6                       | 28.36                  |
|                      | Sural Goun       | 2013-14         | 10                   | 10                      | 13.45                  |
|                      | Suradi           | 2014-15         | 10                   | 7.50                    | 11.45                  |
|                      | Chwara           | 2014-15         | 10                   | 7                       | 14.45                  |
|                      | Sandaniya        | 2015-16         | 7.5                  | 7.5                     | 24.21                  |
| Gohri Range          | Umda Gap Filling | 2013-14         | 10                   | 5                       | 30.10                  |
|                      | Mala             | 2013-14         | 7                    | 7                       | 13.36                  |
|                      | Pamba            | 2013-14         | 7                    | 3                       | 30.65                  |

|              |               |         |              |               |              |
|--------------|---------------|---------|--------------|---------------|--------------|
|              | Jogiana       | 2013-14 | 9            | 9             | 28.08        |
|              | Maral         | 2013-14 | 8            | 8             | 7.05         |
|              | Naugoun Malla | 2014-15 | 10           | 7             | 15.55        |
|              | Bhadasi       | 2014-15 | 10           | 10            | 25.18        |
|              | Naugoun-II    | 2015-16 | 10           | 7.50          | 12.18        |
|              | Juldy         | 2015-16 | 10           | 8.30          | 24.18        |
|              | Patli         | 2016-17 | 8            | 8             | 21.02        |
| Taal Range   | Bhawasi-II    | 2013-14 | 9            | 9             | 20.91        |
|              | Bahawasi-III  | 2013-14 | 16           | 16            | 11.36        |
|              | Talla Banash  | 2014-15 | 8            | 5.50          | 22.50        |
|              | Maroda        | 2014-15 | 15           | 15            | 25.03        |
|              | Udda          | 2015-16 | 10           | 5             | 13.09        |
|              | Malla Banash  | 2015-16 | 10           | 5             | 18           |
|              | Ramjiwala     | 2015-16 | 10           | 10            | 17.09        |
|              | Talla Banash  | 2016-17 | 8            | 6             | 22.73        |
| <b>Total</b> |               |         | <b>626.7</b> | <b>542.01</b> | <b>22.11</b> |

### 5.13 Bageshwar Forest Division

Monitoring and evaluation of plantation under CAMPA scheme in 5 ranges of Bageshwar Forest Division viz. Garhkheth, Baijnath, Kopkot, Dhamardhar and Bageshwar Ranges were conducted. A total of 42 plantation sites covering an area of 300 hectare were surveyed. The species planted under CAMPA plantation is given below (table 5.25).

**Table 5.25** List of species planted under CAMPA in Bageshwar Forest Division

| Sl.No. | Name of species                | Local Name |
|--------|--------------------------------|------------|
| 1.     | <i>Acacia catechu</i>          | Khair      |
| 2.     | <i>Acacia mollissima</i>       | Wattle     |
| 3.     | <i>Adina cordifolia</i>        | Haldu      |
| 4.     | <i>Albizia lebbeck</i>         | Siras      |
| 5.     | <i>Alnus nitida</i>            | Utis       |
| 6.     | <i>Bassia butyracea</i>        | Chuiria    |
| 7.     | <i>Bauhinia purpurea</i>       | Guiral     |
| 8.     | <i>Bauhinia variegata</i>      | Kachnar    |
| 9.     | <i>Cassia fistula</i>          | Amaltas    |
| 10.    | <i>Cedrela toona</i>           | Tun        |
| 11.    | <i>Cedrus deodara</i>          | Deodar     |
| 12.    | <i>Crataegus crulata</i>       | Gingarua   |
| 13.    | <i>Cupressus torulosa</i>      | Surai      |
| 14.    | <i>Dalbergia sissoo</i>        | Shisham    |
| 15.    | <i>Dendrocalamus strictus</i>  | Bans       |
| 16.    | <i>Emblica officinalis</i>     | Amla       |
| 17.    | <i>Eucalyptus hybrid</i>       | Safeda     |
| 18.    | <i>Fraxinus micrantha</i>      | Anga       |
| 19.    | <i>Ficus religiosa</i>         | Pipal      |
| 20.    | <i>Grevillea robusta</i>       | Silver oak |
| 21.    | <i>Mallotus philippinensis</i> | Rohini     |

|     |                                 |               |
|-----|---------------------------------|---------------|
| 22. | <i>Mangifera indica</i>         | Aam           |
| 23. | <i>Moringa oleifera</i>         | Sainjhana     |
| 24. | <i>Morus alba</i>               | Shahtoot      |
| 25. | <i>Ougeinia oojenesis</i>       | Sandan        |
| 26. | <i>Pongamia pinnata</i>         | Kanju         |
| 27. | <i>Prunus cerasoides</i>        | Padam         |
| 28. | <i>Psidium guajava</i>          | Amrud         |
| 29. | <i>Punica granatum</i>          | Anar          |
| 30. | <i>Purtranjiva roxburghii</i>   | Putranjiva    |
| 31. | <i>Quercus lamellose</i>        | Manipuri banj |
| 32. | <i>Quercus leucotrichophora</i> | Banj          |
| 33. | <i>Quercus floribunda</i>       | Faliyat       |
| 34. | <i>Sapindus mukrossi</i>        | Ritha         |
| 35. | <i>Syzygium cumini</i>          | Jamun         |
| 36. | <i>Taxus baccata</i>            | Thuner        |
| 37. | <i>Terminalia bellirica</i>     | Baheda        |
| 38. | <i>Terminalia chebula</i>       | Harad         |

Range wise number of sample sites and area verified along with over all survival of plants are indicated in the table 5.26. A total of 42 sample sites were surveyed. It is evedent from the table that an area of 64.42 ha was found deficit as surveyed with the help of GPS. The survival of plants is also very less (25%).

**Table 5.26** Range wise sites, area and survival of plants in Bageashwar Forest Division

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Gharkhet Range       | Jhakera Van Panchayat          | 2012-13         | 5.0                  | 5.0                     | 11.60                  |
|                      | North Khabdoli C.No. 26        | 2013-14         | 5.0                  | 5.0                     | 30.55                  |
|                      | Semar Van Panchayat            | 2014-15         | 8.04                 | 8.04                    | 27.84                  |
|                      | Kulau C.No. 12                 | 2014-15         | 2.0                  | 2.0                     | 34.09                  |
|                      | Wajula C.No. 5                 | 2014-15         | 7.0                  | 5.67                    | 45.19                  |
|                      | Wajula C.No. 4                 | 2014-15         | 5.0                  | 5.0                     | 52.00                  |
|                      | South Khabdoli C.No. 28        | 2015-16         | 5.0                  | 5.0                     | 48.18                  |
|                      | South Khabdoli C.No. 19 Part-I | 2016-17         | 7.0                  | 4.0                     | 44.29                  |
|                      | Kulau C.No. 20                 | 2016-17         | 9.8                  | 9.8                     | 36.36                  |
| Bajjnath Range       | Rolinya Van Panchayat          | 2013-14         | 10.0                 | 6.16                    | 13.18                  |
|                      | Anna Van Panchayat             | 2014-15         | 12.6                 | 9.33                    | 30.63                  |
|                      | Nauta Van Panchayat            | 2014-15         | 4.91                 | 3                       | 12.74                  |
|                      | Kansyari Van Panchayat         | 2014-15         | 10.0                 | 10.0                    | 45.36                  |
|                      | Muthu to Patli Motar Marg      | 2015-16         | 10.0 Km              | 10.0 Km                 | 7.27                   |
|                      | Kulaun C.No. 31                | 2016-17         | 17.042               | 17.042                  | 10.10                  |
| Dharamghar Range     | Simkuna Van Panchayat          | 2012-13         | 10.0                 | 5.29                    | 3.75                   |
|                      | Chakjamini Van Panchayat       | 2014-15         | 4.15                 | 4.15                    | 23.44                  |
|                      | Hudam C.No. 5                  | 2014-15         | 10.57                | 10.57                   | 28.76                  |
|                      | Paisiya Civil                  | 2015-16         | 8.30                 | 6.0                     | 27.62                  |
|                      | Haldwani C.No.3                | 2016-17         | 3.754                | 3.754                   | 29.33                  |
|                      | Dasholi C.No. 2 B              | 2016-17         | 10.0                 | 10.0                    | 37.09                  |

|                    |                          |         |               |               |              |
|--------------------|--------------------------|---------|---------------|---------------|--------------|
| Glacier<br>Range   | Naukodi Van Panchayat    | 2014-15 | 10.0          | 10.0          | 21.82        |
|                    | Naukodi Van Panchayat    | 2014-15 | 6.31          | 5.0           | 8.64         |
|                    | Kilpara Civil            | 2015-16 | 3.20          | 3.20          | 17.30        |
|                    | Choura Civil             | 2015-16 | 4.0           | 4.0           | 10.45        |
| Kapkot<br>Range    | Jatarkot Civil           | 2012-13 | 5.0           | 2.37          | 7.70         |
|                    | Parmati Van Panchayat    | 2014-15 | 8.08          | 6.38          | 22.85        |
|                    | Basani Van Panchayat     | 2014-15 | 12.29         | 5.0           | 4.85         |
|                    | Bhayu Van Panchayat      | 2014-15 | 2.0           | 2.0           | 2.27         |
|                    | Kiroli Civil             | 2015-16 | 4.40          | 4.40          | 55.23        |
|                    | Churiya Civil            | 2015-16 | 7.50          | 7.68          | 6.04         |
|                    | Poling Civil             | 2016-17 | 8.732         | 8.732         | 1.92         |
| Bageshwar<br>Range | Ujeda Civil              | 2012-13 | 5.0           | 3.53          | 4.40         |
|                    | Dhuraphat C.No. 2 B      | 2013-14 | 5.0           | 4.0           | 31.64        |
|                    | Einna Civil              | 2013-14 | 5.89          | 5.89          | 10.28        |
|                    | Amarsarkot Van Panchayat | 2014-15 | 4.0           | 3.32          | 41.82        |
|                    | Harbad Civil             | 2015-16 | 7.5           | 4.0           | 39.32        |
|                    | Tehsil Campus Kafligair  | 2015-16 | 3.0           | 2.0           | 41.21        |
|                    | Harbad Civil             | 2015-16 | 6.5           | 3.76          | 32.74        |
|                    | South Khabdoli C. No. 6  | 2016-17 | 4.95          | 3.47          | 40.75        |
|                    | South Khabdoli C. No. 9  | 2016-17 | 9.25          | 6.28          | 20.61        |
|                    | Anarsa C.No. 2           | 2016-17 | 12.624        | 6.15          | 29.17        |
| <b>Total</b>       |                          |         | <b>300.39</b> | <b>235.96</b> | <b>25.00</b> |

#### 5.14 Nainital Forest Division

A total of 7 forest ranges of Nainital Forest Division viz., Manora Range, Bhowali Range, Kosi Range, North Gola Range, South Gola Range, Barhon Range and Naina were surveyed for CAMPA plantation monitoring. Twenty two (22) plantation sites and an area of 158.305 hectare was surveyed in Nainital Forest Division. The native forest composition consisted of chir, banj, surai, jamun, kaul, Khina, burans etc. The species planted under CAMPA in this division are shown in table 5.27 below.

**Table 5.27** List of species planted under CAMPA in Nainital Forest Division

| Sl.No. | Name of species               | Local Name   |
|--------|-------------------------------|--------------|
| 1.     | <i>Acer oblongum</i>          | Putli        |
| 2.     | <i>Aesculus indica</i>        | Pangar       |
| 3.     | <i>Alnus nitida</i>           | Utis         |
| 4.     | <i>Arundinaria falcata</i>    | Bans/ Ringal |
| 5.     | <i>Bauhinia purpurea</i>      | Guiral       |
| 6.     | <i>Bauhinia variegata</i>     | Kachnar      |
| 7.     | <i>Cassia fistula</i>         | Amaltas      |
| 8.     | <i>Cedrela toona</i>          | Tun          |
| 9.     | <i>Cedrus deodara</i>         | Deodar       |
| 10.    | <i>Cotoneaster bacillaris</i> | Ruinsh       |
| 11.    | <i>Pyracantha crulata</i>     | Gingar       |
| 12.    | <i>Cupressus torulosa</i>     | Surai        |
| 13.    | <i>Emblica officinalis</i>    | Amla         |
| 14.    | <i>Fraxinus micrantha</i>     | Anga         |

|     |                                 |            |
|-----|---------------------------------|------------|
| 15. | <i>Ficus infectoria</i>         | Timla      |
| 16. | <i>Grevillea robusta</i>        | Silver oak |
| 17. | <i>Jacrandra mimosifolia</i>    | Jacrandra  |
| 18. | <i>Juglans regia</i>            | Akhrot     |
| 19. | <i>Plumeria spp.</i>            | Champa     |
| 20. | <i>Prunus cerasoides</i>        | Padam      |
| 21. | <i>Pyrus pashia</i>             | Mahel      |
| 22. | <i>Quercus leucotrichophora</i> | Banj       |
| 23. | <i>Quercus semecarpifolia</i>   | Kharsu     |
| 24. | <i>Quercus spp.</i>             | Faliyat    |
| 25. | <i>Rubus ellipticus</i>         | Hisalu     |
| 26. | <i>Sapindus mukrossi</i>        | Ritha      |
| 27. | <i>Syzygium cumini</i>          | Jamun      |

Range wise number of sample sites and area verified along with over all survival of plants are indicated in the table 5.28. A total of 22 sample sites were surveyed. It is evident from the table 5.28 that an area of 21 ha was found deficit as surveyed with the help of GPS. The survival of plants is also very less (27%).

**Table 5.28** Range wise sites, area and survival of plants in Nainital Forest Division

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Manora Range         | Mangoli Compartment No. 6-9    | 2014-15         | 10.0                 | 7.0                     | 30.45                  |
|                      | Rusi Compartment No. 2         | 2016-17         | 4.29                 | 4.29                    | 28.21                  |
|                      | Mora Compartment No. 4         | 2014-15         | 10.0                 | 10.0                    | 51.18                  |
| Bhowali Range        | Bohrakot Van Panchayat         | 2016-17         | 9.99                 | 9.99                    | 32.71                  |
|                      | Majeda Van Panchayat           | 2013-14         | 4.5                  | 4.5                     | 18.40                  |
| Kosi Range           | Odabaskot Civil                | 2016-17         | 10.8                 | 10.80                   | 22.31                  |
|                      | Odabaskot Civil                | 2016-17         | 8.70                 | 8.70                    | 21.21                  |
|                      | Odabaskot Civil                | 2016-17         | 2.90                 | 2.90                    | 21.59                  |
|                      | Odabaskot Civil                | 2016-17         | 5.53                 | 5.53                    | 20.78                  |
|                      | Odabaskot Civil                | 2016-17         | 2.205                | 2.205                   | 23.41                  |
|                      | Odabaskot Civil                | 2013-14         | 4.50                 | 4.50                    | 19.40                  |
|                      | Saud Van Panchayat             | 2013-14         | 12.0                 | 12.0                    | 26.42                  |
|                      | Saud Van Panchayat             | 2016-17         | 9.72                 | 9.72                    | 39.10                  |
| North Gola Range     | Natadol Van Panchayat          | 2014-15         | 11.60                | 6.23                    | 25.39                  |
|                      | Morpatiyudi Compartment No. 14 | 2013-14         | 13.50                | 7.92                    | 17.16                  |
|                      | Mehtoliya Van Panchayat        | 2016-17         | 5.0                  | 5.0                     | 44.40                  |
|                      | Mehtoliya Van Panchayat        | 2012-13         | 3.0                  | 3.0                     | 40.91                  |
|                      | Kilor Van Panchayat            | 2012-13         | 3.0                  | 3.0                     | 28.33                  |
|                      | Manarsha Chiyoli Civil         | 2016-17         | 7.56                 | 3.61                    | 2.33                   |
| South Gola Range     | Dalkanya Civil                 | 2016-17         | 6.64                 | 5.16                    | 30.16                  |
| Barhon Range         | Babiyad Civil                  | 2016-17         | 2.87                 | 1.26                    | 11.56                  |
| Naina Range          | Adhoda Compartment No. 6A      | 2015-16         | 10.0                 | 10.0                    | 37.64                  |
| <b>Total</b>         |                                |                 | <b>158.30</b>        | <b>137.31</b>           | <b>26.95</b>           |

### 5.15 Rudraprayag Forest Division

A total of 126 sites covering an area of 685 ha were surveyed for monitoring of CAMPA plantation in Rudraprayag forest division. The CAMPA plantation was undertaken in 5 forest ranges of Rudraprayag forest division. There is variation of types of forests in this division. At the lower elevation, tropical forests are distributed which are dominated by khair, shisham, kanju etc. At sub-tropical type, chir is predominant species along with banj in shaddy areas, on higher elevation; banj and deodar are predominant species at temperate type. The list of species planted under CAMPA is shown in the table 5.29 below.

**Table 5.29** List of species planted under CAMPA in Rudraprayag Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 2.     | <i>Cedrela toona</i>            | Toon       |
| 3.     | <i>Dalbergia sissoo</i>         | Shisham    |
| 4.     | <i>Dendrocalamus strictus</i>   | Bans       |
| 5.     | <i>Emblica officinalis</i>      | Amla       |
| 6.     | <i>Leucaena leucocephala</i>    | Subabul    |
| 7.     | <i>Mangifera indica</i>         | Aam        |
| 8.     | <i>Morus alba</i>               | Shahtoot   |
| 9.     | <i>Psidium guajava</i>          | Amrood     |
| 10.    | <i>Pyrus pashia</i>             | Mehal      |
| 11.    | <i>Quercus leucotrichophora</i> | Banj       |
| 12.    | <i>Rubinia pseudocasia</i>      | Rubinia    |
| 13.    | <i>Syzygium cuminii</i>         | Jamun      |
| 14.    | <i>Terminalia bellirica</i>     | Baheda     |
| 15.    | <i>Terminalia chebula</i>       | Harad      |

**Table 5.30** Range wise sites, area and survival of plants in Rudraprayag Forest Division

| Name of Forest Range              | Sample sites   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|-----------------------------------|----------------|-----------------|----------------------|-------------------------|------------------------|
| Augastmuni/<br>Guptkashi<br>Range | Karokhi Civil  | 2013-14         | 6.84                 | 6.84                    | 4.25                   |
|                                   | Sansari        | 2014-15         | 3.80                 | 1.723                   | 9.39                   |
|                                   | Kandara Civil  | 2015-16         | 6                    | 6                       | 12.42                  |
|                                   | Quaja          | 2015-16         | 6                    | 6                       | 14.39                  |
|                                   | Kokhandi       | 2013-14         | 11.38                | 11.38                   | 28.45                  |
|                                   | Swari Civil    | 2013-14         | 11.86                | 11.86                   | 13.68                  |
|                                   | Chopta Civil   | 2013-14         | 11.03                | 11.03                   | 13.14                  |
|                                   | Ukhroli Civil  | 2015-16         | 5                    | 5                       | 34.36                  |
|                                   | Nari Civil     | 2015-16         | 5                    | 5                       | 30.00                  |
|                                   | Babayi Civil   | 2013-14         | 5.12                 | 5.12                    | 0.00                   |
|                                   | Rampur Civil   | 2014-15         | 2.00                 | 2.00                    | 48.18                  |
|                                   | Rumsi Civil    | 2013-14         | 12.60                | 12.60                   | 28.92                  |
|                                   | Rumsi (Nagjai) | 2013-14         | 8.29                 | 8.29                    | 14.68                  |
|                                   | Kund/Singoli   | 2014-15         | 3.155                | 3.155                   | 68.18                  |

|                      |                                  |         |        |        |       |
|----------------------|----------------------------------|---------|--------|--------|-------|
|                      | Nagjai Salya                     | 2013-14 | 12     | 8      | 20.83 |
|                      | Basti Civil                      | 2013-14 | 12     | 12     | 41.54 |
|                      | Basti Civil                      | 2013-14 | 15     | 15     | 20.13 |
|                      | Jamu                             | 2014-15 | 6.50   | 6.50   | 39.26 |
|                      | Ravi Gram Van Panchayat          | 2014-15 | 6.50   | 6.50   | 60.15 |
|                      | Khadiya Van Panchayat            | 2014-15 | 6.50   | 6.50   | 24.85 |
|                      | Viyong                           | 2014-15 | 7      | 7      | 40.91 |
|                      | Neyalshu Civil                   | 2014-15 | 6.24   | 6.24   | 43.63 |
|                      | Jaal                             | 2014-15 | 7.48   | 7.48   | 27.66 |
| Rudraprayag<br>Range | Ratura Civil                     | 2013-14 | 12.658 | 5.160  | 26.54 |
|                      | Pokhri Civil                     | 2013-14 | 5      | 2.843  | 24.95 |
|                      | Ratura Civil                     | 2013-14 | 2.25   | 1.770  | 24.49 |
|                      | Ratura Civil                     | 2014-15 | 4.70   | 2.00   | 27.06 |
|                      | Ratura Van Panchayat             | 2013-14 | 11.29  | 6.370  | 21.45 |
|                      | Soladari Tok                     | 2015-16 | 2.841  | 1.00   | 58.62 |
|                      | Ratura Van Panchayat             | 2016-17 | 5.528  | 2.295  | 34.19 |
|                      | Ratura Civil Van Badhethi Tok    | 2016-17 | 1.138  | 1.138  | 36.42 |
|                      | Ghuar Pokharsari Lagga           | 2013-14 | 5.40   | 5.40   | 46.55 |
|                      | Dungri Civil Bajain              | 2016-17 | 7      | 4.34   | 47.40 |
|                      | Barsu Civil                      | 2013-14 | 12.60  | 8.85   | 16.30 |
|                      | Khairpani Civil                  | 2016-17 | 7.509  | 7.509  | 45.59 |
|                      | Maroda Civil                     | 2013-14 | 13     | 13     | 30.08 |
|                      | Kandalagga Marodha Civil         | 2013-14 | 2.80   | 2.80   | 43.21 |
|                      | Maroda Civil                     | 2015-16 | 1.73   | 1.73   | 32.84 |
|                      | Kot Lagga Chandragudi Civil Van  | 2014-15 | 7      | 4.62   | 16.29 |
|                      | Chingwar Civil Part I            | 2016-17 | 10     | 10     | 42.09 |
|                      | Chingwar Civil Part 2            | 2016-17 | 10.779 | 10.779 | 39.18 |
|                      | Chungawadh Civil Van Dhagpat Tok | 2016-17 | 12.861 | 12.861 | 43.34 |
|                      | Chungawadh Civil Kanda Tok       | 2016-17 | 4.715  | 2.88   | 28.19 |
|                      | Khadi Civil                      | 2013-14 | 5.40   | 5.40   | 12.80 |
|                      | Dhanpur, Dobh DH-II 8C           | 2013-14 | 3      | 3      | 48    |
|                      | Kot Civil                        | 2013-14 | 10.75  | 10.75  | 17.24 |
|                      | Bitha Tok                        | 2016-17 | 9      | 4.50   | 30.68 |
|                      | Jakholi Gair Tok                 | 2016-17 | 12     | 12     | 33.64 |
|                      | Gulab Rai                        | 2014-15 | 4.90   | 4.90   | 27    |
|                      | Pokharsaari                      | 2016-17 | 4.38   | 2.15   | 47.27 |
|                      | Chatikhal                        | 2013-14 | 15     | 15     | 17.30 |
| South<br>Jakholi     | Koti Civil                       | 2013-14 | 4.82   | 2      | 18.76 |
|                      | Ghadra Civil                     | 2013-14 | 0.676  | 0.676  | 28.99 |
|                      | Lounga C.No.- 13                 | 2014-15 | 5      | 1.30   | 40.00 |
|                      | Lounga C.No.- 10                 | 2014-15 | 10     | 3      | 38.55 |
|                      | Budhna Civil                     | 2014-15 | 1.92   | 0.50   | 38.64 |
|                      | Tyunkhar Civil                   | 2014-15 | 1.10   | 0.56   | 25.95 |
|                      | Budhna Civil                     | 2015-16 | 0.20   | 0.20   | 34.55 |
|                      | Gorti to Tyunkhar                | 2015-16 | 1.54   | 1.54   | 25.93 |
|                      | Mamdi to Palakurali              | 2015-16 | 2      | 2      | 24.84 |
|                      | Mamdi to Palakurali              | 2015-16 | 2.64   | 2.64   | 26.40 |
|                      | Mamdi to Palakurali              | 2015-16 | 2.80   | 1.00   | 30.47 |
|                      | Narsing Compartment No-5         | 2013-14 | 10     | 6.17   | 20.70 |

|                  |                           |         |       |       |       |
|------------------|---------------------------|---------|-------|-------|-------|
|                  | Narsingh C.No.-4          | 2013-14 | 10    | 10    | 45.99 |
|                  | Lounga Civil              | 2013-14 | 7.11  | 2.18  | 10.57 |
|                  | Lounga C.No.-1(A)         | 2015-16 | 5     | 3.49  | 26.55 |
|                  | Bhadanga Civil            | 2013-14 | 6     | 4.54  | 9.08  |
|                  | Lounga C.No.-19           | 2014-15 | 6.914 | 2.40  | 34.24 |
|                  | Choki Barshir             | 2013-14 | 1.80  | 1.80  | 40    |
|                  | Khurji Band Choki Barshir | 2015-16 | 1.28  | 1.28  | 11.57 |
|                  | Lounga C.No.-1 (A)        | 2015-16 | 4     | 4     | 14.77 |
|                  | Sumadi Civil              | 2013-14 | 1.846 | 1.846 | 28.76 |
|                  | Sumadi Civil              | 2015-16 | 2.071 | 2.071 | 37.66 |
|                  | Sumadi to Upper Sumadi    | 2015-16 | 1.25  | 1.25  | 20.33 |
|                  | Antholi Civil-I           | 2013-14 | 11.60 | 8.16  | 41.86 |
|                  | Antholi Civil-II          | 2013-14 | 9.37  | 9.37  | 40.22 |
|                  | Jakhal C.No.-3 (A)        | 2013-14 | 10    | 2.63  | 26.60 |
|                  | Jakhal Civil              | 2013-14 | 3.734 | 3.734 | 30.22 |
|                  | Jawari-2                  | 2013-14 | 4.49  | 4.49  | 26.18 |
|                  | Jawari to Mayalsu         | 2015-16 | 1.06  | 1.06  | 16.66 |
|                  | Jawari-1                  | 2013-14 | 2.07  | 2.07  | 21.45 |
|                  | Jawari Civil              | 2015-16 | 0.17  | 0.17  | 31.02 |
|                  | Sonda Civil               | 2013-14 | 7.65  | 7.65  | 12.79 |
|                  | Sonda to Mathiyalkal      | 2015-16 | 2.46  | 2.46  | 13.16 |
|                  | Sonda to Mathiyalkal      | 2015-16 | 3     | 3     | 12.21 |
|                  | Timli-I                   | 2013-14 | 8.40  | 8.40  | 8.82  |
|                  | Timli-II                  | 2013-14 | 7.20  | 7.20  | 17.08 |
|                  | Bhardarigarh C.No.-5      | 2014-15 | 5     | 5     | 32    |
| North<br>Jakholi | Mawadgoan Gorti Civil     | 2013-14 | 6     | 6     | 23.83 |
|                  | Mawadgoan Civil           | 2013-14 | 3.286 | 3.286 | 11.31 |
|                  | Kumdi Civil               | 2013-14 | 2.378 | 2.378 | 15    |
|                  | Bhimli Civil              | 2016-17 | 4.05  | 4.05  | 53.96 |
|                  | Bandortoli Civil          | 2013-14 | 3.375 | 3.375 | 16.71 |
|                  | Jelly Civil               | 2013-14 | 0.859 | 0.859 | 51.80 |
|                  | Musadang                  | 2013-14 | 0.585 | 0.585 | 13.42 |
|                  | Chaka Civil               | 2013-14 | 0.720 | 0.720 | 5.49  |
|                  | Dobalya Civil             | 2013-14 | 2.700 | 1.75  | 4.26  |
|                  | Jakholi Civil             | 2013-14 | 1.85  | 1.85  | 18.71 |
|                  | Sem Civil                 | 2013-14 | 3.300 | 3.300 | 12.12 |
|                  | Jakhani C.No.-3           | 2013-14 | 2.40  | 2.40  | 27.83 |
|                  | Kurchola Van Panchayat    | 2013-14 | 1.250 | 1.250 | 2.25  |
|                  | Panjana C.No.-9           | 2014-15 | 10    | 10    | 40.40 |
|                  | Kurchola to Jamukhal      | 2015-16 | 0.90  | 0.90  | 24.38 |
|                  | Kurcholla Civil           | 2013-14 | 1.250 | 1.250 | 60.16 |
|                  | Sogna Civil               | 2013-14 | 8.40  | 3.40  | 21.63 |
|                  | Syur Civil                | 2014-15 | 0.90  | 0.90  | 47.27 |
|                  | Dangi Civil               | 2014-15 | 0.944 | 0.944 | 4.53  |
|                  | Rayadu to Arkhund         | 2015-16 | 2.63  | 2.63  | 6.25  |
|                  | Kyank to Barsudi          | 2015-16 | 0.98  | 0.98  | 6.89  |
|                  | Baksir                    | 2013-14 | 2.520 | 2.520 | 5.14  |
|                  | Badani Compartment 6      | 2013-14 | 5.198 | 5.198 | 9.26  |
|                  | Kot Jhakhawari            | 2015-16 | 3.7   | 3.7   | 20.68 |
|                  | DharkuriCompartment-1     | 2014-15 | 10    | 10    | 47.60 |
|                  | Dharkuri Compartment-3    | 2013-14 | 2.43  | 2.43  | 7.49  |

|              |                                      |         |              |              |              |
|--------------|--------------------------------------|---------|--------------|--------------|--------------|
| Kakhara      | Chatikhal Compartment-1              | 2013-14 | 15           | 15           | 25.60        |
| Range        | Kakhara Civil Bhatrakhal Tok         | 2014-15 | 0.500        | 0.500        | 9.65         |
|              | Kakhara Civil Bhatrakhal Tok         | 2013-14 | 0.208        | 0.208        | 22.16        |
|              | Norkota Civil Suradi Tok             | 2014-15 | 1.25         | 1.25         | 9.45         |
|              | Surakhal-2 Siyari Matar Marg Patch-1 | 2015-16 | 3.31         | 3.31         | 31.22        |
|              | Surakhal-2 Siyari Motar Marg Patch-2 | 2015-16 | 2.91         | 2.91         | 36.31        |
|              | Surakhal-2 Siyari Motar Marg Patch-3 | 2015-16 | 7.30         | 3.76         | 16.80        |
|              | Surakhal-2 Siyari Motar Marg Patch-4 | 2015-16 | 1.43         | 1.43         | 16.26        |
|              | Chonda Civil Muchkandi Tok           | 2014-15 | 7.20         | 7.20         | 12.31        |
|              | Maduchonda Civil Chakalya Tok        | 2013-14 | 0.424        | 0.424        | 16.86        |
|              | Margoan Civil Mandala Tok            | 2015-16 | 0.60         | 0.60         | 24.00        |
|              | North Khirshu C.No.-8                | 2014-15 | 13.72        | 4.15         | 30.70        |
| <b>Total</b> |                                      |         | <b>685.2</b> | <b>575.5</b> | <b>26.44</b> |

It is evident from table 5.30 that an area of 110 ha area is found to be less than recorded plantation area during the GPS survey. The survival of plants is very less (26.44%).

### 5.16 Nainital Soil Conservation Division

Nainital Soil Conservation division has 5 forest ranges namely, Chaugad, Ramgarh, Betalghat, Mukteshwar and Okhalkhanda where CAMPA plantations were undertaken. The natural forests consist of moist hill sal and its associated species. Chir-banj forests are distributed at higher elevation in sub-tropical and temperate type of forests. The species planted under CAMPA are shown in the table below.

**Table 5.31** List of species planted under CAMPA in Nainital Soil Conservation Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Bauhinia purpurea</i>        | Guiral     |
| 2.     | <i>Boehmeria rugulosa</i>       | Genti      |
| 3.     | <i>Buddleja asiatica</i>        | Dhudhia    |
| 4.     | <i>Cassia fistula</i>           | Amaltas    |
| 5.     | <i>Cedrela toona</i>            | Tun        |
| 6.     | <i>Cedrus deodara</i>           | Deodar     |
| 7.     | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 8.     | <i>Pyracantha crenulata</i>     | Gingararu  |
| 9.     | <i>Cupressus torulosa</i>       | Surai      |
| 10.    | <i>Dendrocalamus strictus</i>   | Bans       |
| 11.    | <i>Emblica officinalis</i>      | Amla       |
| 12.    | <i>Ficus infectoria</i>         | Timla      |
| 13.    | <i>Grevillea robusta</i>        | Silver oak |
| 14.    | <i>Grewia optiva</i>            | Bhimal     |
| 15.    | <i>Quercus leucotrichophora</i> | Banj       |
| 16.    | <i>Sapindus mukrossi</i>        | Ritha      |
| 17.    | <i>Syzygium cumini</i>          | Jamun      |
| 18.    | <i>Terminalia tomentosa</i>     | Sain       |

**Table 5.32** Range wise sites, area and survival of plants in Nainital Soil Conservation Division

| Name of Forest Range | Sample sites                      | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-----------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Chaugad Range        | Amiya Van Panchayat Tok Ana       | 2015-16         | 2.0                  | 2.0                     | 37.00                  |
|                      | Bhaursha Van Panchayat            | 2015-16         | 4.0                  | 4.0                     | 33.75                  |
|                      | Banna Van Panchayat               | 2015-16         | 4.0                  | 4.0                     | 31.50                  |
|                      | Banna Van Panchayat               | 2016-17         | 5.0                  | 5.0                     | 34.40                  |
|                      | Pinrow Van Panchayat              | 2016-17         | 5.0                  | 5.0                     | 20.40                  |
|                      | Haidakhan Van Panchayat Murkuriya | 2015-16         | 10.0                 | 10.0                    | 32.70                  |
| Ramgarh Range        | Dhari Ulgaur Van Panchayat        | 2015-16         | 14.0                 | 14.0                    | 17.57                  |
|                      | Jangliyagaon Van Panchayat        | 2016-17         | 5.0                  | 3.37                    | 13.60                  |
| Betalghat Range      | Naugaon Van Panchayat             | 2012-13         | 10.0                 | 10.0                    | 29.10                  |
|                      | Sonli Van Panchayat               | 2015-16         | 10.0                 | 10.0                    | 20.40                  |
|                      | Joshikhola Van Panchayat          | 2015-16         | 5.0                  | 5.0                     | 23.20                  |
|                      | Dadima Van Panchayat              | 2016-17         | 5.0                  | 5.0                     | 10.80                  |
|                      | Pali Van Panchayat                | 2012-13         | 10.0                 | 7.62                    | 5.10                   |
|                      | Ghanghreti Van Panchayat          | 2015-16         | 5.0                  | 5.0                     | 23.60                  |
| Mukteshwar Range     | Letibunga Van Panchayat           | 2015-16         | 10.0                 | 10.0                    | 35.10                  |
|                      | Roljanger Van Panchayat           | 2015-16         | 5.0                  | 5.0                     | 18.80                  |
|                      | Sarna Van Panchayat               | 2016-17         | 6.0                  | 4.38                    | 36.33                  |
| Okhalkanda Range     | Putgaon Van Panchayat             | 2016-17         | 5.0                  | 5.0                     | 38.40                  |
|                      | Putgaon Civil                     | 2012-13         | 10.0                 | 10.0                    | 25.90                  |
|                      | Kalaagar Van Panchayat            | 2014-15         | 10.0                 | 10.0                    | 41.60                  |
|                      | Nartola Van Panchayat             | 2015-16         | 10.0                 | 10.0                    | 16.70                  |
| <b>Total</b>         |                                   |                 | <b>150</b>           | <b>144.37</b>           | <b>25.99</b>           |

It is evident from the above table that 5.63 ha area was found less than the recorded area when the area was marked by the GPS. The average survival of plants is 25.99% which is found to be poor.

### 5.17 Civil & Soyam Forest Division, Almora

Monitoring and evaluation of plantation were conducted under CAMPA scheme in 6 ranges of Civil & Soyam Forest Division, Almora viz. Chaubutiya, Kosi, Lamgara, Gananath, Jageshwar and Kanarichhina. A total of 30 plantation sites and 150 hectare area were surveyed in the Division. The native vegetation of plantation's sites are dominated by chir. Banj is also found mixed with chir in some localities. The species planted under CAMPA are shown in the following table.

**Table 5.33** List of species planted under CAMPA in Civil & Soyam Forest Division Forest Division, Almora

| Sl.No. | Name of species           | Local Name |
|--------|---------------------------|------------|
| 1.     | <i>Acacia mollissima</i>  | Wattle     |
| 2.     | <i>Aesculus indica</i>    | Pangar     |
| 3.     | <i>Alnus nitida</i>       | Utis       |
| 4.     | <i>Bauhinia purpurea</i>  | Guiral     |
| 5.     | <i>Boehmeria rugulosa</i> | Genti      |
| 6.     | <i>Buddleja asiatica</i>  | Dhudhia    |

|     |                                 |            |
|-----|---------------------------------|------------|
| 7.  | <i>Cassia fistula</i>           | Amaltas    |
| 8.  | <i>Cedrela toona</i>            | Tun        |
| 9.  | <i>Cedrus deodara</i>           | Deodar     |
| 10. | <i>Celtis australis</i>         | Kharik     |
| 11. | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 12. | <i>Pyracantha crenulata</i>     | Gingarur   |
| 13. | <i>Cupressus torulosa</i>       | Surai      |
| 14. | <i>Dendrocalamus strictus</i>   | Bans       |
| 15. | <i>Emblica officinalis</i>      | Amla       |
| 16. | <i>Ficus infectoria</i>         | Timla      |
| 17. | <i>Grevillea robusta</i>        | Silver oak |
| 18. | <i>Grewia optiva</i>            | Bhimal     |
| 19. | <i>Leucaena azadirachta</i>     | Subabul    |
| 20. | <i>Melia azedarach</i>          | Bakain     |
| 21. | <i>Morus alba</i>               | Shahtoot   |
| 22. | <i>Prunus armeniaca</i>         | Khumani    |
| 23. | <i>Prunus cerasoides</i>        | Padam      |
| 24. | <i>Pyrus pashia</i>             | Mahel      |
| 25. | <i>Quercus floribunda</i>       | Faliyant   |
| 26. | <i>Quercus leucotrichophora</i> | Banj       |
| 27. | <i>Salix tetrasperma</i>        | Salix      |
| 28. | <i>Sapindus mukrossi</i>        | Ritha      |
| 29. | <i>Syzygium cumini</i>          | Jamun      |
| 30. | <i>Terminalia tomentosa</i>     | Sain       |
| 31. | <i>Platyclusus orientalis</i>   | Morpankhi  |

Range wise survival and plantation area verified by GPS is shown in the table 5.34.

**Table 5.34** Range wise sites, area and survival of plants in Civil & Soyam Forest Division Forest Division, Almora

| Name of Forest Range | Sample sites                | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-----------------------------|-----------------|----------------------|-------------------------|------------------------|
| Chaubutiya Range     | Kanda Civil                 | 2012-13         | 3.0                  | 3.0                     | 37.33                  |
|                      | Vayadi Van Panchayat        | 2016-17         | 5.0                  | 2.0                     | 15.27                  |
|                      | Vishalkot Van Panchayat     | 2016-17         | 4.0                  | 2.0                     | 16.82                  |
|                      | Shehro Van Panchayat        | 2016-17         | 6.0                  | 3.0                     | 40.00                  |
| Kosi Range           | Dhadsemi Van Panchayat      | 2016-17         | 6.0                  | 4.48                    | 52.12                  |
| Lamgara Range        | Chiratimaniya Van Panchayat | 2016-17         | 5.0                  | 3.15                    | 44.18                  |
|                      | Jayati Van Panchayat        | 2016-17         | 5.0                  | 5.0                     | 17.82                  |
|                      | Sandhanshu Van Panchayat    | 2016-17         | 5.0                  | 2.0                     | 19.27                  |
| Gananath Range       | Kotyuda Van Panchayat       | 2015-16         | 5.0                  | 3.68                    | 41.09                  |
|                      | Bhasudi Van Panchayat       | 2016-17         | 5.0                  | 2.50                    | 7.64                   |
|                      | Malera Van Panchayat-I      | 2016-17         | 3.0                  | 2.28                    | 30.30                  |
|                      | Malera Van Panchayat-II     | 2016-17         | 3.0                  | 2.0                     | 16.97                  |
|                      | Jakhshuda Van Panchayat-II  | 2016-17         | 4.50                 | 4.50                    | 32.30                  |

|              |                      |         |           |              |              |
|--------------|----------------------|---------|-----------|--------------|--------------|
| Jageshwar    | Maanu-1              | 2016-17 | 5.0       | 5.0          | 7.45         |
| Range        | Maanu-2              | 2016-17 | 6.50      | 6.50         | 4.08         |
| Kanarichhina | Mangalta Civil       | 2016-17 | 8.0       | 3.64         | 7.84         |
| Range        | Pokhri Van Panchayat | 2016-17 | 5.0       | 3.0          | 42.36        |
| <b>Total</b> |                      |         | <b>84</b> | <b>57.73</b> | <b>25.46</b> |

Seventeen sites were sampled for data collection. It is cleared from the table 5.34 that 26.27 ha area was found less than recorded plantation area. The survival of plants is found to be poor (25.46%).

### 5.18 Pithoragarh Forest Division

A total of 7 forest ranges of Pithoragarh Forest Division have been surveyed viz., Dharchula, Askot, Didihat, Munsiyari, Berinag, Gangolihat and Pithoragarh. A total of 70 plantation sites with an area of 477.35 ha and 10 km were surveyed for monitoring of CAMPA plantations in Pithoragarh Forest Division. The native forest species consisted of banj, burans, kail, deodar, chir, kafal, mahel etc. The species planted under CAMPA are shown in the following table.

**Table 5.35** List of species planted under CAMPA in Pithoragarh Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Alnus nitida</i>             | Utis       |
| 3.     | <i>Arundinaria fulcata</i>      | Ringal     |
| 4.     | <i>Bauhinia purpurea</i>        | Guiral     |
| 5.     | <i>Cedrela toona</i>            | Tun        |
| 6.     | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 7.     | <i>Pyracantha crenulata</i>     | Gingaru    |
| 8.     | <i>Cupressus torulosa</i>       | Surai      |
| 9.     | <i>Diploknema butyracea</i>     | Chura      |
| 10.    | <i>Hydrangea altissima</i>      | Kathmoda   |
| 11.    | <i>Leucaena leucocephala</i>    | Subabul    |
| 12.    | <i>Populus cilata</i>           | Poplar     |
| 13.    | <i>Prunus cerasoides</i>        | Padam      |
| 14.    | <i>Pyrus pashia</i>             | Mahel      |
| 15.    | <i>Quercus floribunda</i>       | Faliyant   |
| 16.    | <i>Quercus leucotrichophora</i> | Banj       |
| 17.    | <i>Salix tetrasperma</i>        | Salix      |

**Table 5.36** Range wise sites, area and survival of plants in Pithoragarh Forest Division

| Name of Forest Range | Sample sites                          | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|---------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Dharchula Range      | Jaikot Van Panchayat I                | 2012-13         | 9.0                  | 7.24                    | 57.33                  |
|                      | Jaikot Van Panchayat II               | 2012-13         | 9.0                  | 5.1                     | 27.11                  |
|                      | Jaikot Van Panchayat Tok              | 2016-17         | 10.0                 | 5.79                    | 28.05                  |
|                      | Durga Mandap                          |                 |                      |                         |                        |
|                      | Sungdum Gampanga Tok                  | 2016-17         | 10.0                 | 10.0                    | 41.80                  |
|                      | Jhimirgaun Van Panchayat              | 2016-17         | 5.0                  | 3.0                     | 41.50                  |
|                      | Bhatkhana Van Panchayat hectare       | 2012-13         | 9.0                  | 6.1                     | 10.28                  |
|                      | Puraich Van Panchayat                 | 2014-15         | 5.0                  | 3.85                    | 39.13                  |
| Askot Range          | Helpiya Van Panchayat I               | 2016-17         | 5.0                  | 5.0                     | 26.8                   |
|                      | Bheliya Bagdihat Van Panchayat        | 2016-17         | 5.0                  | 5.0                     | 36.00                  |
|                      | Kimkhola Van Panchayat                | 2016-17         | 5.0                  | 5.0                     | 26.80                  |
|                      | Saily Van Panchayat                   | 2016-17         | 5.0                  | 5.0                     | 15.20                  |
|                      | Lekhsalla Bajani Van Panchayat        | 2014-15         | 5.0                  | 3.73                    | 23.50                  |
|                      | Lekhsalla Bajani Van Panchayat        | 2016-17         | 5.0                  | 5.0                     | 35.20                  |
|                      | Kanda Van Panchayat                   | 2015-16         | 5.0                  | 5.0                     | 43.20                  |
|                      | Kanda Van Panchayat                   | 2014-15         | 5.0                  | 5.0                     | 23.25                  |
|                      | Sera Van Panchayat                    | 2015-16         | 5.0                  | 5.0                     | 36.40                  |
|                      | Lumati Van Panchayat                  | 2015-16         | 5.0                  | 5.0                     | 35.20                  |
| Didihat Range        | Lamghar part I                        | 2012-13         | 10.0                 | 6.2                     | 9.05                   |
|                      | Lamghar part II                       | 2012-13         | 10.0                 | 10.0                    | 9.05                   |
|                      | Lamghar Van Panchayat                 | 2016-17         | 5.0                  | 5.0                     | 26.80                  |
|                      | Jadapani Compartment 5D               | 2012-13         | 5.0                  | 5.0                     | 14.55                  |
|                      | Devchula Compartment 5D               | 2012-13         | 5.0                  | 5.0                     | 22.36                  |
|                      | Devchula Compartment 5E               | 2012-13         | 5.0                  | 5.0                     | 21.82                  |
|                      | Kholikanyuri Van Panchayat            | 2016-17         | 5.0                  | 3.1                     | 27.20                  |
|                      | Dangti Civil                          | 2012-13         | 5.0                  | 3.08                    | 15.63                  |
|                      | Dangti Van Panchayat                  | 2012-13         | 5.0                  | 5.0                     | 4.13                   |
|                      | Jethigaon Civil Jadiyagad Tok Part I  | 2016-17         | 7.0                  | 4.20                    | 30.50                  |
|                      | Jethigaon Civil Jadiyagad Tok Part II | 2016-17         | 7.5                  | 5.46                    | 31.20                  |
|                      | Jethigaon Civil Gawani Tok Part I     | 2016-17         | 7.0                  | 4.65                    | 29.79                  |
|                      | Jethigaon Civil Gawani Tok Part II    | 2016-17         | 7.0                  | 3.95                    | 31.00                  |
|                      | Jethigaon Civil Gawana Tok Part III   | 2016-17         | 7.5                  | 7.5                     | 30.67                  |
|                      | Talimirthi                            | 2013-14         | 5.0                  | 3.29                    | 19.60                  |
|                      | Humkapita                             | 2013-14         | 5.0                  | 5.0                     | 19.20                  |
|                      | Hatharp Van Panchayat                 | 2016-17         | 5.0                  | 3.37                    | 43.60                  |
|                      | Chowki Van Panchayat Part I           | 2015-16         | 2.0                  | 2.0                     | 6.0                    |
|                      | Chowki Van Panchayat Part II          | 2015-16         | 4.35                 | 3.59                    | 25.01                  |
|                      | Udai Van Panchayat                    | 2014-15         | 5.0                  | 5.0                     | 19.13                  |
|                      | Badalchamu Van Panchayat              | 2012-13         | 5.0                  | 4.0                     | 6.25                   |
| Munsiyari Range      | Van Panchayat Raiya                   | 2012-13         | 10.0                 | 8.37                    | 11.30                  |
|                      | Van Panchayat Tala Bhaikot            | 2012-13         | 10.0                 | 10.0                    | 14.00                  |
|                      | Van Panchayat Hupli                   | 2012-13         | 10.0                 | 10.0                    | 10.50                  |
|                      | Huma Compartment No. 3                | 2013-14         | 5.0                  | 5.0                     | 17.40                  |
|                      | Van Panchayat Harkot                  | 2014-15         | 5.0                  | 3.0                     | 13.80                  |
|                      | Van Panchayat Harkot                  | 2016-17         | 5.0                  | 5.0                     | 34.00                  |
|                      | Van Panchayat Hokra II                | 2012-13         | 11.0                 | 8.64                    | 5.86                   |

|                   |                                      |         |       |       |       |
|-------------------|--------------------------------------|---------|-------|-------|-------|
|                   | Van Panchayat Hokra I                | 2012-13 | 10.0  | 10.0  | 2.85  |
|                   | Van Panchayat Khoyam                 | 2016-17 | 20.0  | 15.20 | 32.15 |
|                   | Van Panchayat Quiti                  | 2016-17 | 13.0  | 11.70 | 12.69 |
|                   | Van Panchayat Gini                   | 2012-13 | 10.0  | 10.0  | 9.36  |
| Berinag Range     | Dasauli Van Panchayat                | 2013-14 | 5.0   | 5.0   | 20.88 |
|                   | Dasauli Compartment No.2             | 2013-14 | 5.0   | 5.0   | 25.00 |
|                   | Khamlek Compartment No.9             | 2013-14 | 10.0  | 10.0  | 31.60 |
|                   | Khamlek Compartment No.8             | 2012-13 | 10.0  | 10.0  | 37.09 |
|                   | Gadera Bisht Civil II                | 2016-17 | 6.0   | 4.24  | 35.33 |
|                   | Berinag Purnanathal Motor Marg       | 2013-14 | 10.0  | 10.0  | 11.02 |
|                   | Pilkhi Van Panchayat                 | 2012-13 | 8.0   | 5.44  | 15.75 |
|                   | Pausa Van Panchayat                  | 2013-14 | 5.0   | 5.0   | 24.88 |
|                   | Sukliyani Ukhliya Civil              | 2016-17 | 5.0   | 5.0   | 37.30 |
| Gangolihat Range  | Kothera Civil I                      | 2016-17 | 5.0   | 5.0   | 30.50 |
|                   | Kothera Civil II                     | 2016-17 | 5.0   | 3.0   | 30.63 |
|                   | Lamkeshwar Compartment No.3          | 2013-14 | 5.0   | 5.0   | 16.20 |
|                   | Kanaura Civil                        | 2016-17 | 10.0  | 10.0  | 35.15 |
|                   | Surkhal Civil                        | 2016-17 | 10.0  | 10.0  | 35.05 |
|                   | Ghanjari Civil)                      | 2012-13 | 5.0   | 4.20  | 4.80  |
|                   | Kuntola Civil                        | 2016-17 | 10.0  | 10.0  | 10.50 |
|                   | Podhar Compartment No.5 Part I       | 2013-14 | 5.0   | 5.0   | 17.40 |
|                   | Podhar Compartment No.5 Part II      | 2013-14 | 5.0   | 5.0   | 16.20 |
|                   | Chwdiyar Van Panchayat               | 2014-15 | 5.0   | 5.0   | 15.63 |
|                   | Lamkeshwar Compartment No. 5         | 2012-13 | 10.0  | 10.0  | 29.28 |
|                   | Basukinag Compartment No. 11         | 2016-17 | 10.0  | 5.19  | 30.80 |
| Pithoragarh Range | Madkhadayat Van Panchayat            | 2015-16 | 5.0   | 5.0   | 35.92 |
|                   | Madkhadayat                          | 2014-15 | 10.0  | 10.0  | 4.86  |
|                   | Madkhadayat Van Panchayat            | 2014-15 | 5.0   | 5     | 36.16 |
|                   | Madkhadayat Van Panchayat            | 2012-13 | 10.0  | 10    | 6.60  |
|                   | Chandak Reserve Compartment No. 1, 2 | 2016-17 | 10.0  | 10    | 32.20 |
|                   | Totanaula Van Panchayat              | 2012-13 | 16.0  | 16    | 28.64 |
|                   | Totanaula Sinkholi Civil             | 2012-13 | 10.54 | 10.54 | 39.13 |
|                   | Saudlekh Compartment No. 5           | 2012-13 | 5.0   | 5.0   | 32.27 |
|                   | Kanharipabhan Van Panchayat          | 2016-17 | 10.0  | 10.0  | 40.30 |
|                   | Totanaula Tok Ratamata               | 2012-13 | 18.0  | 15.6  | 35.92 |
|                   | Wadda Adkini Road Plantation         | 2013-14 | 10.0  | 10.0  | 31.92 |
|                   | Madsaun                              | 2015-16 | 5.0   | 3.47  | 52.53 |
|                   | Chaudigad Van Panchayat)             | 2015-16 | 5.0   | 3.34  | 44.88 |
|                   | Devdar Van Panchayat                 | 2014-15 | 10.0  | 10.0  | 48.62 |
|                   | Khadkini Van Panchayat               | 2014-15 | 5.0   | 5.0   | 6.33  |
|                   | Khadkini                             | 2014-15 | 10.0  | 10.0  | 52.12 |
|                   | Khadkini Van Panchayat               | 2015-16 | 5.0   | 5.0   | 38.88 |
|                   | Pattharkhani Van Panchayat           | 2015-16 | 5.0   | 4.0   | 43.32 |
|                   | Devdar Van Panchayat                 | 2015-16 | 5.0   | 5.0   | 50.48 |
|                   | Thakledar Beat Compartment No. 8     | 2012-13 | 5.0   | 5.0   | 50.87 |
|                   | Gogna Civil Tok Baithiyadhar I       | 2016-17 | 7.5   | 4.85  | 30.55 |
|                   | Gogna Civil Machiyadhar Tok          | 2016-17 | 5.0   | 5.0   | 24.43 |
|                   | Gogna Civil Tok Dhanadidhar          | 2016-17 | 7.5   | 7.5   | 11.95 |
|                   | Thakledar Compartment No. 1          | 2016-17 | 10.0  | 10.0  | 31.50 |
|                   | Thakledar Compartment No. 1          | 2015-16 | 5.0   | 5.0   | 10.24 |

|                                   |         |               |               |              |
|-----------------------------------|---------|---------------|---------------|--------------|
| Gurna Compartment No. 2           | 2013-14 | 5.0           | 2.52          | 17.46        |
| Thakledar Compartment No. 5       | 2013-14 | 5.0           | 5.0           | 71.24        |
| Bamandhaun Compartment No. 1      | 2012-13 | 5.0           | 5.0           | 52.56        |
| Totanaula Supokhara Van Panchayat | 2012-13 | 20.0          | 14.18         | 27.39        |
| Saudlekh Compartment No. 6        | 2013-14 | 5.0           | 3.48          | 30.9         |
| Madsaun Van Panchayat             | 2012-13 | 10.0          | 10.0          | 43.63        |
| Chupkot se Jamradi Motormarg      | 2012-13 | 3.33          | 3.33          | 37.76        |
| Bans Maitoli Van Panchayat        | 2012-13 | 10.0          | 10.0          | 17.52        |
| Khatigaun Civil                   | 2012-13 | 5.0           | 3.13          | 15.42        |
| <b>Total</b>                      |         | <b>755.22</b> | <b>670.12</b> | <b>26.91</b> |

It is cleared from the above table that 104 plantation's sites were surveyed for monitoring of plantation in Pithoragarh Forest Division. An area of 85 ha was found less than the recorded plantation area. The survival of plants is found very less (26.91%).

## 5.19 Champawat Forest Division

A total of 6 Ranges of Champawat Forest Division viz., Devidhura, Bhingrada, Lohaghat, Kali Kumaun, Champawat, and Boom were monitored under CAMPA project. A total of 61 plantation sites with an area of 410 hectare area were surveyed in Champawat Forest Division. The native forest species consisted of banj, burans, kafal, jamun, mahel etc. The species planted under CAMPA in the division are indicated in the table below.

**Table 5.37** List of species planted under CAMPA in Champawat Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Alnus nitida</i>             | Utis       |
| 3.     | <i>Arundinaria fulcata</i>      | Ringal     |
| 4.     | <i>Bauhinia purpurea</i>        | Guiral     |
| 5.     | <i>Cedrus deodara</i>           | Deodar     |
| 6.     | <i>Grewia optiva</i>            | Bhimal     |
| 7.     | <i>Hydrangea altissima</i>      | Kathmoda   |
| 8.     | <i>Leucaena leucocephala</i>    | Subabul    |
| 9.     | <i>Myrica nagi</i>              | Kafal      |
| 10.    | <i>Phoebe lanceolata</i>        | Bhedue     |
| 11.    | <i>Prunus cerasoides</i>        | Padam      |
| 12.    | <i>Pyrus pashia</i>             | Mahel      |
| 13.    | <i>Quercus floribunda</i>       | Faliyant   |
| 14.    | <i>Quercus leucotrichophora</i> | Banj       |
| 15.    | <i>Quercus semecarpifolia</i>   | Kharsu     |
| 16.    | <i>Robinia pseudocasia</i>      | Robinia    |
| 17.    | <i>Sapindus mukrossi</i>        | Ritha      |

**Table 5.38** Range wise sites, area and survival of plants in Champawat Forest Division

| Name of Forest Range | Sample sites               | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|----------------------------|-----------------|----------------------|-------------------------|------------------------|
| Devidhura Range      | Kulaun Van Panchayat       | 2015-16         | 5.0                  | 1.81                    | 17.20                  |
|                      | Dholi Gaon Civil           | 2015-16         | 5.4                  | 2.0                     | 6.73                   |
|                      | Batoliya Civil             | 2015-16         | 4.09                 | 2.39                    | 9.78                   |
|                      | Batoliya Civil             | 2015-16         | 4.32                 | 2.23                    | 11.36                  |
|                      | Batoliya Van Panchayat     | 2012-13         | 5.0                  | 0.88                    | 8.40                   |
|                      | Dardoli Van Panchayat      | 2014-15         | 10.0                 | 3.27                    | 28.91                  |
|                      | Anarpa Civil               | 2015-16         | 6.48                 | 3.26                    | 9.69                   |
|                      | Dechmar Van Panchayat      | 2015-16         | 6.0                  | 6.0                     | 37.73                  |
|                      | Bhadoliya Compartment No.8 | 2014-15         | 10.                  | 5.68                    | 42.18                  |
|                      | Kimari Civil               | 2015-16         | 4.0                  | 2.89                    | 51.59                  |
| Bhingrada Range      | Sakdena Compartment No. 3  | 2015-16         | 10.0                 | 6.87                    | 42.27                  |
|                      | Sakdena Compartment No. 3  | 2014-15         | 10.0                 | 5.45                    | 41.18                  |
|                      | Mandevi Compartment No.2   | 2014-15         | 6.0                  | 6.0                     | 56.67                  |
|                      | Chauda Khayali Civil       | 2014-15         | 5.0                  | 5.0                     | 49.90                  |
|                      | Pashchimi Pal Vilaun       | 2014-15         | 8.0                  | 4.87                    | 48.52                  |
|                      | Compartment No. 39         |                 |                      |                         |                        |

|                 |                                    |         |               |              |              |
|-----------------|------------------------------------|---------|---------------|--------------|--------------|
| Lohaghat Range  | Edakot Bhumlai Civil               | 2014-15 | 13.0          | 5.25         | 46.12        |
|                 | Rudramali Civil                    | 2016-17 | 2.34          | 2.34         | 63.64        |
|                 | Dungrabaku Compartment No. 5 II    | 2016-17 | 2.40          | 0.76         | 37.73        |
|                 | Dungrabaku Compartment No. 15      | 2014-15 | 5.0           | 2.35         | 14.50        |
|                 | Koyati Van Panchayat               | 2014-15 | 10.0          | 3.63         | 30.90        |
|                 | Koyati Van Panchayat II            | 2016-17 | 4.8           | 1.43         | 31.82        |
|                 | Koyati Van Panchayat III           | 2016-17 | 2.4           | 0.77         | 26.82        |
| Kali            | Bapru Reserve                      | 2014-15 | 5.0           | 5.0          | 71.82        |
| Kumaun Range    | Barakot Civil                      | 2014-15 | 4.0           | 4.0          | 63.63        |
|                 | Mayu Van Panchayat                 | 2016-17 | 8.34          | 8.34         | 58.07        |
|                 | Pamda Civil                        | 2015-16 | 6.3           | 6.3          | 55.76        |
|                 | Pamda Van Panchayat                | 2015-16 | 10.0          | 10.0         | 43.44        |
|                 | Tadag Van Panchayat                | 2016-17 | 6.0           | 6.0          | 52.33        |
|                 | Vedaodh Van Panchayat              | 2016-17 | 5.0           | 5.0          | 51.60        |
|                 | Chulape Civil                      | 2014-15 | 10.0          | 10.0         | 43.90        |
|                 | Talla Bapru Van Panchayat          | 2015-16 | 5.0           | 5.0          | 54.40        |
|                 | Maulani Van Panchayat              | 2016-17 | 5.0           | 5.0          | 50.00        |
|                 | Chami Van Panchayat                | 2012-13 | 10.0          | 10.0         | 32.89        |
|                 | Chami Van Panchayat                | 2016-17 | 6.0           | 6.0          | 36.67        |
|                 | Poorvi Cheeda Compartment No. 12 b | 2012-13 | 10.0          | 10.0         | 48.55        |
|                 | Suteda Van Panchayat               | 2016-17 | 6.0           | 6.0          | 48.67        |
|                 | Cheeda Van Panchayat               | 2016-17 | 5.64          | 5.64         | 65.81        |
|                 | Cheeda Van Panchayat               | 2012-13 | 18.0          | 18.0         | 44.11        |
|                 | Hichauda Van Panchayat             | 2015-16 | 10.0          | 10.0         | 57.11        |
|                 | Mau Van Panchayat                  | 2014-15 | 2.66          | 2.66         | 36.02        |
|                 | Puniyal Van Panchayat              | 2014-15 | 5.0           | 5.0          | 52.38        |
|                 | Puniyal Van Panchayat              | 2015-16 | 5.0           | 5.0          | 50.80        |
| Champawat Range | Dudh Pokhra Civil                  | 2014-15 | 4.0           | 1.12         | 6.50         |
|                 | Chauki Van Panchayat               | 2015-16 | 5.0           | 2.26         | 33.20        |
|                 | Birmola Van Panchayat              | 2015-16 | 10.0          | 4.17         | 00.00        |
|                 | Ninodi Van Panchayat               | 2016-17 | 5.0           | 3.0          | 17.20        |
|                 | Punethi Van Panchayat              | 2015-16 | 2.7           | 2.7          | 51.38        |
|                 | Birmola Van Panchayat              | 2014-15 | 10.5          | 3.52         | 1.38         |
|                 | Naghan Van Panchayat               | 2016-17 | 6.0           | 2.0          | 48.67        |
|                 | Churakhark Van Panchayat           | 2015-16 | 5.0           | 0.87         | 61.60        |
|                 | Dhakna Darja I Van Panchayat       | 2012-13 | 5.0           | 3.74         | 30.75        |
|                 | Dhakna Darja I Van Panchayat       | 2013-14 | 10.0          | 10.0         | 15.44        |
|                 | Dhakna Van Panchayat               | 2016-17 | 5.0           | 2.18         | 40.00        |
|                 | Bastriya Majheda Van Panchayat     | 2013-14 | 10.0          | 10.0         | 34.80        |
|                 | Nayal Patthar Maun Van Panchayat   | 2013-14 | 10.0          | 10.0         | 0.00         |
|                 | Mudiyani Part 2 Van Panchayat      | 2016-17 | 6.0           | 2.66         | 49.33        |
|                 | Swala Van Panchayat                | 2016-17 | 5.0           | 3.14         | 31.60        |
|                 | Mudiyani Van Panchayat             | 2015-16 | 5.0           | 5.0          | 48.00        |
|                 | Cheedapani Compartment No. 2       | 2016-17 | 3.27          | 3.27         | 50.04        |
| Boom Range      | Naghan Compartment No. 1 B         | 2012-13 | 10.0          | 10.0         | 33.50        |
|                 | Kalsandev Compartment No. 1 A      | 2013-14 | 10.0          | 10.0         | 47.64        |
| <b>Total</b>    |                                    |         | <b>409.64</b> | <b>307.7</b> | <b>38.24</b> |

It is seen from the table 5.38 that the average survival of plants in the division is 38.24%. The area surveyed by GPS was found less than the recorded plantation area by 100 ha.

## 5.20 Haldwani Forest Division

Sharda range of Haldwani Forest Division was surveyed. The monitoring of CAMPA plantation was carried out by FRI team in 3 plantation sites with an area of 116 hectare was covered in Haldwani Forest Division. The native forest vegetation on the site is khair, shisham, kanju, gutel etc. List of species planted under CAMPA plantation is given below.

**Table 5.39** List of species planted under CAMPA in Haldwani Forest Division

| Sl.No. | Name of species                | Local Name |
|--------|--------------------------------|------------|
| 1.     | <i>Acacia catechu</i>          | Khair      |
| 2.     | <i>Albizia lebbeck</i>         | Siris      |
| 3.     | <i>Azadirachta indica</i>      | Neem       |
| 4.     | <i>Bombax ceiba</i>            | Semal      |
| 5.     | <i>Dalbergia sissoo</i>        | Shisham    |
| 6.     | <i>Emblia officinalis</i>      | Amla       |
| 7.     | <i>Holoptelea integrifolia</i> | Kanju      |
| 8.     | <i>Syzygium cumini</i>         | Jamun      |
| 9.     | <i>Terminalia chebula</i>      | Harad      |
| 10.    | <i>Terminalia tomentosa</i>    | Sain       |

Table 5.40 below shows that Sharda range has implemented CAMPA plantation in three sites. The survival of plants is 35.72%.

**Table 5.40** Range wise sites, area and survival of plants in Haldwani Forest Division

| Name of Forest Range | Sample sites                     | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|----------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Sharda Range         | Sharda Tapu No. 37               | 2015-16         | 63.00                | 63.00                   | 51.78                  |
|                      | Sharda Tapu No. 35 & 38 (Middle) | 2014-15         | 25.00                | 25.00                   | 7.92                   |
|                      | Sharda Tapu No. 36               | 2015-16         | 28.00                | 28.00                   | 47.46                  |
|                      | <b>Total</b>                     |                 | <b>116.00</b>        | <b>116.00</b>           | <b>35.72</b>           |

## 5.21 Tarai East Forest Division

A total of 9 forest ranges of Tarai East Forest Division were surveyed in the report viz. Khatima, Dauli, Kilpura, Gola, Kishanpur, Barakoli, Surai, South Jolasal and Jolasal. An area of 305.16 hectare and 16 plantation sites were covered under Tarai East Forest Division. The native vegetation in the plantation sites are jamun, khair, eucalyptus, teak, sal, dhauri, amla, amaltas, babul etc. The predominant species is sal. The list of species planted under CAMPA is given as under.

**Table 5.41** List of species planted under CAMPA in Tarai East Forest Division

| Sl.No. | Name of species                   | Local Name   |
|--------|-----------------------------------|--------------|
| 1.     | <i>Acacia catechu</i>             | Khair        |
| 2.     | <i>Acacia nilotica</i>            | Babul        |
| 3.     | <i>Adina cordifolia</i>           | Haldu        |
| 4.     | <i>Aegle marmelos</i>             | Bel          |
| 5.     | <i>Aesculus indica</i>            | Pangar       |
| 6.     | <i>Ailanthus excels</i>           | Maharukh     |
| 7.     | <i>Albizia lebbeck</i>            | Siris        |
| 8.     | <i>Artocarpus lacucha</i>         | Borah        |
| 9.     | <i>Asparagus racemosus</i>        | Shatawar     |
| 10.    | <i>Azadirachta indica</i>         | Neem         |
| 11.    | <i>Bauhunia variegata</i>         | Kachnar      |
| 12.    | <i>Berberis asiatica</i>          | Kilmora      |
| 13.    | <i>Bombax cieba</i>               | Semal        |
| 14.    | <i>Cassia fistula</i>             | Amaltas      |
| 15.    | <i>Dalbergia latifolia</i>        | Kala shisham |
| 16.    | <i>Dalbergia sissoo</i>           | Shisham      |
| 17.    | <i>Delonix regia</i>              | Gulmohar     |
| 18.    | <i>Dendrocalamus strictus</i>     | Bamboo       |
| 19.    | <i>Emblica officinalis</i>        | Amla         |
| 20.    | <i>Ficus religiosa</i>            | Pipal        |
| 21.    | <i>Holarrhena antidysenterica</i> | Inderjhao    |
| 22.    | <i>Holoptelea integrifolia</i>    | Kanju        |
| 23.    | <i>Jacrandia mimosifolia</i>      | Jacrandia    |
| 24.    | <i>Lagerstroemia parviflora</i>   | Dhau         |
| 25.    | <i>Lannea coromandelica</i>       | Jhingan      |
| 26.    | <i>Madhuca latifolia</i>          | Mahua        |
| 27.    | <i>Mallotus philippinensis</i>    | Rohini       |
| 28.    | <i>Melia dubia</i>                | Bakain       |
| 29.    | <i>Pongamia pinnata</i>           | Kanji        |
| 30.    | <i>Psidium guajava</i>            | Amrud        |
| 31.    | <i>Putranjiva roxburghii</i>      | Puranjiva    |
| 32.    | <i>Sapindus mukrosii</i>          | Ritha        |
| 33.    | <i>Syzygium cumini</i>            | Jamun        |
| 34.    | <i>Tamarindus indica</i>          | Imli         |
| 35.    | <i>Tectona grandis</i>            | Sagwan       |
| 36.    | <i>Terminalia arjuna</i>          | Arjun        |
| 37.    | <i>Terminalia chebula</i>         | Harad        |
| 38.    | <i>Terminalia elliptica</i>       | Asna         |
| 39.    | <i>Terminalia tomentosa</i>       | Sain         |
| 40.    | <i>Trewia nudiflora</i>           | Gutel        |

**Table 5.42** Range wise sites, area and survival of plants in Tarai East Forest Division

| Name of Forest Range | Sample sites                    | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|---------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Khatima Range        | South Banbasa Compartment No. 1 | 2016-17         | 10.0                 | 8.02                    | 75.00                  |
|                      | Chini Compartment No. 3         | 2012-13         | 30.0                 | 30.0                    | 24.85                  |
|                      | North Banbasa Compartment No. 5 | 2016-17         | 20.0                 | 20.0                    | 26.73                  |
| Dauli Range          | Kot Khara South A               | 2016-17         | 14.0                 | 14.0                    | 54.10                  |
|                      | Kot Khara South A N-1           | 2012-13         | 28.0                 | 28.0                    | 47.46                  |
|                      | Kot Khara South Plot 1D ABC     | 2016-17         | 10.0                 | 10.0                    | 49.78                  |
| Kilpura Range        | Pashchimi Kilpura Plot No. 1    | 2012-13         | 17.50                | 14.14                   | 52.62                  |
|                      | Dugadi Block 1 Beat             | 2012-13         | 35.00                | 23                      | 25.45                  |
|                      | Mandir Kilpura                  | 2012-13         | 20.00                | 20.00                   | 21.25                  |
|                      | Dugali Block 1C                 | 2016-17         | 30.00                | 30.00                   | 23.80                  |
| Gola Range           | Golarokhar Plot No. 2           | 2016-17         | 40.50                | 40.50                   | 59.46                  |
| Kishanpur Range      | Gola 3A Plot No. 12             | 2016-17         | 7.50                 | 3.82                    | 52.27                  |
| Barakoli Range       | Barakoli A Plot No. 52          | 2015-16         | 14.65                | 14.65                   | 60.93                  |
| Surai Range          | Kakara - 10                     | 2016-17         | 10.0                 | 10.0                    | 78.14                  |
| Jolasal Range        | Purvi Jolasal Compartment No. 8 | 2016-17         | 8.0                  | 8.0                     | 66.25                  |
| <b>Total</b>         |                                 |                 | <b>305.15</b>        | <b>284.13</b>           | <b>48.76</b>           |

Table 5.42 revealed that there was shortage of 21 ha area when the area was verified by GPS. The survival of plants is 48.76%.

## 5.22 Tarai West Forest Division

CAMPA plantations in Tarai West Forest Division were made in 7 forest ranges viz. Aamphokhra, Bannakheda, Belpadav, Kashipur, North Jaspur, Ramnagar and South Jaspur. A total of 26 plantation sites with 409 hectare area were covered in Tarai West Forest Division. The native vegetation consisted of sal (*Shorea robusta*) as predominant species and it's associated like Terminalias, *Holoptelea intgerifolia*, *Adina cordifolia*, *Lagerstroemia parviflora* etc. and revrain forests of shisham and khair. The species planted under CAMPA are shown in the following table.

**Table 5.43** List of species planted under CAMPA in Tarai West Forest Division

| Sl.No. | Name of species            | Local Name |
|--------|----------------------------|------------|
| 1.     | <i>Acacia catechu</i>      | Khair      |
| 2.     | <i>Acacia nilotica</i>     | Babul      |
| 3.     | <i>Adina cordifolia</i>    | Haldu      |
| 4.     | <i>Aegle marmelos</i>      | Bel        |
| 5.     | <i>Aesculus indica</i>     | Pangar     |
| 6.     | <i>Ailanthus excelsa</i>   | Maharukh   |
| 7.     | <i>Albizia lebbbeck</i>    | Siris      |
| 8.     | <i>Artocarpus lacucha</i>  | Borah      |
| 9.     | <i>Asparagus racemosus</i> | Shatawar   |

|     |                                  |               |
|-----|----------------------------------|---------------|
| 10. | <i>Azadirachta indica</i>        | Neem          |
| 11. | <i>Bauhunia variegata</i>        | Kachnar       |
| 12. | <i>Berberis asiatica</i>         | Kilmora       |
| 13. | <i>Bombax cieba</i>              | Semal         |
| 14. | <i>Cassia fistula</i>            | Amaltas       |
| 15. | <i>Dalbergia latifolia</i>       | Kala shisham  |
| 16. | <i>Dalbergia sissoo</i>          | Shisham       |
| 17. | <i>Delonix regia</i>             | Gulmohar      |
| 18. | <i>Dendrocalamus strictus</i>    | Bamboo        |
| 19. | <i>Embllica officinalis</i>      | Amla          |
| 20. | <i>Eucalyptus hybrid</i>         | Safeda        |
| 21. | <i>Ficus religiosa</i>           | Pipal         |
| 22. | <i>Holarrhena antidysentrica</i> | Inderjhao     |
| 23. | <i>Holoptelea integrifolia</i>   | Kanju         |
| 24. | <i>Jacrandia mimosifolia</i>     | Jacrandia     |
| 25. | <i>Lagerstroemia parviflora</i>  | Dhauri        |
| 26. | <i>Lannea coromandelica</i>      | Jhingan       |
| 27. | <i>Madhuca latifolia</i>         | Mahua         |
| 28. | <i>Mallotus philippinensis</i>   | Rohini        |
| 29. | <i>Melia dubia</i>               | Bakain        |
| 30. | <i>Pithecellobium dulce</i>      | Jangle jalebi |
| 31. | <i>Pongamia pinnata</i>          | Kanji         |
| 32. | <i>Psidium gujava</i>            | Amrud         |
| 33. | <i>Putranjiva roxburghii</i>     | Puranjiva     |
| 34. | <i>Sapindus mukrosii</i>         | Ritha         |
| 35. | <i>Syzygium cumini</i>           | Jamun         |
| 36. | <i>Tamarindus indica</i>         | Imli          |
| 37. | <i>Tectona grandis</i>           | Sagwan        |
| 38. | <i>Terminalia arjuna</i>         | Arjun         |
| 39. | <i>Terminalia chebula</i>        | Harad         |
| 40. | <i>Terminalia elliptica</i>      | Asna          |
| 41. | <i>Terminalia tomentosa</i>      | Sain          |
| 42. | <i>Trewia nudiflora</i>          | Gutel         |
| 43. | <i>Zizyphus mauritiana</i>       | Ber           |

Table 5.44 shows the survival of plants, survey of sample plantation's sites and area surveyed by GPS. The average survival of plants was estimated as 48.71% of the division.

**Table 5.44** Range wise sites, area and survival of plants in Tarai West Forest Division

| Name of Forest Range | Sample sites                       | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Aampokhra Range      | Shivnathpur 33A                    | 2015-16         | 10.0                 | 10.0                    | 49.45                  |
|                      | Shivnathpur Plot No-11             | 2015-16         | 15.0                 | 15.0                    | 50.40                  |
|                      | Shivnathpur Plot No- 12            | 2015-16         | 20.0                 | 17.0                    | 45.04                  |
|                      | Shivnathpur - 3                    | 2015-16         | 7.0                  | 7.0                     | 73.14                  |
|                      | Shivnathpur 15                     | 2015-16         | 15.0                 | 15.0                    | 52.55                  |
| Bannakheda Range     | Purvi Dhamola plot no. 28          | 2015-16         | 10.0                 | 10.0                    | 45.40                  |
|                      | Berhaini 62                        | 2016-17         | 29.2                 | 29.2                    | 45.12                  |
|                      | Belpadao - 08                      | 2015-16         | 30.0                 | 30.0                    | 55.12                  |
|                      | Belpadao - 28                      | 2016-17         | 38.0                 | 38.0                    | 59.49                  |
| Belpadav Range       | Barua- 19                          | 2012-13         | 5.0                  | 5.0                     | 50.50                  |
|                      | Gabua 8                            | 2016-17         | 10.0                 | 10.0                    | 56.60                  |
|                      | Gabua-29                           | 2016-17         | 15.0                 | 15.0                    | 52.00                  |
| Kashipur Range       | Kashipur Thakurdwara Motor Marg    | 2015-16         | 3.0                  | 3.0                     | 61.82                  |
| North Jaspur Range   | Jaspur Compartment No- 51 B Part-I | 2014-15         | 12.0                 | 12.0                    | 50.13                  |
|                      | Jaspur Compartment No- 51 A        | 2016-17         | 10.8                 | 10.8                    | 60.27                  |
|                      | Jaspur Compartment No- 21 B        | 2014-15         | 12.0                 | 12.0                    | 52.10                  |
| Ramnagar Range       | Upper Kosi Block                   | 2015-16         | 50.0                 | 50.0                    | 26.05                  |
|                      | Guljarpur Plot- 9 Part-II          | 2012-13         | 12.0                 | 12.0                    | 39.29                  |
| South Jaspur Range   | Jaspur Compartment No- 30 A        | 2015-16         | 20.0                 | 20.0                    | 40.15                  |
|                      | Jaspur Compartment No- 28 (5)      | 2012-13         | 10.0                 | 10.0                    | 45.00                  |
|                      | Shivrajpur Plot No-02              | 2012-13         | 14.0                 | 14.0                    | 35.21                  |
|                      | Jaspur Compartment No- 30 B        | 2017-18         | 20.0                 | 20.0                    | 40.88                  |
|                      | Jaspur Compartment No- 22          | 2013-14         | 15.0                 | 15.0                    | 41.80                  |
|                      | Jaspur Compartment No- 22          | 2016-17         | 6.0                  | 6.0                     | 41.52                  |
|                      | Kripacharjpur Part-I               | 2017-18         | 10.0                 | 10.0                    | 47.36                  |
|                      | Kripacharjpur Compartment No- 19   | 2017-18         | 10.0                 | 10.0                    | 50.05                  |
| <b>Total</b>         |                                    |                 | <b>409</b>           | <b>406</b>              | <b>48.71</b>           |

## 5.23 Ramnagar Forest Division

CAMPA plantation in Ramnagar Forest Division was carried out in 4 ranges viz. Fatehpur, Kaladungi, Kosi- Raji and Ramnagar range. A total of 7 plantation sites with 66 hectare area were surveyed in Ramnagar Forest Division. The natural forests consisted of sal as predominant species with associated species in different types of forests. Sissoo-Khair forest is distributed along river sides. The following species were found planted in the division.

**Table 5.45** List of species planted under CAMPA in Ramnagar Forest Division

| Sl.No. | Name of species           | Local Name |
|--------|---------------------------|------------|
| 1.     | <i>Albizia lebbbeck</i>   | Siris      |
| 2.     | <i>Azadirachta indica</i> | Neem       |
| 3.     | <i>Bauhunia variegata</i> | Kachnar    |
| 4.     | <i>Bombax cieba</i>       | Semal      |
| 5.     | <i>Cassia fistula</i>     | Amaltas    |
| 6.     | <i>Dalbergia sissoo</i>   | Shisham    |

|     |                                |               |
|-----|--------------------------------|---------------|
| 7.  | <i>Delonix regia</i>           | Gulmohar      |
| 8.  | <i>Dendrocalamus strictus</i>  | Bamboo        |
| 9.  | <i>Emblica officinalis</i>     | Amla          |
| 10. | <i>Ficus religiosa</i>         | Pipal         |
| 11. | <i>Ficus virens</i>            | Pilkhan       |
| 12. | <i>Helicterus isora</i>        | Marorphali    |
| 13. | <i>Holoptelea integrifolia</i> | Kanju         |
| 14. | <i>Lannea coromandelica</i>    | Jhingan       |
| 15. | <i>Madhuca latifolia</i>       | Mahua         |
| 16. | <i>Mallotus philippinensis</i> | Rohini        |
| 17. | <i>Mangifera indica</i>        | Mango         |
| 18. | <i>Millettia pinnata</i>       | Totta         |
| 19. | <i>Pithecellobium dulce</i>    | Jangle jalebi |
| 20. | <i>Pongamia pinnata</i>        | Kanji         |
| 21. | <i>Psidium guajava</i>         | Amrud         |
| 22. | <i>Syzygium cumini</i>         | Jamun         |
| 23. | <i>Tamarindus indica</i>       | Imli          |
| 24. | <i>Tectona grandis</i>         | Sagwan        |
| 25. | <i>Terminalia arjuna</i>       | Arjun         |
| 26. | <i>Terminalia bellirica</i>    | Baheda        |
| 27. | <i>Terminalia chebula</i>      | Harad         |
| 28. | <i>Terminalia tomentosa</i>    | Sain          |
| 29. | <i>Trewia nudiflora</i>        | Gutel         |
| 30. | <i>Zizyphus mauritiana</i>     | Ber           |

Table 5.46 Below revealed the actual area of plantation, survival of plants. The survival of plants is 40.44%

**Table 5.46** Range wise sites, area and survival of plants in Ramnagar Forest Division

| Name of Forest Range | Sample sites                         | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Fatehpur Range       | Kaligarh Compartment No- 3           | 2016-17         | 10.0                 | 10.0                    | 49.91                  |
| Kaladungi Range      | Nihal Tarai Block Compartment No- 2C | 2016-17         | 10.0                 | 10.0                    | 37.00                  |
| Kosi- Raji Range     | Bhallon Compartment No-4             | 2016-17         | 6.0                  | 4.0                     | 46.06                  |
|                      | Dhulva Compartment No- 4B            | 2016-17         | 20.0                 | 20.0                    | 32.03                  |
|                      | Bhallon Compartment No- 6B           | 2016-17         | 6.0                  | 6.0                     | 31.82                  |
|                      | Bhallon Compartment No- 5A           | 2016-17         | 6.0                  | 6.0                     | 43.79                  |
| Ramnagar Range       | Guljarpur Plot- 9 Part-I             | 2012-13         | 8.0                  | 8.0                     | 42.50                  |
| <b>Total</b>         |                                      |                 | <b>66</b>            | <b>64</b>               | <b>40.44</b>           |

## 5.24 Ramnagar Soil Conservation Division

CAMPA plantation in Ramnagar Soil Conservation Division was carried out in 5 forest ranges viz. Abhiyantrik, Dhumakot, Nainidanda, Ringlana and Salt. A total of 25 plantation sites with 181 hectare area were covered in Ramnagar Soil Conservation Division. The natural forests consisted of sal as predominant species with associated species in different types of forests. Sissoo-Khair forest is distributed along river sides. On high altitude chir- banj forests is distributed. The following species were found planted in the division.

**Table 5.47** List of species planted under CAMPA in Ramnagar Soil Conservation Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Acacia mollissima</i>        | Wattle     |
| 2.     | <i>Albizia lebbeck</i>          | Siris      |
| 3.     | <i>Bauhinia purpurea</i>        | Gurial     |
| 4.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 5.     | <i>Bombax cieba</i>             | Semal      |
| 6.     | <i>Cassia fistula</i>           | Amaltas    |
| 7.     | <i>Cedrela toona</i>            | Toon       |
| 8.     | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 9.     | <i>Delonix regia</i>            | Gulmohar   |
| 10.    | <i>Dendrocalamus strictus</i>   | Bamboo     |
| 11.    | <i>Emblica officinalis</i>      | Amla       |
| 12.    | <i>Grevillea robusta</i>        | Silver oak |
| 13.    | <i>Holoptelea integrifolia</i>  | Kanju      |
| 14.    | <i>Prunus cerasoides</i>        | Padam      |
| 15.    | <i>Psidium guajava</i>          | Amrud      |
| 16.    | <i>Pyrus pashia</i>             | Mahel      |
| 17.    | <i>Quercus leucotrichophora</i> | Banj       |
| 18.    | <i>Sapindus mukrosii</i>        | Ritha      |
| 19.    | <i>Syzygium cumini</i>          | Jamun      |
| 20.    | <i>Tamarindus indica</i>        | Imli       |
| 21.    | <i>Terminalia arjuna</i>        | Arjun      |
| 22.    | <i>Terminalia bellrica</i>      | Baheda     |
| 23.    | <i>Terminalia chebula</i>       | Harad      |

The survival of plants, sampled sites and area surveyed by GPS is shown in the table 5.48 below:

**Table 5.48** Range wise sites, area and survival of plants in Ramnagar Soil Conservation Forest Division

| Name of Forest Range     | Sample sites                             | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|--------------------------|------------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Abhiyantrik Range        | Sarpatta Van Panchayat Tok Talli Cango   | 2012-13         | 5.0                  | 2.0                     | 28.00                  |
|                          | Jihar Van Panchayat Tok Talda            | 2012-13         | 6.0                  | 2.0                     | 24.00                  |
|                          | Khatoli Van Panchayat Tok Satlok         | 2014-15         | 8.0                  | 6.0                     | 31.75                  |
|                          | Charikyari Van Panchayat Tok             | 2015-16         | 5.0                  | 5.0                     | 53.20                  |
|                          | Malla Bagad                              |                 |                      |                         |                        |
|                          | Asron Malla Van Panchayat Tok            | 2015-16         | 5.0                  | 5.0                     | 51.80                  |
| Dhumakot Range           | Darshanpani                              |                 |                      |                         |                        |
|                          | Devaldhar Tok Bakhriya Pani              | 2012-13         | 10.0                 | 10.0                    | 51.20                  |
|                          | Satkholu Van Panchayat                   | 2015-16         | 7.0                  | 7.0                     | 47.14                  |
| Nainidanda Range         | Babliayani Van Panchayat                 | 2016-17         | 7.0                  | 7.0                     | 28.71                  |
|                          | Bamankhatta Uniyal Moskhen Tok           | 2012-13         | 4.0                  | 4.0                     | 27.93                  |
|                          | Badyo Van Panchayat Tok Buglarn          | 2016-17         | 7.0                  | 7.0                     | 25.57                  |
|                          | Kafligair Tok Van Panchayat Khutda Talla | 2015-16         | 8.0                  | 5.0                     | 35.62                  |
| Ringlana Range           | Dhangal Gaon Civil                       | 2012-13         | 10.0                 | 10.0                    | 22.47                  |
|                          | Mathali Silk Tok Piplighair              | 2012-13         | 5.0                  | 5.0                     | 21.48                  |
|                          | Mathli Silk Tok Dollyachal               | 2012-13         | 5.0                  | 5.0                     | 28.02                  |
|                          | Dalla-1                                  | 2012-13         | 5.0                  | 5.0                     | 30.40                  |
|                          | Tollu Danda 4                            | 2013-14         | 13.0                 | 13.0                    | 38.09                  |
|                          | Tollu Danda Van Panchayat                | 2014-15         | 12.0                 | 12.0                    | 32.72                  |
|                          | Rajbo Talla Van Panchayat                | 2014-15         | 9.0                  | 9.0                     | 32.53                  |
|                          | Karthiya Van Panchayat 1                 | 2014-15         | 4.0                  | 4.0                     | 26.15                  |
|                          | Tollu Danda Compartment no. 3            | 2013-14         | 13.0                 | 13.0                    | 37.17                  |
| Salt Range Jhalla Dhaiya | Punakot Van Panchayat Tok Khattha        | 2015-16         | 5.0                  | 5.0                     | 38.25                  |
|                          | Gadkot Van Panchayat Tok Kafligher       | 2014-15         | 7.0                  | 7.0                     | 33.93                  |
|                          | Gadkot Malla Van Panchayat Tok           | 2015-16         | 6.0                  | 6.0                     | 25.33                  |
|                          | Bandrayan Van Panchayat                  | 2012-13         | 5.0                  | 5.0                     | 46.90                  |
|                          | Tok Gunsarkhal                           |                 |                      |                         |                        |
|                          | Jhargaon Civil Tok Pudiyal Bakhali       | 2012-13         | 10.0                 | 10.0                    | 43.07                  |
| <b>Total</b>             |                                          |                 | <b>181</b>           | <b>169</b>              | <b>34.46</b>           |

The average survival of plants is found 34.46%. An area of 12 ha was found less than recorded plantation area when it was surveyed by GPS (table 5.48)

### 5.25 Ranikhet Soil Conservation Forest Division

CAMPA plantations in Ranikhet Soil Conservation Forest Division was undertaken in 7 ranges of Ranikhet Soil Conservation Division viz., Tarikhet, Gagas, Chanthariya, Jalali, Chaukhutiya, Gairsain and Boom. A total of 51 plantation sites with 287.82 hectare sampled area were surveyed in Ranikhet Soil Conservation Division. Chir, banj, burans, kafal, mehal etc. were the native tree species found at the plantation sites. The species planted under CAMPA at the sites are shown in table 5.49 below.

**Table 5.49** List of species planted under CAMPA in Ranikhet Soil Conservation Forest Division

| Sl.No. | Name of species                 | Local Name       |
|--------|---------------------------------|------------------|
| 1.     | <i>Acacia auriculiformis</i>    | Wattle           |
| 2.     | <i>Acer oblongum</i>            | Putli            |
| 3.     | <i>Alnus nitida</i>             | Utis             |
| 4.     | <i>Arundinaria falcata</i>      | Ringal           |
| 5.     | <i>Asparagus racemosus</i>      | Shatawar         |
| 6.     | <i>Bauhinia purpurea</i>        | Gurial           |
| 7.     | <i>Bauhinia variegata</i>       | Kachnar          |
| 8.     | <i>Berberis asiatica</i>        | Kilmora          |
| 9.     | <i>Cedrela toona</i>            | Toon             |
| 10.    | <i>Cedrus deodara</i>           | Deodar           |
| 11.    | <i>Celtis australis</i>         | Kharik           |
| 12.    | <i>Cinnamomum tamala</i>        | Tejpatta         |
| 13.    | <i>Emblica officinalis</i>      | Amla             |
| 14.    | <i>Eucalyptus hybrid</i>        | Safeda           |
| 15.    | <i>Fraxinus micrantha</i>       | Anga             |
| 16.    | <i>Grevillia robusta</i>        | Silver oak       |
| 17.    | <i>Grewia optiva</i>            | Bhimal           |
| 18.    | <i>Melia dubia</i>              | Bakain           |
| 19.    | <i>Morus alba</i>               | Shahtoot         |
| 20.    | <i>Myrica esculenta</i>         | Kafal            |
| 21.    | <i>Pieris ovalifolia</i>        | Aiyar            |
| 22.    | <i>Pinus roxburghii</i>         | Chir             |
| 23.    | <i>Prunus cerasoides</i>        | Padam            |
| 24.    | <i>Pyrus pashia</i>             | Mahel            |
| 25.    | <i>Quercus floribunda</i>       | Faliyant, Tilonj |
| 26.    | <i>Quercus lamellosa</i>        | Manipuri banj    |
| 27.    | <i>Quercus leucotrichophora</i> | Banj             |
| 28.    | <i>Rhododendron arboreum</i>    | Burans           |
| 29.    | <i>Sapindus mukrossi</i>        | Ritha            |
| 30.    | <i>Syzygium cumini</i>          | Jamun            |
| 31.    | <i>Terminalia bellirica</i>     | Baheda           |
| 32.    | <i>Terminalia chebula</i>       | Harad            |

**Table 5.50** Range wise sites, area and survival of plants in Ranikhet Soil Conservation Division

| Name of Forest Range | Sample sites            | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-------------------------|-----------------|----------------------|-------------------------|------------------------|
| Tarikhet Range       | Nuna Van Panchayat      | 2015-16         | 5.0                  | 5.0                     | 42.60                  |
|                      | Nuna Van Panchayat      | 2012-13         | 5.0                  | 5.0                     | 28.50                  |
|                      | Dharad Van Panchayat    | 2016-17         | 5.0                  | 5.0                     | 42.80                  |
|                      | Gairgaon Van Panchayat  | 2015-16         | 5.0                  | 5.0                     | 44.80                  |
|                      | Nainisera Van Panchayat | 2015-16         | 5.0                  | 5.0                     | 50.20                  |

|                   |                                         |         |               |               |              |
|-------------------|-----------------------------------------|---------|---------------|---------------|--------------|
|                   | Gangoda Van Panchayat                   | 2015-16 | 5.0           | 5.0           | 36.00        |
|                   | Kadakot Van Panchayat                   | 2014-15 | 10.0          | 7.45          | 30.05        |
|                   | Bayali Van Panchayat                    | 2016-17 | 5.0           | 5.0           | 38.60        |
| Gagas Range       | Karchooli Van Panchayat                 | 2015-16 | 5.0           | 5.0           | 32.80        |
|                   | Aeroli Van Panchayat                    | 2016-17 | 6.0           | 4.0           | 40.83        |
|                   | Chayali Van Panchayat                   | 2015-16 | 5.0           | 5.0           | 37.60        |
|                   | Aena Van Panchayat                      | 2015-16 | 5.0           | 5.0           | 40.80        |
|                   | Mujholi Van Panchayat                   | 2013-14 | 5.0           | 5.0           | 50.80        |
| Chanthriya Range  | Nagarjuna Van Panchayat Tok Van Kholi   | 2016-17 | 5.0           | 5.0           | 50.00        |
|                   | Naad Van Panchayat Tok Gwailegair       | 2012-13 | 5.0           | 5.0           | 43.10        |
|                   | Talli Kahali Van Panchayat              | 2016-17 | 5.0           | 5.0           | 18.80        |
|                   | Tok Leelamani                           |         |               |               |              |
|                   | Malli Suvali Van Panchayat Part I       | 2015-16 | 5.0           | 5.0           | 34.80        |
| Jalali Range      | Bhatkot Van Panchayat                   | 2012-13 | 5.0           | 5.0           | 15.40        |
|                   | Budheena Van Panchayat                  | 2015-16 | 5.0           | 5.0           | 22.40        |
|                   | Jamineevar Van Panchayat                | 2016-17 | 5.0           | 5.0           | 19.20        |
|                   | Tedgaon Van Panchayat                   | 2016-17 | 5.0           | 5.0           | 26.80        |
|                   | Kharak Van Panchayat                    | 2016-17 | 5.0           | 5.0           | 25.20        |
|                   | Sure Van Panchayat Tok Nimukhalta       | 2013-14 | 5.0           | 5.0           | 27.20        |
|                   | Sure Van Panchayat Tok Feru             | 2013-14 | 4.0           | 4.0           | 21.00        |
|                   | Minar Van Panchayat                     | 2014-15 | 4.0           | 4.0           | 11.60        |
|                   | Dangar Khola Van Panchayat              | 2014-15 | 4.0           | 4.0           | 24.50        |
| Chaukhutiya Range | Naugaon Akhodiya Van Panchayat          | 2016-17 | 5.0           | 5.0           | 50.40        |
|                   | Jhalakarchooli Van Panchayat            | 2016-17 | 5.0           | 5.0           | 38.80        |
|                   | Dudhaliya Manral Van Panchayat          | 2013-14 | 4.57          | 4.57          | 26.26        |
|                   | Bajan Van Panchayat                     | 2016-17 | 5.0           | 5.0           | 24.80        |
|                   | Nail Van Panchayat                      | 2016-17 | 5.0           | 5.0           | 24.40        |
|                   | Khurudi Van Panchayat                   | 2016-17 | 6.25          | 6.25          | 11.90        |
|                   | Kala Chauna Van Panchayat               | 2015-16 | 5.0           | 5.0           | 30.00        |
|                   | Chauna Van Panchayat                    | 2012-13 | 5.0           | 5.0           | 48.40        |
|                   | Timta Van Panchayat                     | 2014-15 | 4.0           | 4.0           | 22.80        |
| Gairsain Range    | Ghandiyal Van Panchayat Tok Fermate     | 2016-17 | 10.0          | 10.0          | 60.00        |
|                   | Rikholee Van Panchayat Tok Pankha       | 2012-13 | 10.0          | 10.0          | 31.50        |
|                   | Rayvan Kumolee Van Panchayat            | 2012-13 | 10.0          | 10.0          | 17.00        |
|                   | Parvadi Van Panchayat Tok Kimbolia Sain | 2012-13 | 10.0          | 10.0          | 35.90        |
|                   | Rohida Van Panchayat                    | 2014-15 | 10.0          | 10.0          | 6.60         |
|                   | Kunkhet Van Panchayat                   | 2014-15 | 5.0           | 5.0           | 40.40        |
| Syalde Range      | Chiyani Van Panchayat                   | 2012-13 | 5.0           | 5.0           | 25.00        |
|                   | Jaspur Van Panchayat                    | 2016-17 | 5.0           | 5.0           | 8.80         |
|                   | Palpur Van Panchayat                    | 2016-17 | 5.0           | 5.0           | 64.40        |
|                   | Papdiya Van Panchayat                   | 2012-13 | 5.0           | 5.0           | 30.20        |
|                   | Bhaidgaon Civil                         | 2016-17 | 10.0          | 10.0          | 60.30        |
|                   | Chakkargaon Van Panchayat               | 2014-15 | 5.0           | 5.0           | 52.40        |
|                   | Bajarkhoda Van Panchayat                | 2015-16 | 5.0           | 5.0           | 60.80        |
|                   | Sade Van Panchayat                      | 2012-13 | 5.0           | 5.0           | 9.20         |
|                   | Patalgaon Van Panchayat                 | 2016-17 | 5.0           | 5.0           | 46.80        |
|                   | Mangro Van Panchayat                    | 2012-13 | 5.0           | 5.0           | 12.40        |
| <b>Total</b>      |                                         |         | <b>287.82</b> | <b>283.27</b> | <b>33.25</b> |

It is evident from table 5.50 that survival of plants is found 33.25% which is poor survival.

## 5.26 Mussoorie Forest Division

CAMPA plantation in Mussoorie forest division has been implemented in 7 forest ranges and 46 sample sites were selected for field data collection. The native vegetation of the division is comprised of kachnar, banj, deodar, burans, kafal etc. List of species planted under CAMPA is shown in the table 5.51 below.

**Table 5.51** List of species planted under CAMPA in Mussoorie Forest Division

| Sl.No. | Name of species                 | Local Name   |
|--------|---------------------------------|--------------|
| 1.     | <i>Aesculus indica</i>          | Pangar       |
| 2.     | <i>Albizia lebbeck</i>          | Siris        |
| 3.     | <i>Arundunaria falcata</i>      | Ringal       |
| 4.     | <i>Bauhinia retusa</i>          | Semla        |
| 5.     | <i>Bauhinia variegata</i>       | Kachnar      |
| 6.     | <i>Buxus wallichiana</i>        | Papdi        |
| 7.     | <i>Cedrella serrata</i>         | Toon         |
| 8.     | <i>Cedrus deodara</i>           | Deodar       |
| 9.     | <i>Cymbopogon citratus</i>      | Lemon grass  |
| 10.    | <i>Dendrocalamus strictus</i>   | Bans         |
| 11.    | <i>Fraxinus micrantha</i>       | Anga         |
| 12.    | <i>Juglans regia</i>            | Akhrot       |
| 13.    | <i>Mangifera indica</i>         | Aam          |
| 14.    | <i>Morus alba</i>               | Shahtoot     |
| 15.    | <i>Phyllanthus emblica</i>      | Amla         |
| 16.    | <i>Prunus armeniaca</i>         | Chullu       |
| 17.    | <i>Prunus cerasoides</i>        | Padam        |
| 18.    | <i>Psidium guajava</i>          | Amrood       |
| 19.    | <i>Pterospermum acrifolium</i>  | Kanak champa |
| 20.    | <i>Punica granatum</i>          | Dadim        |
| 21.    | <i>Pyrus pashia</i>             | Mehal        |
| 22.    | <i>Quercus dilatata</i>         | Moru         |
| 23.    | <i>Quercus leucotrichophora</i> | Banj         |
| 24.    | <i>Rhododendron arboreum</i>    | Burans       |
| 25.    | <i>Robinia pseudocacia</i>      | Rubinina     |
| 26.    | <i>Salix alba</i>               | Salix        |
| 27.    | <i>Sapindus mukrosii</i>        | Ritha        |
| 28.    | <i>Syzygium cumini</i>          | Jamun        |
| 29.    | <i>Terminalia bellirica</i>     | Baheda       |
| 30.    | <i>Terminalia chebula</i>       | Harad        |

The survival of plants is found 32%. The plantation area was surveyed with the help of GPS and it was found that plantation's area of 8.05 ha was lesser than the recorded area (table 5.52).

**Table 5.52** Range wise sites, area and survival of plants in Mussoorie Forest Division

| Name of Forest Range | Sample sites                    | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|---------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Mussoorie Range      | Nali Compartment-1              | 2012-13         | 10                   | 10                      | 7.45                   |
|                      | Nali compartment-1              | 2014-15         | 10                   | 10                      | 20.73                  |
|                      | Nali compartment- 4             | 2015-16         | 7                    | 7                       | 55.36                  |
|                      | Motidhar compartment-5A         | 2012-13         | 10                   | 10                      | 46.45                  |
|                      | Silla compartment- 3            | 2012-13         | 10                   | 10                      | 57.09                  |
|                      | Silla compartment- 3            | 2014-15         | 10                   | 10                      | 57.73                  |
|                      | Sarona Civil Soyam              | 2016-17         | 5                    | 5                       | 51.27                  |
|                      | Sarona Civil Soyam              | 2016-17         | 10                   | 10                      | 59.09                  |
|                      | Silla Compartment No. 3         | 2012-13         | 10                   | 10                      | 31.95                  |
|                      | Nali Compartment No. 5          | 2012-13         | 10                   | 10                      | 1.15                   |
|                      | Silla Compartment No. 06        | 2012-13         | 5                    | 5                       | 5.22                   |
|                      | Kyara Soyam                     | 2015-16         | 7                    | 7                       | 46.83                  |
|                      | Badal Compartment No. 1 Part-I  | 2012-13         | 10                   | 10                      | 4.26                   |
|                      | Badal Compartment No. 1 Part-II | 2012-13         | 10                   | 10                      | 3.44                   |
|                      | Rikholi Compartment No. 06      | 2012-13         | 5                    | 5                       | 19.08                  |
| Raipur Range         | Ringalgarh Compartment No.7     | 2013-14         | 10                   | 10                      | 27.73                  |
|                      | Ringalgarh Compartment No. 1    | 2013-14         | 11                   | 11                      | 20.99                  |
|                      | Kund compartment No. 6A         | 2014-15         | 10                   | 10                      | 8.22                   |
|                      | Kund compartment No. 6B         | 2014-15         | 10                   | 10                      | 11.18                  |
|                      | Kund compartment No. 2          | 2015-16         | 10                   | 10                      | 0.00                   |
|                      | Ordinance Factory               | 2012-13         | 2                    | 1.12                    | 7.39                   |
| Devalsari Range      | Sirs Compartment No.2           | 2014-15         | 20                   | 20                      | 20.77                  |
|                      | Sirs Compartment No. 1B         | 2015-16         | 10                   | 10                      | 18.36                  |
|                      | Sirs compartment No. 3          | 2012-13         | 10                   | 10                      | 17.45                  |
|                      | Bajri Namey Tok                 | 2012-13         | 10                   | 10                      | 17.74                  |
|                      | Kyari Compartment-10            | 2015-16         | 10                   | 10                      | 35.81                  |
|                      | Dhakka Namey Tok                | 2012-13         | 15                   | 8.28                    | 13.64                  |
| Badrigad Range       | Andi Compartment No. 1&2        | 2012-13         | 10                   | 10                      | 26.09                  |
|                      | Pavet Soyam-1                   | 2014-15         | 10                   | 10                      | 26.91                  |
|                      | Negyana Soyam-I                 | 2012-13         | 10                   | 10                      | 17.35                  |
|                      | Thureti Civil Soyam             | 2012-13         | 10                   | 10                      | 44.64                  |
|                      | Kori compartment No. 3          | 2015-16         | 8                    | 8                       | 66.86                  |
|                      | Bhutgaon Soyam                  | 2016-17         | 5                    | 5                       | 50.09                  |
|                      | Negyana Soyam-II                | 2012-13         | 10                   | 10                      | 63.28                  |
|                      | Sanav Soyam                     | 2014-15         | 10                   | 10                      | 59.73                  |
|                      | Andi compartment No. 10         | 2015-16         | 10                   | 10                      | 56.51                  |
|                      | Bhutgaon Soyam                  | 2016-17         | 10                   | 10                      | 51.07                  |
|                      | Sendul Soyam                    | 2015-16         | 5                    | 5                       | 71.95                  |
| Kempty Range         | Ghandiala block                 | 2014-15         | 10                   | 10                      | 70.10                  |
|                      | Ghandiala Compartment-1         | 2012-13         | 10                   | 7                       | 7.36                   |
|                      | Bakarana Compartment No. 13     | 2014-15         | 10                   | 10                      | 70.94                  |
|                      | Bakarana Compartment No. 11     | 2015-16         | 10                   | 10                      | 0.00                   |
| Jaunpur Range        | Fidogi soyam                    | 2012-13         | 10                   | 10                      | 28.55                  |
|                      | Bhal Compartment No. 1          | 2015-16         | 10                   | 10                      | 37.55                  |
|                      | Sainsori Tok                    | 2014-15         | 14.4                 | 9.35                    | 21.72                  |
|                      | Kadalgaon Soyam                 | 2014-15         | 10                   | 10                      | 32.16                  |
| <b>Total</b>         |                                 |                 | <b>439.4</b>         | <b>423.75</b>           | <b>31.94</b>           |

### 5.27 Chakrata Forest Division

CAMPA plantation in Chakrata Forest Division was undertaken in 3 forest ranges namely, Kanasar, River and Rikhnar. A total of 207 ha area and 25 sample sites were surveyed. The forests of Chakrata are widely distributed in sub-tropical and moist temperate forest types. Chir and banj are predominant species in sub-tropical zone and in moist temperate type, deodar is predominant species mixed with kail in some pocketes. Burans, kafal, padam, papdi, kilmora, moru, kharsu etc. are mixed with confiferous species. List of species planted under CAMPA is shown in the table 5.53 below.

**Table 5.53** List of species planted under CAMPA in Chakrata Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Abies pindrow</i>            | Rai        |
| 2.     | <i>Aegle marmelos</i>           | Bel        |
| 3.     | <i>Aesculus indica</i>          | Pangar     |
| 4.     | <i>Albizia lebbeck</i>          | Siris      |
| 5.     | <i>Arundinaria falcata</i>      | Ringal     |
| 6.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 7.     | <i>Bombax cieba</i>             | Semal      |
| 8.     | <i>Cassia fistula</i>           | Amaltas    |
| 9.     | <i>Cedrus deodara</i>           | Deodar     |
| 10.    | <i>Celtis australis</i>         | Khadik     |
| 11.    | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 12.    | <i>Dendrocalamus strictus</i>   | Bans       |
| 13.    | <i>Emblica officinalis</i>      | Amla       |
| 14.    | <i>Fraxinus micrantha</i>       | Anga       |
| 15.    | <i>Ficus racemosa</i>           | Timla      |
| 16.    | <i>Juglans regia</i>            | Akhrot     |
| 17.    | <i>Picea smithiana</i>          | Murainda   |
| 18.    | <i>Prunus armeniaca</i>         | Chullu     |
| 19.    | <i>Prunus cerasoides</i>        | Padam      |
| 20.    | <i>Punica granatum</i>          | Dadim      |
| 21.    | <i>Quercus leucotrichophora</i> | Banj       |
| 22.    | <i>Quercus semecarpifolia</i>   | Savun oak  |
| 23.    | <i>Sapindus mukrossi</i>        | Ritha      |
| 24.    | <i>Syzygium cuminii</i>         | Jamun      |
| 25.    | <i>Taxus baccata</i>            | Thuner     |
| 26.    | <i>Terminalia bellirica</i>     | Baheda     |

Site wise survival, total survival and area verified with GPS are presented in table 5.54. It is evident from the table that survival of plants is found 29.26% which is found very poor. There was 41.76 ha area found deficit as surveyed by GPS.

**Table 5.54** Range wise sites, area and survival of plants in Chakrata Forest Division

| Name of Forest Range | Sample sites      | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-------------------|-----------------|----------------------|-------------------------|------------------------|
| Kanasar Range        | Deoban - 4        | 2012-13         | 12                   | 12                      | 36.67                  |
|                      | Deoban - 6A       | 2012-13         | 6.76                 | 6.76                    | 27.89                  |
|                      | Kanasar 21A       | 2012-13         | 10                   | 10                      | 43.04                  |
|                      | Deoban -9B        | 2012-13         | 7.50                 | 7.50                    | 43.29                  |
|                      | Vayla civil       | 2014-15         | 13                   | 3.20                    | 21.52                  |
|                      | Vayla civil       | 2014-15         | 10                   | 4.81                    | 35.41                  |
| River Range          | Kalsi- 8          | 2012-13         | 9.50                 | 3.92                    | 18.02                  |
|                      | Kalsi- 19         | 2012-13         | 9.50                 | 9.50                    | 20.59                  |
|                      | Kalsi- 7          | 2012-13         | 2                    | 2                       | 22.65                  |
|                      | Kalsi- 2          | 2012-13         | 3.50                 | 1.29                    | 17.03                  |
|                      | Kotha civil       | 2012-13         | 6.30                 | 3.49                    | 30.51                  |
|                      | Kalsi- 26         | 2012-13         | 9.50                 | 9.50                    | 31.68                  |
| Rikhnar Range        | Ekra 13-B         | 2013-14         | 6.57                 | 6.57                    | 36.61                  |
|                      | Kharsi civil      | 2012-13         | 6                    | 6                       | 14.55                  |
|                      | Dudhlog II Kharsi |                 |                      |                         |                        |
| Civil                | 2013-14           | 5               | 5                    | 33.02                   |                        |
|                      | Dudhlog -I        | 2013-14         | 5                    | 5                       | 27.58                  |
|                      | Buawagi Tok       |                 |                      |                         |                        |
| Kharsi Civil         | 2013-14           | 10              | 10                   | 25.76                   |                        |
|                      | Kharsi Civil      | 2015-16         | 8                    | 8                       | 26.97                  |
|                      | Kharsi Civil      | 2015-16         | 6                    | 6                       | 22.42                  |
|                      | Kudog - 23        | 2013-14         | 10                   | 5.03                    | 30.00                  |
|                      | Kudog -I          | 2014-15         | 12                   | 7.11                    | 33.03                  |
|                      | Kudog -II         | 2014-15         | 11.5                 | 5.19                    | 28.79                  |
| Bawar Range          | Mundali C. No. 4B | 2013-14         | 5.5                  | 5.5                     | 40.16                  |
| Deodhar Range        | Sainj Civil       | 2014-15         | 16.88                | 13.5                    | 30.45                  |
| Molta Range          | Khunigadh         | 2012-13         | 5                    | 5                       | 33.81                  |
| <b>Total</b>         |                   |                 | <b>207.01</b>        | <b>161.87</b>           | <b>29.26</b>           |

## 5.28 Upper Yamuna Barkot Forest Division

Upper Yamuna Barkot Forest Division consisted of 5 forest ranges wherein CAMPA plantation were undertaken. A total of 10 sites were sampled and an area of 62 ha was surveyed by the team. The native species in the forests are dominated by chir and banj mixed with banj is distributed in the depressions of the hills. Mahel, padam, khadik, burans, kachnar, chullu etc. are also found distributed in the forests. The species planted under CAMPA are shown in table 5.55 below.

**Table 5.55** List of species planted under CAMPA in Upper Yamuna Barkot Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Quercus leucotrichophora</i> | Banj       |
| 2.     | <i>Arundinaria falcata</i>      | Ringal     |
| 3.     | <i>Fraxinus micrantha</i>       | Anga       |
| 4.     | <i>Juglans regia</i>            | Akhrot     |
| 5.     | <i>Punica granatum</i>          | Dadim      |
| 6.     | <i>Pyrus pashia</i>             | Mehal      |
| 7.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 8.     | <i>Sapindus mukrosii</i>        | Ritha      |
| 9.     | <i>Prunus cerasoides</i>        | Padam      |
| 10.    | <i>Cedrus deodara</i>           | Devdar     |
| 11.    | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 12.    | <i>Prunus armeniaca</i>         | Chullu     |

The survival of plants is very poor (25.30%). Five ha area was found short during survey than the recorded area of plantation (table 5.56).

**Table 5.56** Range wise sites, area and survival of plants in Upper Yamuna Barkot Forest Division

| Name of Forest Range | Sample sites        | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|---------------------|-----------------|----------------------|-------------------------|------------------------|
| Kuthnaur Range       | Pali Sola-A         | 2013-14         | 7                    | 7                       | 26.06                  |
|                      | Kuthnaur soil civil | 2013-14         | 1.0                  | 1.0                     | 25.91                  |
|                      | Pali Soyam          | 2013-14         | 1                    | 1                       | 38.18                  |
|                      | Sar Soyam           | 2013-14         | 8                    | 8                       | 30.11                  |
|                      | Kimdar Soyam        | 2013-14         | 5                    | 5                       | 31.27                  |
| Rawain Range         | Saurnaul Soyam      | 2012-13         | 8                    | 8                       | 14.31                  |
|                      | Barkot 7A           | 2012-13         | 12                   | 12                      | 32.80                  |
| Magarshanti Range    | Molda civil soyam   | 2012-13         | 7.50                 | 7.50                    | 22.12                  |
| Yamnotri Range       | Digdora-6           | 2012-13         | 10                   | 5.62                    | 11.58                  |
| Naugaon Range        | Bhankoli civil      | 2012-13         | 2.50                 | 2.50                    | 20.62                  |
| <b>Total</b>         |                     |                 | <b>62</b>            | <b>57.62</b>            | <b>25.3</b>            |

## 5.29 Haridwar Forest Division

The CAMPA plantation in Haridwar Forest Division was undertaken in 5 forest ranges i.e. Haridwar, Shyampur, Jhilmil, Laksar and Khanpur. The forests are distributed in tropical moist deciduous and tropical dry deciduous types with predominant species of sal, bakli, dhauri, sain, baheda and jamun. Reverain forests consisted of khair-sissoo forests along with gutel and jamun and kan grass. Lantana, Ageratum and Parthenium are the common invasive species also spread in the plantations. The species planted under CAMPA project is shown in the table 5.57 below.

**Table 5.57** List of species planted under CAMPA in Haridwar Forest Division

| Sl.No. | Name of species                    | Local Name   |
|--------|------------------------------------|--------------|
| 1.     | <i>Aegle marmelos</i>              | Bel          |
| 2.     | <i>Bauhinia variegata</i>          | Kachnar      |
| 3.     | <i>Cassia fistula</i>              | Amaltas      |
| 4.     | <i>Cedrela toona</i>               | Toon         |
| 5.     | <i>Dalbergia sissoo</i>            | Shisham      |
| 6.     | <i>Dendrocalamus strictus</i>      | Bans         |
| 7.     | <i>Emblica officinalis</i>         | Amla         |
| 8.     | <i>Ficus rumphii</i>               | Pilkhan      |
| 9.     | <i>Holoptelea integrifolia</i>     | Kanju        |
| 10.    | <i>Jacrandia mimosifolia</i>       | Jacaranda    |
| 11.    | <i>Lagerstroemia flos-reginaea</i> | Jarul        |
| 12.    | <i>Mangifera indica</i>            | Aam          |
| 13.    | <i>Pongamia pinnata</i>            | Kanji        |
| 14.    | <i>Psidium guajava</i>             | Amrood       |
| 15.    | <i>Pterospermum acerifolium</i>    | Kanak Champa |
| 16.    | <i>Syzygium cumini</i>             | Jamun        |
| 17.    | <i>Tectona grandis</i>             | Sagwan       |
| 18.    | <i>Terminalia arjuna</i>           | Arjun        |
| 19.    | <i>Terminalia bellirica</i>        | Baheda       |
| 20.    | <i>Terminalia chebula</i>          | Harad        |
| 21.    | <i>Trewia nudiflora</i>            | Gutel        |

The survival of plants is found 40.60%. About 5 ha plantation area was found short than the recorded area of plantation during survey (table 5.58).

**Table 5.58** Range wise sites, area and survival of plants in Haridwar Forest Division

| Name of Forest Range | Sample sites          | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-----------------------|-----------------|----------------------|-------------------------|------------------------|
| Haridwar Range       | Tigri Pathri          | 2016-17         | 10                   | 10                      | 66.27                  |
|                      | Pathri West           | 2016-17         | 10                   | 10                      | 40.89                  |
|                      | Pathri Central        | 2016-17         | 10                   | 10                      | 42.07                  |
|                      | Pathri East Part - 1  | 2016-17         | 10                   | 10                      | 44.09                  |
|                      | Pathri East Part - 2  | 2016-17         | 10                   | 10                      | 39.73                  |
| Shyampur             | Nalowala I A Plot III | 2014-15         | 10                   | 10                      | 45.82                  |
|                      | Nalowala 2 A          | 2014-15         | 10                   | 10                      | 32.25                  |
|                      | Mithiberi             | 2014-15         | 15                   | 15                      | 37.27                  |
|                      | Nalowala 1A, Plot - 1 | 2014-15         | 10                   | 8.28                    | 45.73                  |
|                      | Nalowala 1A, Plot - 1 | 2016-17         | 10                   | 10                      | 27.18                  |
|                      | Nalowala 1A, Plot - 2 | 2016-17         | 10                   | 10                      | 25.27                  |
|                      | Pilli 2A, Plot - 1    | 2014-15         | 10                   | 10                      | 47.09                  |
|                      | Pilli 2A, Plot - 2    | 2014-15         | 10                   | 10                      | 29.64                  |
|                      | Mithiberi, Plot - 2   | 2014-15         | 15                   | 15                      | 33.45                  |
| Jhilmil Range        | Nalowala 7A Plot II   | 2014-15         | 10                   | 10                      | 42.18                  |
|                      | Nalowala 7 A Vth      | 2016-17         | 9                    | 9                       | 79.56                  |
|                      | Nalowala 3            | 2013-14         | 20                   | 20                      | 68.50                  |

|                        |                              |         |            |               |             |
|------------------------|------------------------------|---------|------------|---------------|-------------|
|                        | Nalowala 9B                  | 2016-17 | 15         | 15            | 38.06       |
|                        | Nalowala 7 A II              | 2016-17 | 13         | 13            | 65.08       |
|                        | Amsot 1A                     | 2015-16 | 11         | 11            | 47.23       |
|                        | Nalowala 7A-1                | 2014-15 | 12         | 12            | 40.33       |
|                        | Nalowala 7A-3                | 2016-17 | 10         | 10            | 34.24       |
|                        | Nalowala 7A-4                | 2016-17 | 10         | 10            | 37.20       |
| Laksar<br>Range        | Dharmapur I                  | 2016-17 | 5          | 5             | 8.15        |
|                        | Dharmapur II                 | 2016-17 | 5          | 1.38          | 22.36       |
|                        | Sherpur                      | 2016-17 | 15         | 15            | 12.15       |
|                        | Jogawala                     | 2016-17 | 10         | 10            | 37.64       |
|                        | Sherpurbella                 | 2015-16 | 10         | 10            | 40.18       |
|                        | Badshahpur Van Block, Plot-1 | 2013-14 | 10         | 10            | 53.09       |
|                        | Badshahpur Van Block, Plot-2 | 2013-14 | 10         | 8.34          | 40.73       |
|                        | Bhogpur Van Block - 1        | 2016-17 | 10         | 10            | 38.27       |
|                        | Bhogpur Van Block - 2        | 2015-16 | 10         | 10            | 34.55       |
|                        | Dharampur Van block          | 2016-17 | 5          | 5             | 53.27       |
| Khanpur<br>Range       | Shahmansur                   | 2013-14 | 20         | 20            | 40.00       |
|                        | Hazara I                     | 2013-14 | 10         | 10            | 40.36       |
|                        | Hazara II                    | 2013-14 | 20         | 20            | 43.22       |
|                        | Sikroda 2A                   | 2016-17 | 10         | 10            | 44.00       |
|                        | Budhvasaheed Poorvi          | 2013-14 | 10         | 7.13          | 36.18       |
|                        | Budhvasaheed Poorvi          | 2016-17 | 10         | 10            | 60.25       |
|                        | Budhvasaheed Pachmi          | 2013-14 | 10         | 8.93          | 50.55       |
|                        | Sikroda 2A-01                | 2013-14 | 10         | 10            | 37.91       |
| Rasiabud<br>Unit Range | Nalowala, Compartment- 6     | 2013-14 | 20         | 20            | 34.80       |
|                        | Nalowala, Compartment- 3     | 2013-14 | 20         | 20            | 26.30       |
|                        | Nalowala Compartment- 4      | 2013-14 | 10         | 10            | 34.20       |
|                        | Nalowala, Compartment- 7A    | 2014-15 | 10         | 10            | 29.64       |
| <b>Total</b>           |                              |         | <b>510</b> | <b>499.06</b> | <b>40.6</b> |

### 5.30 Dehradun Forest Division

CAMPA plantation in Dehradun Forest Division was undertaken in 5 forest ranges i.e. Lacchiwala, Rishikesh, Barkot, Thanu and Asarodhi. A total of 13 plantation's sites were selected and area of 235 ha was surveyed. The natural forests consisted of sal as predominant species along with associated species like sain, baheda, bel, bakli, dhaura, chamror, kanak champa, kala tendu, jamun etc. On river sides, khair-sissoo forests are distributed along with jamun, gutel and kan grass. Lantana, Ageratum and Parthenium weeds are invading in the forests and also found invading in CAMPA plantations. The species planted under CAMPA project in Dehradun forest division is shown in table 5.59 below.

**Table 5.59** List of species planted under CAMPA in Dehradun Forest Division

| Sl.No. | Name of species              | Local Name   |
|--------|------------------------------|--------------|
| 1.     | <i>Acacia catechu</i>        | Khair        |
| 2.     | <i>Aegle marmelos</i>        | Bel          |
| 3.     | <i>Bauhinia variegata</i>    | Kachnar      |
| 4.     | <i>Callistemon viminalis</i> | Bottle brush |
| 5.     | <i>Cassia fistula</i>        | Amaltas      |
| 6.     | <i>Cedrela toona</i>         | Toon         |
| 7.     | <i>Celtis australis</i>      | Khadik       |
| 8.     | <i>Cordia dichotoma</i>      | Lasoor       |

|     |                                 |              |
|-----|---------------------------------|--------------|
| 9.  | <i>Citrus limon</i>             | Lemon        |
| 10. | <i>Dalbergia sissoo</i>         | Shisham      |
| 11. | <i>Delonix regia</i>            | Gulmohar     |
| 12. | <i>Dendrocalamus strictus</i>   | Bans         |
| 13. | <i>Embllica officinalis</i>     | Amla         |
| 14. | <i>Ficus racemosa</i>           | Gular        |
| 15. | <i>Ficus virens</i>             | White Fig    |
| 16. | <i>Holoptelea integrifolia</i>  | Kanju        |
| 17. | <i>Kigelia africana</i>         | Balam kheera |
| 18. | <i>Lagerstroemia parviflora</i> | Dhauri       |
| 19. | <i>Madhuca latifolia</i>        | Mahua        |
| 20. | <i>Mallotus philippinensis</i>  | Rohini       |
| 21. | <i>Mangifera indica</i>         | Aam          |
| 22. | <i>Morus alba</i>               | Shehtoot     |
| 23. | <i>Psidium guajava</i>          | Amrood       |
| 24. | <i>Pterospermum acerifolium</i> | Kanak champa |
| 25. | <i>Sapindus mukrosii</i>        | Ritha        |
| 26. | <i>Schleichera oleosa</i>       | Kusum        |
| 27. | <i>Syzygium cuminii</i>         | Jamun        |
| 28. | <i>Terminalia arjuna</i>        | Arjun        |
| 29. | <i>Terminalia bellirica</i>     | Baheda       |
| 30. | <i>Terminalia chebula</i>       | Harad        |
| 31. | <i>Terminalia tomentosa</i>     | Sain         |

**Table 5.60** Range wise sites, area and survival of plants in Dehradun Forest Division

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Lacchiwala           | Banwaha                        | 2016-17         | 18                   | 18                      | 40.50                  |
| Rishikesh            | Bibiwala                       | 2016-17         | 12                   | 12                      | 26.92                  |
| Thano Range          | Vidhalna - 3                   | 2016-17         | 25                   | 25                      | 47.89                  |
|                      | Vidhalna 1 Part - 1            | 2016-17         | 25                   | 19.7                    | 30.73                  |
|                      | Vidhalna 1 Part - II           | 2016-17         | 25                   | 12.5                    | 27.36                  |
|                      | Soda Block                     | 2016-17         | 25                   | 21.8                    | 6.80                   |
|                      | Soda Block                     | 2014-15         | 25                   | 18.6                    | 4.51                   |
|                      | Soda Block                     | 2015-16         | 20                   | 15.8                    | 3.61                   |
| Asarodhi Range       | Kadwapani Compartment No. 2B   | 2016-17         | 10                   | 10                      | 28.88                  |
| Barkot Range         | Ranipokhori Compartment No.3 B | 2016-17         | 10                   | 10                      | 11.30                  |
|                      | Golatappar                     | 2016-17         | 10                   | 10                      | 25.32                  |
|                      | Jakhan                         | 2016-17         | 20                   | 20                      | 30.27                  |
|                      | Ghamandpur                     | 2016-17         | 10                   | 10                      | 31.64                  |
| <b>Total</b>         |                                |                 | <b>235</b>           | <b>203.4</b>            | <b>24.29</b>           |

Table 5.60 shows that 32 ha plantation's area was found less during survey of recorded areas in the field with the help of GPS. The survival of plants is very poor (24.29%).

### 5.31 Lansdowne Forest Division

Three forest ranges namely, Duggada, Lansdowne and Kotdwar were selected for CAMPA plantations in Lansdowne forest division. An area of 209 ha was surveyed and 23 plantation's sites were selected for monitoring of CAMPA plantations. The natural forests are consisted of chir as predominant species along with mixture of banj, gurial, kilmora, burans, mahel etc. List of species planted under CAMPA is shown in the table 5.61 below.

**Table 5.61** List of species planted under CAMPA in Lansdowne Forest Division

| Sl.No. | Name of species                | Local Name   |
|--------|--------------------------------|--------------|
| 1.     | <i>Acacia catechu</i>          | Khair        |
| 2.     | <i>Adina cordifolia</i>        | Haldu        |
| 3.     | <i>Aegle marmelos</i>          | Bel          |
| 4.     | <i>Albizia lebbeck</i>         | Siris        |
| 5.     | <i>Alstonia scholaris</i>      | Alstomia     |
| 6.     | <i>Azadirachta indica</i>      | Neem         |
| 7.     | <i>Bauganvillea</i>            | Saude        |
| 8.     | <i>Bauhinia variegata</i>      | Kachnar      |
| 9.     | <i>Berberis asiatica</i>       | Kingod       |
| 10.    | <i>Callistemon viminalis</i>   | Bottle brush |
| 11.    | <i>Carissa opaca</i>           | Karonda      |
| 12.    | <i>Cassia fistula</i>          | Amaltas      |
| 13.    | <i>Cassia galuca</i>           | Amaltas      |
| 14.    | <i>Cassia siamea</i>           | Kassod       |
| 15.    | <i>Cedrela toona</i>           | Toon         |
| 16.    | <i>Cedrus deodara</i>          | Deodar       |
| 17.    | <i>Cordia dichotoma</i>        | Lasoor       |
| 18.    | <i>Cinnamomum camphora</i>     | Camphor      |
| 19.    | <i>Dalbergia sissoo</i>        | Shisham      |
| 20.    | <i>Dendrocalamus strictus</i>  | Bamboo       |
| 21.    | <i>Diospyros malenoxylon</i>   | Dhodi        |
| 22.    | <i>Ehretia laevis</i>          | Chamrod      |
| 23.    | <i>Emblica officinalis</i>     | Amla         |
| 24.    | <i>Ficus benghalensis</i>      | Bargad       |
| 25.    | <i>Ficus religiosa</i>         | Pipal        |
| 26.    | <i>Gardenia turgida</i>        | Thanela      |
| 27.    | <i>Gravellia robusta</i>       | Silver oak   |
| 28.    | <i>Holoptelea integrifolia</i> | Kanju        |
| 29.    | <i>Jacranda mimosifolia</i>    | Jacranda     |
| 30.    | <i>Kigelia africana</i>        | Balam kheera |
| 31.    | <i>Lagerstroemia speciosa</i>  | Jarul        |
| 32.    | <i>Mallotus philippinensis</i> | Rohini       |
| 33.    | <i>Mangifera indica</i>        | Aam          |
| 34.    | <i>Mimusops elangi</i>         | Molsri       |
| 35.    | <i>Pongamia pinnata</i>        | Kanji        |

|     |                                 |              |
|-----|---------------------------------|--------------|
| 36. | <i>Psidium guajava</i>          | Amrood       |
| 37. | <i>Pterospermum acerifolium</i> | Kanak champa |
| 38. | <i>Punica granatum</i>          | Dadim        |
| 39. | <i>Putranjiva roxburghii</i>    | Putranjiva   |
| 40. | <i>Quercus leucotrichophora</i> | Banj         |
| 41. | <i>Rubus ellipticus</i>         | Hisar        |
| 42. | <i>Sapindus mukrosii</i>        | Ritha        |
| 43. | <i>Schleichera oleosa</i>       | Kusum        |
| 44. | <i>Shorea robusta</i>           | Sal          |
| 45. | <i>Syzygium cuminii</i>         | Jamun        |
| 46. | <i>Tamarindus indica</i>        | Imli         |
| 47. | <i>Terminalia arjuna</i>        | Arjun        |
| 48. | <i>Terminalia bellirica</i>     | Baheda       |
| 49. | <i>Terminalia chebula</i>       | Harad        |
| 50. | <i>Terminalia tomentosa</i>     | Sain         |
| 51. | <i>Trewia nudiflora</i>         | Gutel        |
| 52. | <i>Zizyphus xylopyrus</i>       | Kathber      |

**Table 5.62** Range wise sites, area and survival of plants in Lansdowne Forest Division

| Name of Forest Range | Sample sites                 | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Dugadda              | Khoh-3                       | 2016-17         | 10                   | 5.7                     | 33.48                  |
|                      | Silgad-9                     | 2016-17         | 12                   | 7.7                     | 40.80                  |
| Lansdowne            | Bhankot-6                    | 2014-15         | 10                   | 10                      | 27.40                  |
|                      | Jadiana                      | 2016-17         | 10                   | 6.7                     | 31.69                  |
|                      | Kura-1                       | 2012-13         | 10                   | 6.01                    | 47.88                  |
|                      | Bhalgoan-civil               | 2016-17         | 4                    | 1.91                    | 16.36                  |
|                      | Bhalgoan-6                   | 2016-17         | 10                   | 10                      | 69.13                  |
|                      | Bhalgoan-5                   | 2012-13         | 10                   | 10                      | 53.00                  |
|                      | Langoor-2                    | 2016-17         | 10                   | 5.17                    | 27.09                  |
|                      | Suradi Civil                 | 2016-17         | 15                   | 8.96                    | 66.97                  |
|                      | Silogi-7                     | 2014-15         | 10                   | 10                      | 54.70                  |
| Kotdwara             | Lalpaani 1B I                | 2016-17         | 10                   | 10                      | 27.55                  |
|                      | Lalpaani 1B II               | 2016-17         | 10                   | 10                      | 38.45                  |
|                      | Sukhrokham                   | 2016-17         | 10                   | 10                      | 27.55                  |
|                      | Malankham                    | 2016-17         | 8                    | 8                       | 19.09                  |
|                      | Sidhbali Kotdwara Motor Road | 2014-15         | 5 km                 | 5 km                    | 54.53                  |
| Laldhang Range       | Gadakothe Civil Van          | 2012-13         | 10                   | 10                      | 49.55                  |
| Kotdi Range          | Dakshini Kotdi Comp 11       | 2015-16         | 10                   | 10                      | 45.09                  |
|                      | Dakshini Kotdi Comp 5A       | 2015-16         | 10                   | 10                      | 49.18                  |
|                      | Dakshini Kotdi Comp 4A       | 2014-15         | 10                   | 10                      | 46.64                  |
| Dogaada              | Tutgadera Part I             | 2015-16         | 10                   | 10                      | 52.18                  |
| Range                | Tutgadera Part II            | 2015-16         | 10                   | 10                      | 50.27                  |
| <b>Total</b>         |                              |                 | <b>209</b>           | <b>180.15</b>           | <b>42.21</b>           |

The survival of plants is found 42.21%. An area of 29 ha was found less when the area was surveyed with GPS.

### 5.32 Kedarnath Wildlife Division Gopeshwar

CAMPA plantation in Kedarnath Wildlife Division was carried out in 3 forest ranges i.e. Gangotri, Ukhimath and Nagnath. A total of 6 plantation's sites and an area of 48 ha were covered for monitoring of plantation. List of species planted under CAMPA is shown in table 5.63 below.

**Table 5.63** List of species planted under CAMPA in Kedarnath Wildlife Division Gopeshwar

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Albizia lebbek</i>           | Siris      |
| 3.     | <i>Bauhinia variegata</i>       | Kachnar    |
| 4.     | <i>Cedrus deodara</i>           | Deodar     |
| 5.     | <i>Cinnamomum tamala</i>        | Tejpatta   |
| 6.     | <i>Dendrocalamus strictus</i>   | Bans       |
| 7.     | <i>Emblica officinalis</i>      | Amla       |
| 8.     | <i>Juglans regia</i>            | Akhrot     |
| 9.     | <i>Mangifera indica</i>         | Aam        |
| 10.    | <i>Pyrus pashia</i>             | Mehal      |
| 11.    | <i>Quercus dilatata</i>         | Moru       |
| 12.    | <i>Quercus leucotrichophora</i> | Banj       |
| 13.    | <i>Quercus semecarpifolia</i>   | Kharsu     |
| 14.    | <i>Rhododendron arboreum</i>    | Burans     |
| 15.    | <i>Sapindus mukrosii</i>        | Ritha      |
| 16.    | <i>Syzygium cuminii</i>         | Jamun      |
| 17.    | <i>Terminalia bellirica</i>     | Baheda     |
| 18.    | <i>Terminalia chebula</i>       | Harad      |

**Table 5.64** Range wise sites, area and survival of plants in Kedarnath Wildlife Division Gopeshwar

| Name of Forest Range | Sample sites                     | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|----------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Ukhimath             | Ukhimath-III, Compartment No. 1  | 2012-13         | 10                   | 10                      | 28.73                  |
| Nagnath              | Pokhri Chamethi                  | 2016-17         | 4.42                 | 4.42                    | 40.80                  |
|                      | Semi Lagga Maithana              | 2016-17         | 12.96                | 12.96                   | 24.95                  |
|                      | Lostu Panthria                   | 2016-17         | 5.94                 | 5.94                    | 18.22                  |
|                      | Lostu Panthari                   | 2016-17         | 4.90                 | 4.90                    | 17.65                  |
|                      | Nagnath Reserve Compartment No.1 | 2012-13         | 10                   | 10                      | 31.18                  |
| <b>Total</b>         |                                  |                 | <b>48.22</b>         | <b>48.22</b>            | <b>26.92</b>           |

The survival of plants is found 26.92% which is very poor (table 5.64).

### 5.33 Nanda Devi Forest Division

The CAMPA plantation was undertaken in 3 forest ranges namely, Valley of Flowers, Joshimath and Govindghat. Nineteen plantation's sites were selected for monitoring of CAMPA plantations with 175.49 ha area was covered. The forests of Nanda Devi forest division are located in temperate and alpine zones which are dominated by deodar, kail, moru, rai, morinda and kharsu oak. It was proposed to plant fruit bearing species under CAMPA to provide food to wild life. The list of species planted under CAMPA is shown in the table 5.65 below.

**Table 5.65** List of species planted under CAMPA in Nanda Devi Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Aesculus indica</i>          | Pangar     |
| 2.     | <i>Bauhinia variegata</i>       | Kanchana   |
| 3.     | <i>Berberis asiatica</i>        | Kilmoda    |
| 4.     | <i>Cedrus deodara</i>           | Deodar     |
| 5.     | <i>Cornus capitata</i>          | Bhamora    |
| 6.     | <i>Cupressus torulosa</i>       | Surai      |
| 7.     | <i>Fraxinus micrantha</i>       | Anga       |
| 8.     | <i>Juglans regia</i>            | Akhrot     |
| 9.     | <i>Melia dubia</i>              | Bakain     |
| 10.    | <i>Pinus wallichiana</i>        | Kail       |
| 11.    | <i>Prinsepia utilis</i>         | Baikar     |
| 12.    | <i>Prunus armeniaca</i>         | Chullu     |
| 13.    | <i>Prunus cerasoides</i>        | Padam      |
| 14.    | <i>Pyrus pashia</i>             | Mehar      |
| 15.    | <i>Quercus leucotrichophora</i> | Banj       |
| 16.    | <i>Quercus semecarpifolia</i>   | Moru Oak   |
| 17.    | <i>Robinia pseudacasia</i>      | Robinia    |
| 18.    | <i>Taxus baccata</i>            | Thuner     |

**Table 5.66** Range wise sites, area and survival of plants in Nanda Devi Forest Division

| Name of Forest Range | Sample sites                      | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|-----------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Valley of Flowers    | Khero Van Panchayat               | 2015-16         | 10                   | 5.2                     | 61.82                  |
|                      | Paikhanda Comp 9                  | 2014-15         | 10                   | 10                      | 57.00                  |
| Joshimath Range      | Malari Civil                      | 2016-17         | 5                    | 5                       | 50.40                  |
|                      | Malari Civil                      | 2016-17         | 10                   | 10                      | 56.63                  |
|                      | Malari Civil                      | 2016-17         | 10                   | 10                      | 53.63                  |
|                      | Sukki Civil                       | 2016-17         | 10                   | 10                      | 41.25                  |
|                      | Sukki Civil                       | 2016-17         | 10                   | 10                      | 32.7                   |
|                      | Sukki Civil                       | 2015-16         | 10                   | 10                      | 25.10                  |
| Govindghat Range     | Arudi-Patudi                      | 2016-2017       | 7.5                  | 7.5                     | 29.71                  |
|                      | Talla Pankhanda Compartment no. 7 | 2015-2016       | 5                    | 5                       | 54.55                  |
|                      | Kailaspur civil I                 | 2016-2017       | 10                   | 10                      | 48.60                  |
|                      | Kailaspur civil II                | 2016-2017       | 10                   | 10                      | 48.63                  |
|                      | Kailaspur civil III               | 2016-2017       | 10                   | 10                      | 26.25                  |
|                      | Kailaspur civil IV                | 2016-2017       | 5                    | 5                       | 54.50                  |
|                      | Joshimath Reserve 2(A)            | 2013-2014       | 11.47                | 11.47                   | 38.44                  |
|                      | Joshimath Reserve 2(B)            | 2013-2014       | 10                   | 4.45                    | 41.36                  |
|                      | Joshimath Reserve 2(B)            | 2013-2014       | 11.520               | 11.50                   | 62.61                  |
|                      | Dronagiri Civil                   | 2016-2017       | 10                   | 10                      | 35.15                  |
|                      | Dronagiri Civil                   | 2015-2016       | 10                   | 10                      | 36.30                  |
| <b>Total</b>         |                                   |                 | <b>175.49</b>        | <b>165.12</b>           | <b>44.98</b>           |

### 5.34 Almora Forest Division

CAMPA plantation in Almora forest division comprised of 5 forest ranges namely, Almora, Dwarahat, Jorasi, Mohan and Ranikhet. A total area of 524 ha was surveyed and it was found that 166 ha area was less than the recorded area (table 5.68). There is wide variation of forest vegetation in the division. The forests are located in tropical, sub-tropical and temperate zones. In tropical zone, khair-sissoo, semal, kanju, kachnar etc. are the main species, in sub-tropical zone, chir is predominant species mix with banj at higher elevation. In temperate zone deodar and kail are predominant species along with oaks and burans trees. Under CAMPA plantations, more than 5 species were planted as per suitability of zones (table 5.67).

**Table 5.67** List of species planted under CAMPA in Almora Forest Division

| Sl.No. | Name of species                | Local Name      |
|--------|--------------------------------|-----------------|
| 1.     | <i>Acacia mollissima</i>       | Wattle          |
| 2.     | <i>Aesculus indica</i>         | Pangar          |
| 3.     | <i>Albizia lebbeck</i>         | Siris           |
| 4.     | <i>Alnus nitida</i>            | Utis            |
| 5.     | <i>Arundinaria falcata</i>     | Ringal          |
| 6.     | <i>Bauhinia purpurea</i>       | Guriyal         |
| 7.     | <i>Bauhinia vahlii</i>         | Molu            |
| 8.     | <i>Berberis asiatica</i>       | Kilmoda         |
| 9.     | <i>Carpinus viminea</i>        | Cham kadik      |
| 10.    | <i>Cedrela toona</i>           | Toon            |
| 11.    | <i>Cedrus deodara</i>          | Devdar          |
| 12.    | <i>Cleistemon vimianils</i>    | Bottle brush    |
| 13.    | <i>Celtis australis</i>        | Khadik          |
| 14.    | <i>Cinnamomum tamala</i>       | Tejpatta        |
| 15.    | <i>Citrus limon</i>            | Nimbu           |
| 16.    | <i>Cupressus torulosa</i>      | Surai           |
| 17.    | <i>Dalbergia sissoo</i>        | Shisham         |
| 18.    | <i>Dendrocalamus strictus</i>  | Bamboo          |
| 19.    | <i>Diploknema butraycea</i>    | Chura           |
| 20.    | <i>Emblica officinalis</i>     | Amla            |
| 21.    | <i>Fraxinus micrantha</i>      | Anga            |
| 22.    | <i>Ficus palmata</i>           | Bedu            |
| 23.    | <i>Ficus virens</i>            | Timla           |
| 24.    | <i>Ginkgo biloba</i>           | Maidenhair tree |
| 25.    | <i>Grevillia robusta</i>       | Silver Oak      |
| 26.    | <i>Grewia optiva</i>           | Bhimal          |
| 27.    | <i>Holoptelea integrifolia</i> | Kanju           |
| 28.    | <i>Jacaranda mimosifolia</i>   | Jacaranda       |
| 29.    | <i>Juglans regia</i>           | Akhrot          |
| 30.    | <i>Leucaena leucocephala</i>   | Subabul         |
| 31.    | <i>Mangifera indica</i>        | Aam             |
| 32.    | <i>Melia dubia</i>             | Bakain          |

|     |                                 |               |
|-----|---------------------------------|---------------|
| 33. | <i>Morus alba</i>               | Shehtoot      |
| 34. | <i>Myrica esculenta</i>         | Kafal         |
| 35. | <i>Prunus armeniaca</i>         | Khumani       |
| 36. | <i>Prunus cerasoides</i>        | Padam         |
| 37. | <i>Prunus persica</i>           | Aadu          |
| 38. | <i>Psidium guajava</i>          | Amrood        |
| 39. | <i>Punica granatum</i>          | Dadim         |
| 40. | <i>Pyracantha crenulata</i>     | Ghingaroo     |
| 41. | <i>Pyrus pashia</i>             | Mehal         |
| 42. | <i>Quercus dilatata</i>         | Faliyant      |
| 43. | <i>Quercus lamellosa</i>        | Manipuri Banj |
| 44. | <i>Quercus leucotrichophora</i> | Banj          |
| 45. | <i>Radermarchera xylocarpa</i>  | Garud         |
| 46. | <i>Rhododendron arboreum</i>    | Burans        |
| 47. | <i>Robinia pseudocasia</i>      | Robinia       |
| 48. | <i>Rubus ellipticus</i>         | Hinsar        |
| 49. | <i>Salix alba</i>               | Salix         |
| 50. | <i>Sapindus mukrosii</i>        | Ritha         |
| 51. | <i>Shorea robusta</i>           | Sal           |
| 52. | <i>Syzygium cuminii</i>         | Jamun         |
| 53. | <i>Taxus baccata</i>            | Thuner        |
| 54. | <i>Terminalia bellirica</i>     | Baheda        |
| 55. | <i>Terminalia chebula</i>       | Harad         |
| 56. | <i>Vinca rosea</i>              | Sadabahar     |
| 57. | <i>Zanthoxylum alatum</i>       | Timru         |

**Table 5.68** Range wise sites, area and survival of plants in Almora Forest Division

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Almora Range         | Khayala Van Panchayat          | 2013-14         | 5                    | 1.5                     | 39.50                  |
|                      | Khayala Van Panchayat          | 2013-14         | 3.5                  | 1.98                    | 34.16                  |
|                      | Chana Lot Pahad                | 2014-15         | 4.52                 | 2.32                    | 24.90                  |
|                      | Mat Van Panchayat              | 2014-15         | 8                    | 2.82                    | 25.00                  |
|                      | Kalimath Compartment-1         | 2015-16         | 5                    | 5                       | 26.91                  |
|                      | Kalimath Compartment-2         | 2015-16         | 5                    | 2.66                    | 24.67                  |
|                      | Balta Civil I                  | 2016-17         | 3                    | 1.90                    | 26.67                  |
|                      | Balta Van Panchayat            | 2013-14         | 6                    | 4.22                    | 23.33                  |
|                      | Balta Civil II                 | 2016-17         | 3                    | 3                       | 26.67                  |
|                      | Matela Civil                   | 2013-14         | 7.50                 | 3.27                    | 25.25                  |
|                      | Uttari Sahidevi Compartment 19 | 2015-16         | 10                   | 3.29                    | 33.09                  |
|                      | Naula Van Panchayat            | 2013-14         | 8                    | 3.21                    | 33.86                  |
|                      | Sarka Van Panchayat            | 2013-14         | 5                    | 3.11                    | 32.00                  |
|                      | Jhijhad Civil                  | 2016-17         | 10                   | 5.19                    | 27.27                  |
|                      | Tatik Civil I                  | 2013-14         | 4                    | 1.74                    | 16.13                  |
|                      | Tatik Civil II                 | 2013-14         | 4                    | 4                       | 17.57                  |
|                      | Shitlakhhet Compartment 6      | 2015-16         | 5                    | 2.88                    | 34.18                  |

|                   |                                   |         |       |       |       |
|-------------------|-----------------------------------|---------|-------|-------|-------|
|                   | Simtola Model Plantation Eco Park | 2014-15 | 5     | 5     | 27.50 |
|                   | Badgal Rautela Van Panchayat      | 2013-14 | 5     | 1.87  | 24.50 |
| Dwarahat<br>Range | Salna Van Panchayat               | 2012-13 | 5     | 2.61  | 11.80 |
|                   | Tadaktal Compartment No. 18       | 2013-14 | 3     | 3     | 11.82 |
|                   | Khida Chak Majhiyakot Civil       | 2015-16 | 5.5   | 3.08  | 49.27 |
|                   | Puniya Bagad Van Panchayat        | 2013-14 | 10    | 3.79  | 14.45 |
|                   | Khida Van Panchayat               | 2013-14 | 10    | 7.16  | 25.55 |
|                   | Khida Van Panchayat               | 2013-14 | 10    | 5.43  | 19.65 |
|                   | Sagnati Civil                     | 2015-16 | 9     | 4.88  | 14.55 |
|                   | Timta Van Panchayat               | 2013-14 | 5     | 1.55  | 8.90  |
|                   | Papoli Van Panchayat              | 2013-14 | 10    | 5.77  | 10.95 |
|                   | Aasheti Van Panchayat             | 2013-14 | 10    | 10    | 6.45  |
| Jorasi<br>Range   | Kelani Civil Tok Jiwadi           | 2012-13 | 10    | 6.15  | 24.15 |
|                   | Kafaltana Civil                   | 2014-15 | 10    | 5.97  | 28.91 |
|                   | Kanaditod Thor                    | 2016-17 | 8     | 6.23  | 22.07 |
|                   | Udiyari Sera Civil                | 2016-17 | 2.5   | 1.52  | 29.00 |
|                   | Dhadoli Van Panchayat             | 2013-14 | 7     | 3.27  | 40.00 |
|                   | Geluwadana                        | 2016-17 | 3     | 1     | 25.20 |
|                   | Kafalgaun Civil                   | 2016-17 | 7     | 3     | 49.02 |
|                   | Kafalgaun Civil                   | 2016-17 | 6     | 2.43  | 45.42 |
|                   | Nawgaun Van Panchayat             | 2012-13 | 10    | 2.33  | 20.10 |
|                   | Mathkhani Civil                   | 2016-17 | 6     | 2.31  | 37.12 |
| Mohan<br>Range    | Kholyo kyari Van Panchayat        | 2014-15 | 10    | 4.14  | 48.60 |
|                   | Boadtalla II                      | 2013-14 | 5     | 3.96  | 46.50 |
|                   | Boadtalla III                     | 2013-14 | 5     | 2.61  | 35.8  |
|                   | Tolyo Tok Jadapani                | 2013-14 | 5     | 2.75  | 32.8  |
|                   | Tolyo Malubagad                   | 2013-14 | 5     | 2.13  | 30.10 |
|                   | Tolyo Van Panchayat Chiplidhad    | 2013-14 | 8     | 3.30  | 26.50 |
|                   | Totam Van Panchayat               | 2014-15 | 5     | 2.54  | 33.27 |
|                   | Totam Van Panchayat               | 2013-14 | 2.5   | 1.40  | 35.45 |
|                   | Tolyo Rata Pani                   | 2013-14 | 5     | 2.41  | 30.50 |
|                   | Boadtalla I                       | 2013-14 | 5     | 1.82  | 39.60 |
|                   | Tadam Van Panchayat               | 2013-14 | 2.50  | 1.18  | 39.69 |
| Ranikhet<br>Range | Kaligad Compartment No. 21        | 2013-14 | 4     | 4     | 39.09 |
|                   | Simoli Van Panchayat              | 2013-14 | 5     | 2.47  | 50.73 |
|                   | Gadi Van Panchayat                | 2012-13 | 5     | 3.78  | 23.85 |
|                   | Purvi Chobutiya Compartment No. 5 | 2015-16 | 4     | 4     | 38.36 |
|                   | Khagyar Civil                     | 2016-17 | 13.50 | 13.50 | 42.11 |
|                   | Khagyar Civil                     | 2015-16 | 5.5   | 3.16  | 39.72 |
|                   | Shilagi Civil                     | 2016-17 | 3.5   | 3.5   | 42.50 |
|                   | Sauni Compartment No. 22          | 2013-14 | 5     | 5     | 42.00 |
|                   | Sauni Compartment No. 33          | 2016-17 | 6     | 6     | 50.42 |
|                   | Sauni Compartment No. 33          | 2016-17 | 4     | 4     | 50.94 |
|                   | Sauni Compartment No. 33          | 2015-16 | 10    | 7.43  | 59.73 |
|                   | Pantgoun Van Panchayat            | 2012-13 | 6.5   | 6.5   | 24.75 |
|                   | Dharad Van Panchayat              | 2013-14 | 5     | 5     | 39.73 |
|                   | Sauni Van Panchayat               | 2012-13 | 5.50  | 3.43  | 32.60 |
|                   | Malla Dabar Van Panchayat         | 2013-14 | 5     | 5     | 14    |
|                   | Maji Gaun Civil                   | 2016-17 | 5.50  | 5.50  | 28.88 |
|                   | Maji Gaun Civil                   | 2016-17 | 10    | 10    | 37.18 |
|                   | Maji Gaun Civil III               | 2015-16 | 3     | 1.37  | 47.27 |
|                   | Maji Gaun Civil II                | 2015-16 | 2.5   | 1.25  | 30.91 |

|                                  |         |               |            |              |
|----------------------------------|---------|---------------|------------|--------------|
| Saguda Civil                     | 2015-16 | 12.50         | 12.50      | 39.64        |
| Saguda Civil                     | 2015-16 | 12            | 12         | 28.55        |
| Saguda Civil                     | 2016-17 | 4             | 4          | 29.69        |
| Villekhe Van Panchayat           | 2014-15 | 10            | 7.76       | 19.09        |
| Villekhe Van Panchayat           | 2015-16 | 3.50          | 3.50       | 15.28        |
| Matela Manihar Van Panchayat     | 2015-16 | 5             | 5          | 45.45        |
| Chilliyanaula Compartment No. 6  | 2015-16 | 6             | 6          | 65.91        |
| Gudoli Civil                     | 2016-17 | 9.50          | 9.50       | 26.60        |
| Dugauda Van Panchayat            | 2012-13 | 10            | 10         | 20.25        |
| Jaana Van Panchayat              | 2012-13 | 9.50          | 5.07       | 25.61        |
| Jaana Van Panchayat              | 2016-17 | 4             | 4          | 55.00        |
| Manbajuna Van Panchayat          | 2013-14 | 5             | 3.72       | 55.09        |
| Manbajuna Van Panchayat          | 2013-14 | 3             | 3          | 42.42        |
| Dwarso Reserve Compartment No. 2 | 2013-14 | 5             | 5          | 22.73        |
| Baburkhola Van Panchayat         | 2013-14 | 5             | 3.38       | 13.64        |
| <b>Total</b>                     |         | <b>524.02</b> | <b>358</b> | <b>31.62</b> |

The average survival of plants is found low (31.62%).

### 5.35 Garhwal Forest Division

CAMPA plantation in Garhwal Forest Division was carried out in 6 forest ranges namely, Deva Dumakot, Pechni Ameli, Paithani, Pauri, Pokhra and Purvi Ameli. Monitoring of CAMPA plantation was carried out in 26 sampled sites and 235.30 ha area was surveyed. The natural forests of the division are distributed in three zones; tropical, sub-tropical and temperate. The tropical zone consisted of forests of khair, kanju, dhak, shisham, jamun, semal etc. The sub-tropical forests are dominated by chir which is mixed with banj oak at higher elevation. In temperate zone, deodar, kail are predominant species with oaks and burans. The species planted under CAMPA is shown in table 5.69.

**Table 5.69** List of species planted under CAMPA in Garhwal Forest Division

| Sl.No. | Forest Division                 | Average Survival (%) |
|--------|---------------------------------|----------------------|
| 1.     | <i>Acacia ariculiformis</i>     | Australian kikar     |
| 2.     | <i>Acacia catechu</i>           | Khair                |
| 3.     | <i>Acacia mollissima</i>        | Wattle               |
| 4.     | <i>Aegle marmelos</i>           | Bail                 |
| 5.     | <i>Aesculus indica</i>          | Pangar               |
| 6.     | <i>Albizia lebbek</i>           | Siris                |
| 7.     | <i>Alnus nitida</i>             | Utis                 |
| 8.     | <i>Artocarpus heterophyllus</i> | Kathal               |
| 9.     | <i>Arundinaria falcata</i>      | Ringal               |
| 10.    | <i>Bauhinia variegata</i>       | Kachnar              |
| 11.    | <i>Bombax cieba</i>             | Semal                |
| 12.    | <i>Cedrela toona</i>            | Toon                 |
| 13.    | <i>Cedrus deodara</i>           | Devdar               |
| 14.    | <i>Cordia dichotoma</i>         | Lasoor               |
| 15.    | <i>Cinnamomum tamala</i>        | Tejpatta             |

|     |                                 |               |
|-----|---------------------------------|---------------|
| 16. | <i>Citrus sinensis</i>          | Malta         |
| 17. | <i>Dalbergia sissoo</i>         | Shisham       |
| 18. | <i>Dendrocalamus strictus</i>   | Bamboo        |
| 19. | <i>Fraxinus micrantha</i>       | Anga          |
| 20. | <i>Euonymus lacerus</i>         | Angu          |
| 21. | <i>Ficus palmata</i>            | Bedu          |
| 22. | <i>Ficus virens</i>             | Timla         |
| 23. | <i>Grevellia robusta</i>        | Silver Oak    |
| 24. | <i>Holoptelea integrifolia</i>  | Kanju         |
| 25. | <i>Leucaena leucocephala</i>    | Subabul       |
| 26. | <i>Mallutus philippinensis</i>  | Rohini        |
| 27. | <i>Melia dubia</i>              | Bakain        |
| 28. | <i>Morus alba</i>               | Shehtoot      |
| 29. | <i>Myrica esculenta</i>         | Kafal         |
| 30. | <i>Pinus roxburghii</i>         | Chir          |
| 31. | <i>Prunus cerasoides</i>        | Padam         |
| 32. | <i>Prunus persica</i>           | Aadu          |
| 33. | <i>Psidium guajava</i>          | Amrood        |
| 34. | <i>Punica granatum</i>          | Anar          |
| 35. | <i>Pyrus pashia</i>             | Mehal         |
| 36. | <i>Quercus floribunda</i>       | Tilonj        |
| 37. | <i>Quercus lamellosa</i>        | Manipuri Banj |
| 38. | <i>Quercus leucotrichophora</i> | Banj          |
| 39. | <i>Robinia pseudacasia</i>      | Robinia       |
| 40. | <i>Sapindus mukrosii</i>        | Ritha         |
| 41. | <i>Syzygium cuminii</i>         | Jamun         |
| 42. | <i>Tamarinus indica</i>         | Imli          |
| 43. | <i>Terminalia bellirica</i>     | Baheda        |
| 44. | <i>Terminalia chebula</i>       | Harad         |
| 45. | <i>Terminalia tomentosa</i>     | Sain          |

**Table 5.70** Range wise sites, area and survival of plants in Garhwal Forest Division

| Name of Forest Range | Sample sites               | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|----------------------------|-----------------|----------------------|-------------------------|------------------------|
| Deva Range           | Deva II Compartment No. 4A | 2014-15         | 10                   | 8.14                    | 35.20                  |
| Dhumakot             | Deva III Compartment No. 1 | 2014-15         | 10                   | 8.98                    | 36.80                  |
|                      | Kamdai Civil               | 2013-14         | 10                   | 5.21                    | 31.60                  |
|                      | Talai Civil                | 2013-14         | 10                   | 6.90                    | 25.30                  |
|                      | Kolri Civil                | 2013-14         | 10                   | 6.09                    | 32.40                  |
|                      | Deva IV Compartment No. 15 | 2012-13         | 10                   | 7.60                    | 28.00                  |
|                      | Dabrad Compartment No. 5   | 2012-13         | 10                   | 7.44                    | 33.91                  |
|                      | Kuirali Civil              | 2014-15         | 6                    | 6                       | 31.97                  |
|                      | Takoli Civil               | 2014-15         | 6                    | 4.15                    | 32.12                  |

|                                   |                           |         |              |               |              |
|-----------------------------------|---------------------------|---------|--------------|---------------|--------------|
| Pachmi<br>Ameli Range<br>Damdeval | Ukal Civil                | 2014-15 | 10           | 10            | 39.18        |
| Paithani<br>Range                 | Baishwada Civil I         | 2014-15 | 5            | 5             | 40.36        |
|                                   | Baishwada Civil II        | 2014-15 | 11           | 6             | 41.32        |
|                                   | Baishwada Civil III       | 2014-15 | 4            | 4             | 37.27        |
| Pauri Range<br>Nagdev             | Dobh Shrikot Gadwagad     | 2014-15 | 11.22        | 11.22         | 40.50        |
|                                   | Kaldungh Civil            | 2014-15 | 11.12        | 11.12         | 37.85        |
|                                   | Shrikot Civil             | 2014-15 | 8.22         | 6.27          | 31.21        |
|                                   | Koti Civil                | 2014-15 | 8.22         | 6.34          | 27.42        |
|                                   | Nayalgadh Civil           | 2014-15 | 11           | 11            | 30.17        |
|                                   | Jhopdiyo Civil            | 2013-14 | 10           | 10            | 30.20        |
|                                   | Chadigaon Civil           | 2014-15 | 8.22         | 4.57          | 29.09        |
| Pokhra<br>Range                   | Chorkinda<br>Civi         | 2013-14 | 10           | 6.30          | 38.40        |
| Purvi Ameli<br>Thalisain          | Paphadiyana Civil Part I  | 2013-14 | 4.50         | 3.45          | 37.64        |
|                                   | Paphadiyana Civil Part II | 2013-14 | 5.50         | 3.65          | 31.45        |
|                                   | Panjikhal Part I          | 2013-14 | 11           | 11            | 29.82        |
|                                   | Panjikhal Part II         | 2013-14 | 10           | 10            | 28.40        |
|                                   | Panjikhal Part III        | 2013-14 | 14.30        | 14.30         | 30.21        |
| <b>Total</b>                      |                           |         | <b>235.3</b> | <b>194.73</b> | <b>33.38</b> |

There was a shortage of 40.57 ha of plantation's area when the area was surveyed with GPS (table 5.70).

### 5.36 Tehri Dam-1 Forest Division

The CAMPA plantation in Tehri Dam -1 forest division was undertaken in 5 forest ranges i.e Tehri dam, Dharmaganga, Balganga, Nailchami and Dharkot. The natural forests of CAMPA plantation sites are located in the sub-tropical zone where chir is the pre –dominant species. The list of species planted is indicated in the table 5.71 below.

**Table 5.71** List of species planted under CAMPA in Tehri Dam- I Forest Division

| Sl.No. | Name of species               | Local Name |
|--------|-------------------------------|------------|
| 1.     | <i>Aesculus indica</i>        | Pangar     |
| 2.     | <i>Albizia lebbeck</i>        | Siris      |
| 3.     | <i>Alnus nitida</i>           | Utis       |
| 4.     | <i>Arundinaria falcata</i>    | Ringal     |
| 5.     | <i>Bauhinia retusa</i>        | Semla      |
| 6.     | <i>Bauhinia variegata</i>     | Kachnar    |
| 7.     | <i>Cedrela toona</i>          | Toon       |
| 8.     | <i>Cedrus deodara</i>         | Devdar     |
| 9.     | <i>Cinnamomum tamala</i>      | Tejpatta   |
| 10.    | <i>Dendrocalamus strictus</i> | Bamboo     |
| 11.    | <i>Emblica officinalis</i>    | Amla       |
| 12.    | <i>Fraxinus micrantha</i>     | Anga       |
| 13.    | <i>Jugland regia</i>          | Akhrot     |

|     |                                 |               |
|-----|---------------------------------|---------------|
| 14. | <i>Morus alba</i>               | Shehtoot      |
| 15. | <i>Prunus cerasoides</i>        | Padam         |
| 16. | <i>Pyrus pashia</i>             | Mehal         |
| 17. | <i>Quercus lamellosa</i>        | Manipuri Banj |
| 18. | <i>Quercus leucotrichophora</i> | Banj          |
| 19. | <i>Rubus ellipticus</i>         | Hisar         |

The survival of plants and names of sample sites are presented in table 5.72. The survival of plants is 47.78% which is found satisfactory. There was a shortage of about 9 ha recorded area when it was measured by GPS.

**Table 5.72** Range wise sites, area and survival of plants Tehri Dam-I Forest Division

| Name of Forest Range | Sample sites                                                 | Plantation year               | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%)  |
|----------------------|--------------------------------------------------------------|-------------------------------|----------------------|-------------------------|-------------------------|
| Tehri Dam Range      | Dargi<br>Sawayam                                             | 2014-15                       | 10                   | 10                      | 48.00                   |
| Dharamganga Range    | Titrona Sawayam<br>Kot Sawayam                               | 2014-15<br>2013-14            | 10<br>5              | 8.43<br>5               | 47.10<br>42.20          |
| Balganga Range       | Jaspur Sawayam<br>Silyara Sawayam                            | 2014-15<br>2013-14            | 10<br>5              | 8.1<br>5                | 49.27<br>48.40          |
| Nailchami Range      | Kandar Gaon Soyam<br>That Sawayam<br>Saruna Maye Bariyarkuda | 2013-14<br>2014-15<br>2014-15 | 5<br>10<br>10        | 3.38<br>8.30<br>8.26    | 49.60<br>46.70<br>44.90 |
| Dharkot Range        | Dadak Namey Tok<br>Petav Sawayam<br>Vridhu Namey Tok         | 2014-15<br>2013-14<br>2014-15 | 5<br>5<br>5          | 5<br>5<br>5             | 47.20<br>51.80<br>50.40 |
| <b>Total</b>         |                                                              |                               | <b>80</b>            | <b>71.47</b>            | <b>47.78</b>            |

### 5.37 Binog Wildlife Sanctuary Forest Division

The CAMPA plantation in Binog Wildlife Sanctuary Forest Division was undertaken in 3 compartments of Binog Wildlife Sanctuary range. The wildlife sanctuary was created from Mussoorie forest division and the natural vegetation is predominant by deodar mix with burans and oaks. List of species undertaken for CAMPA plantation is shown in table 5.73 below. The survival of plants is found 37.48% (table 5.74).

**Table 5.73** List of species planted under CAMPA in Binog Wildlife Sanctuary Forest Division

| Sl.No. | Name of species                 | Local Name |
|--------|---------------------------------|------------|
| 1.     | <i>Quercus leucotrichophora</i> | Banj       |
| 2.     | <i>Arundinaria falcata</i>      | Ringal     |
| 3.     | <i>Cedrus deodara</i>           | Devdar     |
| 4.     | <i>Fraxinus micrantha</i>       | Anga       |
| 5.     | <i>Prunus cerasoides</i>        | Padam      |
| 6.     | <i>Robinia pseudacasia</i>      | Robinia    |

**Table 5.74** Range wise sites, area and survival of plants in Binog Wildlife Sanctuary Forest

| Name of Forest Range | Sample sites                   | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Binog                | Binog Beat Compartment No. 6   | 2014-15         | 10                   | 10                      | 35.91                  |
| Wildlife             | Binog Beat Compartment No. 9   | 2014-15         | 5                    | 5                       | 41.27                  |
| Sanctuary            | Bhadraj Beat Compartment No. 7 | 2014-15         | 5                    | 5                       | 35.27                  |
| <b>Total</b>         |                                |                 | <b>20</b>            | <b>20</b>               | <b>37.48</b>           |

### 5.38 Gangotri National Park

The Gangotri National Park is idyllically situated in the natural surroundings of Uttarkashi. The national park falls under the bio-geographical zone and located at an altitude of 1,800 meters to 7,083 meters above sea level. It is lavishly spread over an area of 2,390 sq km. Only deodar was planted under CAMPA in Gangotri range in 10 ha of area. The survival of deodar is found good (67%) (Tables 5.75 and 5.76).

**Table 5.75** List of species planted under CAMPA in Gangotri National Park Division

| Sl.No. | Name of species       | Local Name |
|--------|-----------------------|------------|
| 1.     | <i>Cedrus deodara</i> | Devdar     |

**Table 5.76** Range wise sites, area and survival of plant in Gangotri National Park

| Name of Forest Range | Sample sites                         | Plantation year | Area in Journal (ha) | Area marked by GPS (ha) | Survival of plants (%) |
|----------------------|--------------------------------------|-----------------|----------------------|-------------------------|------------------------|
| Gangotri Range       | Gangotri Compartment No.-1A (Devgad) | 2014-15         | 10                   | 10                      | 67                     |
| <b>Total</b>         |                                      |                 | <b>10</b>            | <b>10</b>               | <b>67</b>              |

### 6.0

# Field Observations

1. Stone wall fencing was created in most of the plantation's sites for the protection of plants as the stones are easily available in hilly areas. In the plains, some sites were found protected from barbed wire fencing. In wildlife areas, trenches around plantation sites were dug. However, fencing was not found effective in protection of plants against wild animals such as wild boar, bear, porcupine, elephants, deer, ghoral etc. The fencing was found broken at several places. The fencing trenches were filled with soil and invasive species like lantana and grasses have found grown. Domestic cattle of villagers are also caused damage to plants due to grazing and trampling. Although watchers were engaged but still plants were damaged.
2. Forest fire incidents occurred in plantation areas during fire season. Plants were also found killed by forest fires. Fire protection measures were not found sufficient in many sites.
3. The plantations were under heavy anthropological pressure due to presence of nearby villages.
4. Regeneration of banj, burans, mahel, shisham, chir, deodar, sal etc. was observed in plantation's sites which require to be protected and enhanced under CAMPA activities.
5. The recorded plantation's area mentioned in the plantation journal was found less than the area measured by GPS during field survey in many sites.
6. Weeds like Karonda, Eupatorium, Tungla, Dhola, Rambans, Lantana, Ageratum, Parthenium, Hisalu, Tiliari etc. were invading in most of the plantation's sites. At riverain sites, kan (Saccharam) grass has suppressed plants in Haridwar and Dehradun Forest Divisions.
7. Survival of plants were found to be satisfied in wildlife protected areas than other areas.

8. Soil erosion is a common feature on higher slopes. Gully plugging in those areas is carried out by construction of series of check dams with the help of local materials like boulders or chir needles. However, check dams and water harvesting ponds (chaal-khaal) were not maintained. Soil and water conservation measures like trenches, contour bunds or terraces were not made for soil and moisture conservation in sloppy areas. Landslide and soil erosion is a common feature in such sites.
9. Some of the sites were not found to be suitable for the species. Such sites are having shallow soils, rocky and very low moisture and nutrient contents. Site selection for plantations under CAMPA should be selected after thorough technical investigation.
10. On hilly terrain, spacing of plants were not accurate as mentioned in plantation journals but in the plain areas, spacing of plants were found correct.
11. The Plantation Journals of each site were available but there was no inspection notes of senior officers found in the journals.

### 7.0

# Lesson Learned and Recommendations

From the available evidence, the monitoring of plantations conducted by FRI, Dehradun concluded that the schemes viz., CAMPA was able to contribute substantially towards the state and central government goal of enhancing forest cover and reclamation of degraded lands. The project activities will result in positive environmental impacts and will also result in enhancing biological richness.

#### 7.1 Lesson learned

The monitoring and evaluation of plantations under Uttarakhand CAMPA scheme highlighted following lessons, which may require follow-up action to enhance future outcomes and outputs:

1. **Plantation record maintenance:** The present analysis found that there were significant number of sites where the inspection of senior forest officers were not done and recorded in the plantation journals which is a serious problem with respect to monitoring and future implementation of activities. It seems that senior officers of forest department are not serious about maintenance and protection of plants under CAMPA schemes.
2. **Protection of plantations:** The field data indicates that at many sites protection measures were not present or were inefficient in providing protection to the newly planted samplings especially from human being, wild animals and from stray cattle. In many sites, plantations were damaged due to browsing and grazing. Plants are also succumbed due to forest fires in many sites. It is, therefore, necessary to provide forest fire control tools to field staff. Forest staff must be trained enough for handling forest fires. Fire lines should be constructed around plantation sites for fire protection. Stone wall fencings or barbed wire fencings are found broken by wild animals. Trench fencing is also not successful and it is filled again by soil or covered by weeds.
3. **Plantation of exotics:** The present monitoring also found that the exotic species were also planted. It is imperative to plant more diverse and local species under CAMPA for enhancing the benefits of plantations, in terms of land reclamation, carbon sequestration and biodiversity conservation.

4. **Soil and water conservation:** It was also found that soil and water conservation measures were feeble considering the fact that there such measures were not adopted in majority of the sites. The soil and water conservation measures are important for enhancing the productivity of the land, recharge water table and improve the water regime in the plantation sites. In the long run, such measures play significant role in improving the survival rate of plantations by improving the productivity and by increasing soil moisture content. It would be prudent, if the soil and water conservation component is compulsorily included in the plantation programmes and annual work plans. There is need to maintain the SMC works. Number of Chaal-Khaal should be increased for harvesting rain water and for improvement of hyderology of forests.
5. **GIS and Remote Sensing:** It was observed that the GIS based planning has not been adopted for taking up plantation and soil and water conservation activities in sites selected for plantation. With the simple and easy to use GIS based technology, it becomes very easy to map all plantation patches for further review, monitoring and assessment on regular basis.
6. **Area of Plantations:** The field survey indicates that the actual plantation areas of about 90% plantation sites were found less than the recorded area. The area was surveyed by GPS. The area of plantation could have been marked with GPS coordinates.
7. **Availability of Plants:** The dead plants should be replaced with similar species. For this about 20% plants of each species should be kept as reserve in nurseries for replacement.

## 7.2. Recommendations

Although the findings of the plantation monitoring presents an encouraging picture, however there are several steps which are suggested be taken up to enhance the outcomes and outputs of the plantations.

1. **Site specific APO for the plantation:** It is imperative to conduct site suitability analysis of the sites well in advance before taking up plantation activities. Some sites were not selected keeping in view of species and biotic pressure. Such sites could have been avoided by the forest department. The advance plantations works must be started after observation of suitability of sites for the plantations. The parameters such as soil characteristics, species suitability, topographic and locality factors should be considered under such assessments prior to plantation planning in a site. It was observed that some sites are not suitable for plantations as people throw garbage in plantation's area and stray cattle menace was also seen. Officials at field level should keep good liasoning with Panchayat representatives to protect the plantation from grazing or other such biotic pressures. Sites with shallow soils, rocky and low nutrients and high slopes should be avoided. The allocation of revenue lands must be investigated thoroughly for their suitability.
2. **Use of Remote Sensing and GIS:** The degraded lands affected by various land degradation drivers such as land slides, erosion, dryness, regular forest fires and other biotic pressures in the state should be mapped. Such degraded lands can be reclaimed and rehabilitated by taking up plantation activities. The GIS and remote sensing techniques are considered to be very helpful in providing more realistic and measurable data.

3. **Adoption of Silviculture and Genetically improved varieties:** Evidences from the field surveys and data analysis suggests that the plantation forestry is likely to be sustainable in terms of wood yield in most of the sites provided good practices are maintained. Adoption of improvised silviculture techniques and plantation of genetically improved tree may enhance crop productivity. Since, silvicultural practices and genetic selection are geared to increase the speed of tree growth and shortening rotation periods which is imperative to achieve the goals and targets stated in the Uttarakhand State Forest Policy. Fast grown trees need to be pruned as those trees produced 2-3 leaders from the ground level. Singling will improve growth of trees. Plant to plant spacing should strictly be followed. Thinning in plantation should be carried out to maintain proper spacing of plants. Weeds like Parthenium, tiliari, tungla, eupatorium, lantana, Cannabis and Ageratum have assumed alarming proportions at many sites. These should preferably be removed before flowering, or before seed formation starts in these weeds. Natural regeneration of desired species like sal, deodar, mahel, kachnar, papdi, kanju etc. should be protected, encouraged and developed under CAMPA activities. Use of tall plants in easy accessible areas will increase survival of plants.
4. **Research needs:** Rapid assessment of biological richness in the plantation sites need to understand the impact of plantation on biodiversity. It should also be a part of CAMPA project.
5. **Plantation of medicinal and aromatic plants:** It is imperative to cultivate medicinal and aromatic plant considering their conservation importance and its economic benefits for the local communities.
6. **Avoiding Man-Animals conflicts:** In wild life prone areas, patures should be developed with planting of grasses, fodder and fruit trees to contain wild life in the forests. This will help to control man-animal conflicts if enough food is available in the forests. It is also imperative to control forest fires so as to reduce man-animal conflicts.
7. **Plantation of multi purposes tree species (MPTS):** The MPTS plantations will be of significant importance in meeting the local needs and for providing alternative livelihood options for the forest dependent communities. The MPTS plantations will also result in enhancing the local's economic conditions.
8. **Proper plantation inventory maintenance:** Proper inventory of plantation activities are essential on all plantation sites to track issues, pitfall and for course correction for enhancing outcomes.
9. **Involvement of local communities under CAMPA:** The field staff needs to be trained with respect to the latest plantation techniques and in forest fire control. Their capacity needs to be enhanced on latest advancements in the field of plantation forestry. Local community should be involved in protection and maintenance of plantations through Van Panchayats by giving some incentives. There is a need to have stakeholders' consultation before selecting the plantation species so as to meet the local's desire and needs.
10. **Adoption of best practices on land reclamation and restoration:** The best practices developed elsewhere with similar geographic conditions should be adopted for plantation activities and for enhancing soil moisture regime in the state.



(a)



(b)



(c)



(d)



(e)



(f)

**Photos:** (a) Laying out sample plot at plantation site  
(b) Height measurement of the plant  
(c) Barbed wire fencing around plantation site  
(d) Patch of planted Devdar (*Cedrus deodara*) at plantation site  
(e) Height measurement of the plant  
(f) Stone wall fencing at plantation site



(a)



(b)



(c)



(d)



(e)



(f)

- Photos:**
- (a) Laying out sample plot
  - (b) Stone wall fencing around plantation site
  - (c) Diameter measurement of the plant
  - (d) Patch of Devdar (*Cedrus deodara*) at plantation site
  - (e) View of plantation site
  - (f) Height measurement of the plant



(a)



(b)



(c)



(d)



(e)



(f)

**Photos:** (a) View of the plantation site  
(b) Sign Board at plantation site  
(c) Chaal-Khaal (water hole) found at plantation site  
(d) Height measurement of the plant  
(e) Laying out sample plot at plantation site  
(f) Stone wall fencing around plantation site



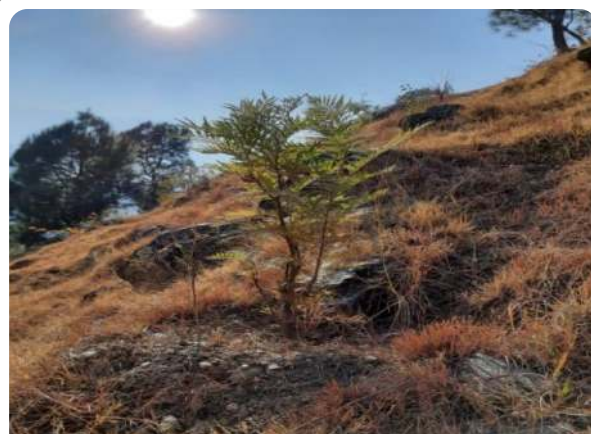
(a)



(b)



(c)



(d)



(e)



(f)

- Photos:**
- (a) Height measurement of the plant
  - (b) Animal dung found at plantation site
  - (c) View of plantation site
  - (d) Silver Oak (*Grevillia robusta*) at the plantation's site
  - (e) Tree guard for protection of the sapling
  - (f) Chaal-Khal (water hole) found at plantation site



(a)



(b)



(c)



(d)



(e)



(f)

**Photos:** (a) Banj (*Quercus leucotricophora*)  
(b) Devdar (*Cedrus deodara*)  
(c) Padam (*Prunus cerasoides*)  
(d) Kachnar (*Bauhinia variegata*)  
(e) Khair (*Acacia catechu*)  
(f) Kanju (*Holoptelea integrifolia*)

# References

- Kumar M, Singh H, Pandey R, Singh MP, Ravindranath NH, Kalra N (2019) Assessing vulnerability of forest ecosystem in the Indian Western Himalayan region using trends of net primary productivity. *Biodivers Conserv* 28 (8-9):2163-2182
- Forest Survey of India (2017) State of Forest Report, FSI, Dehradun
- Forest Survey of India (2019) State of Forest Report, FSI, Dehradun
- NIC (2019). Uttarakhand Forest, Govt of Uttarakhand

# **APPENDICES**

## Appendix-2.1

# CAMPA guidelines of Uttarakhand



जहाँ है हरियाली ।  
वहाँ है खुशहाली ॥

Ministry of Environment and Forests, Government of India

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The Guidelines on State Compensatory Afforestation Fund Management  
and Planning Authority  
(State CAMPA)

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Dated 2nd July 2009

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## **Guidelines on State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)**

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### **Introduction**

Guidelines for establishing CAMPAs in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilising funds received towards Compensatory Afforestation, Net Present Value (NPV), etc., currently available with the Adhoc CAMPA.

The guidelines, prepared are, by and large, in line with the discussions held in the meeting of the Chief Secretaries, have the objective to assist the States/UT's for setting up the requisite mechanism and are in consonance with the directions issued from time to time by the Hon'ble Supreme Court.

These guidelines have desired flexibility; therefore the States/UTs would be able to notify the State level CAMPAs keeping in view specific conditions prevailing there.

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## **Overarching Objectives and Core Principles**

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1. An Authority to be known as the "State Compensatory Afforestation Fund Management and Planning Authority" (State CAMPA) is intended as an instrument to accelerate activities for preservation of natural forests, management of wildlife, infrastructure development in the sector and other allied works.
2. The State CAMPA would presently receive monies 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.
3. The State CAMPA would administer the amount received from the Adhoc CAMPA and utilize the monies 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.
4. State CAMPA would serve as a common repository of funds accruing on account of compensatory afforestation and NPV. It would deploy funds as per guidelines governing the use of funds for conservation, protection and management of forests. The amounts would also be deployed for wildlife preservation and enhancement of wildlife habitats.
5. 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 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). The amount received by it will also be utilized for providing residential accommodation to the field staff and necessary machines and equipments to them. These include appropriate arrangement for their conveyance during inspections and protection duty. In short, the department would be modernized to protect and regenerate the forests and wildlife habitat.
6. The State CAMPA may decide to utilize a minor part of its funds for contractual engagement of personnel wherever there is shortage of personnel. This should be done cautiously to avoid recurring revenue expenditure on the State Government. It may also take up State-specific activity relevant to the State, in keeping with the core objectives.
7. The State CAMPA would also promote a voluntary movement of youth and students for supporting conservation activities initiated / ongoing in the State Forest Department.
8. Aims and Objectives  
State CAMPA shall seek to promote:
  - a. conservation, protection, regeneration and management of existing natural forests;
  - b. conservation, protection and management of wildlife and its habitat within and outside protected areas including the consolidation of the protected areas;
  - c. compensatory afforestation;
  - d. environmental services, which include:-
    - i. provision of goods such as wood, non-timber forest products, fuel, fodder and water, and provision of services such as grazing, tourism, wildlife protection and life support;
    - ii. regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes;
    - iii. non-material benefits obtained from ecosystems, spiritual, recreational, aesthetic, inspirational, educational and symbolic; and

- iv. supporting such other services necessary for the production of ecosystem services, biodiversity, nutrient cycling and primary production.
  - e. Research, training and capacity building.
9. The Functions of State CAMPA shall include, inter alia–
- i. funding, overseeing and promoting compensatory afforestation done in lieu of diversion of forest land for non-forestry use under the Forest (Conservation) Act, 1980
  - ii. overseeing forest and wildlife conservation and protection works within forest areas undertaken and financed under the programme.
  - iii. maintaining a separate account in respect of the funds received for conservation and protection of Protected Areas.
  - iv. creating transparency for the programme and mobilizing citizen support; and
  - v. earmarking up to two percent of the funds for monitoring and evaluation.
10. Establishment of a State CAMPA
- 1. The State Government may establish the Compensatory Afforestation Fund Management and Planning Authority (State CAMPA) in the State. There shall be credited into the account of State CAMPA:
    - i. Amount transferred to it by the ad-hoc CAMPA.
    - ii. receipt of all monies from user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, Net Present Value (NPV), Catchment Area Treatment Plan or any money for compliance of conditions stipulated by the Central Government while according approval under the provisions of the Forest (Conservation) Act, 1980;
    - iii. the unspent funds already realized by States from user agencies and not transferred yet to the Adhoc Compensatory Afforestation Fund Management and Planning Authority for crediting into the Fund by respective States;
    - iv. the funds recoverable from user agencies in cases where forest land diverted falls within the protected areas, that is, areas notified under sections 18, 26A or 35 of the Wildlife (Protection) Act, 1972 for undertaking activities relating to the protection of biodiversity and wildlife, which would be maintained under a separate head; and
    - v. Net Present Value of the forest land diverted for non-forestry purposes, collected under the Forest (Conservation) Act, 1980 and the rules and the guidelines made thereunder and in pursuance of the judgment of the Supreme Court dated the 29<sup>th</sup> October 2002 from user agencies. And
  - 2. The State Government may also credit to the State CAMPA–
    - a. grants or aid received if any;
    - b. any loan taken by the Authority or any borrowings made by it; and
    - c. any other sums received by the Authority by way of benefaction, gift or donations.
  - 3. The monies received in the State CAMPA shall be kept in interest-bearing account(s) in nationalized bank(s).and periodically withdrawn for the works as per the Annual Plan of Operations (APOs) approved by the Steering Committee.
11. Utilization of the money: The money available with the state CAMPA shall be utilized for meeting:
- i. expenditure towards the development, maintenance and protection of forests and wildlife management as per the approved APO;
  - ii. the non-recurring as well as recurring expenditure for the management of the State CAMPA, including the salary and allowances payable to its officers and other employees, by utilizing a part of the income from interest received by on funds invested by State CAMPA, but excluding income from funds recoverable from the user agencies in cases where forest land diverted falls within the protected areas, that is, areas notified under sections 18, 26A or 35 of the Wildlife (Protection) Act, 1972 for undertaking activities related to protection of biodiversity and wildlife;

- iii. the expenditure incurred on monitoring and evaluation subject to overall ceiling of 2% of the amount to be spent every year; and
- iv. disbursement on such other projects related to forest conservation.

12. Disbursement of funds:

1. The money received for compensatory Afforestation, additional compensatory afforestation, penal compensatory afforestation, Catchment Area Treatment Plan and for any other site specific scheme may be used as per site-specific schemes submitted by the State along with the approved proposals for diversion of forest land under the Forest (Conservation) Act, 1980.
2. After receipt of the money, State CAMPA shall accomplish the afforestation for which money is deposited in the Compensatory Afforestation Fund within a period of one year or two growing seasons after project completion, as may be appropriate.
3. The money received on account of Net Present Value (NPV) shall be used for natural assisted regeneration, forest management, protection, infrastructure development, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities.
4. Monies realized from the user agencies in pursuance of the Hon'ble Supreme Court's orders or decision taken by the National Board for Wildlife involving cases of diversion of forest land in protected areas shall form a distinct corpus and shall be used exclusively for undertaking protection and conservation activities in protected areas of the State.
5. State CAMPA shall release monies to the field officers in predetermined installments as per the Annual Plan of Operation (APO) finalized.

13. State CAMPA shall consist of a Governing Body, a Steering Committee and an Executive Committee.

14. (1) The Governing body of the state CAMPA shall consist of the following:

|       |                                        |   |                  |
|-------|----------------------------------------|---|------------------|
| I.    | Chief Minister                         | - | Chairperson      |
| II.   | Minister of Forests                    | - | Member           |
| III.  | Minister of Finance                    | - | Member           |
| IV.   | Minister of Planning                   | - | Member           |
| V.    | Chief Secretary                        | - | Member           |
| VI.   | Principal Secretary (Finance)          | - | Member           |
| VII.  | Principal Secretary (Planning)         | - | Member           |
| VIII. | Principal Chief Conservator of Forests | - | Member           |
| IX.   | Chief Wildlife Warden                  | - | Member           |
| X.    | Secretary (Forests)                    | - | Member Secretary |

The Governing Body shall lay down the broad policy framework for the functioning of State level CAMPA and review its working from time to time.

14 (2). The Steering Committee of State CAMPA shall consist of the following:

|        |                                                                                                                                     |   |             |
|--------|-------------------------------------------------------------------------------------------------------------------------------------|---|-------------|
| i)     | Chief Secretary                                                                                                                     | - | Chairperson |
| ii)    | Principal Chief Conservator of Forests                                                                                              | - | Member      |
| iii)   | Principal Secretary (Forests)                                                                                                       | - | Member      |
| iv)    | Principal Secretary (Finance)                                                                                                       | - | Member      |
| v)     | Principal Secretary (Planning)                                                                                                      | - | Member      |
| (vi)   | Chief Wildlife Warden                                                                                                               | - | Member      |
| (vii)  | Nodal Officer                                                                                                                       | - | Member      |
| (viii) | A representative of the Ministry of Environment & Forests                                                                           | - | Member      |
| (ix)   | Two eminent NGO's to be nominated by the State Government for a period of 2 years at a time who shall be eligible for re-nomination | - | Member      |

- (x) Chief Conservator of Forests (Plan/Schemes) – Member Secretary 14 (3) The Steering Committee shall:
- i. lay down and / or approve rules and procedures for the functioning of the body and its Executive Committee, subject to the overarching objectives and core principles of State CAMPA;
  - ii. monitor the progress of the utilization of funds released by the State CAMPA;
  - iii. approve the Annual Plan of Operation (APO) prepared by the Executive Committee;
  - iv. approve the annual reports and audited accounts of the State CAMPA;
  - vi. ensure inter-departmental coordination;
  - vii. meet at least once in six months.

15(1) The Executive Committee shall consist of the following:

- |      |                                                                                                                                           |   |                  |
|------|-------------------------------------------------------------------------------------------------------------------------------------------|---|------------------|
| i.   | Principal Chief Conservator of Forests                                                                                                    | - | Chairperson      |
| ii.  | Chief Wildlife Warden                                                                                                                     | - | Member           |
| iii. | Chief Conservator of Forests (Plan/Schemes)                                                                                               | - | Member           |
| iv.  | Financial Controller/Financial Adviser in the<br>O/o the Principal Chief Conservator of Forests                                           | - | Member<br>Member |
| v.   | Two eminent NGO's to be nominated by the<br>State Government for a period of 2 years at a<br>time who shall be eligible for re-nomination |   |                  |
| vi.  | Nodal Officer                                                                                                                             | - | Member Secretary |

2. The State level Executive Committee shall –

- i. take all steps for giving effect to the State CAMPA and overarching objectives and core principles, in accordance with rules and procedures approved by the Steering Committee and the approved APO;
- ii. prepare the APO of the State for various activities, submit it to the Steering Committee before end of December for each financial year, and obtain the Steering Committee's concurrence for release of funds, while giving break-up of the proposed activities and estimated costs;
- iii. supervise the works being implemented in the State out of the funds released from the State CAMPA;
- iv. be responsible for proper auditing of both receipt and expenditure of funds;
- v. develop the code for maintenance of the account at the implementing agency level;
- vi. submit reports to the Steering Committee for review / consideration; and
- vii. prepare Annual Report by end-June for each financial year.

16. Accounting Procedure

1. State CAMPA shall prepare, in such form and at such time in each financial year as may be prescribed, its budget for the next financial year, showing the estimated receipts and expenditure of the State CAMPA.
2. State CAMPA shall adopt financial regulations and procedures, in particular the procedure for approval and implementing the APO.
3. State CAMPA shall maintain proper accounts and other relevant records and prepare an annual statement of accounts in such form as may be prescribed in consultation with the Accountant General concerned.
4. The accounts of the State CAMPA shall be audited by the Accountant General at such intervals as may be specified by him and any expenditure incurred in connection with such audit shall be payable by the Authority to the Accountant General.
5. The Accountant General and any other person appointed by him in connection with the audit of the accounts of the State CAMPA shall have the same rights and privileges and authority in connection with such audit as the Accountant General generally has in connection with the audit of the Government accounts and, in particular, shall have the right to demand the production of books, accounts, connected vouchers and other documents and papers and to inspect the office of the State CAMPA.

6. The accounts of the State CAMPA as certified by the Accountant General or any other person appointed by him in this behalf together with the audit report thereon and annual report, shall be forwarded annually to the State Government, the MoE&F and the Adhoc CAMPA by the State CAMPA.
  7. The State Government and the MoE&F shall have the power to conduct special audit or performance audit of the State CAMPA.
  8. The Annual Report shall provide, inter alia, for:
    - i. the details of various works done and the amount spent;
    - ii. the details of the amount received by the State CAMPA from various sources; and
    - iii. the observations made in the audit report.
17. Monitoring and evaluation of the works
1. An independent system for concurrent monitoring and evaluation of the works implemented in the States utilizing the funds available shall be evolved and implemented to ensure effective and proper utilization of funds.
  2. The National CAMPA advisory council shall have the powers to order special inspection and financial audit of works executed by the State CAMPA with utilizing CAMPA money.
  3. If satisfied that the funds released are not being utilized properly, the National CAMPA advisory council as well as the State level Steering Committee shall have the power to withhold or suspend the release of remaining funds or part thereof.
18. National CAMPA Advisory Council
1. A National CAMPA Advisory Council shall be established. It will
    - i. Lay down broad guidelines for State CAMPAs;
    - ii. Regularly monitor and evaluate, in consultation with states, projects being undertaken by state CAMPAs.
    - iii. Facilitate scientific, technological and other assistance that may be required by state CAMPAs
    - iv. Make recommendations to state CAMPAs based on a review of their plans and programmes.
    - v. Provide a mechanism to state CAMPAs to resolve issues of an inter- state or Centre-state character.
  2. The composition of the Council shall be as follows:
 

|                                                                                                                                          |   |                  |
|------------------------------------------------------------------------------------------------------------------------------------------|---|------------------|
| i. Minister of Environment and Forests                                                                                                   | : | Chairperson      |
| ii. Three PCCF's by rotation with a term of one year each.                                                                               | : | Member           |
| iii. two environmentalist / conservationists /<br>scientists / economists / social scientists<br>with a non-renewable term of two years. | : | Member           |
| iv. Director General Forests &<br>Special Secretary, MoE&F                                                                               | : | Member           |
| v. IG (Forest Conservation), MoE&F                                                                                                       | : | Member Secretary |

The existing establishment of adhoc CAMPA would be utilized as secretariat to the National CAMPA Advisory Council. The expenditure will be met out of the provision kept for Monitoring and Evaluation of the programme.

19. In addition to the above out of the interest received / accrued so far with the Ad hoc CAMPA, a suitable amount, with the permission of the Supreme Court, will be retained by the Adhoc CAMPA and will be utilized as per the specific schemes as approved by the National CAMPA Advisory Council. These will include monitoring and evaluation of schemes implemented in the States or the UTs utilizing CAMPA money, setting up of institutes, societies, center of excellence in the field of forest and wildlife, pilot schemes, standardization of codes/ guidelines, etc., for the sector.

## Appendix-2.2

### Compensatory Afforestation Fund (CAF) Rules, 2018

#### MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (Forest Conservation Division) NOTIFICATION New Delhi, the 10th August, 2018

G.S.R. 766(E).-Whereas, the Central Government in exercise of the powers conferred by sub-section (i) of section 30 of the Compensatory Afforestation Fund Act, 2016 (38 of 2016), published the draft Compensatory Afforestation Fund Rules, 2018 vide the Government of India in the Ministry of Environment and Climate Change notification number G.S.R. 172(E), dated the 16th February, 2018, in the Gazette of India, Extraordinary, Part-II, Section 3, sub-section (i), dated the 17th February, 2018 for inviting objections and suggestions from persons likely to be affected thereby, before the expiry of thirty days from the date on which copies of the Gazette containing the said notification were made available to the general public;

And whereas, copies of the Gazette in which the said notification was published, were made available to the general public on the 17th February, 2018;

And whereas, the objections and suggestions received in respect of the said draft rules within the specified period have been considered by the Central Government;

Now, therefore, in exercise of the power conferred by sub-section (1) and (2) of section 30 of the Compensatory Afforestation Fund Act, 2016 (38 of 2016), read with section 22 of the General Clauses Act, 1897, the Central Government in consultation with the State Government hereby makes the following rules, namely:-

1. Short title and commencement.-These rules may be called the Compensatory Afforestation Fund Rules, 2018.
2. Definitions.-(1) In these rules, unless the context otherwise requires,-
  - a. "Act" means the Compensatory Afforestation Fund Act, 2016 (38 of 2016);
  - b. "annual plan of operation" means the annual plan for physical activities and financial provisions approved by the National Authority or State Authority as the case may be, which describes milestones, conditions for success and explains how, a strategic annual plan will be put into operation during the financial year in given budgetary term, and containing inter alia, brief description, estimated cost, basis for cost estimation, agency identified for execution and time schedule of each activity to be executed from State Fund during a year;
  - c. "Form" means a form appended to these rules;
  - d. "section" means a section of the Act;
  - e. "third party monitoring" means monitoring and evaluation of works executed from National

Fund and State Fund by the parties which are external to a project's direct beneficiary chain and management structure having no conflict of interest on parameters of evaluation as determined by the National Authority over and above the baseline to assess whether desired social, environmental or other impacts are being achieved and undesirable impacts avoided;

- f. "Village Forest Management Committee" means a committee constituted for joint forest management by the competent authority in the State;
  - g. "working plan" means the management plan of forest land prepared and approved by the competent authority under the National Working Plan Code published by the Ministry of Environment, Forests and Climate Change for sustainable management of forests and biodiversity in India;
2. The words and expressions used and not defined in these rules but defined in the Act, the Indian Forest Act 1927 (16 of 1927), the Wildlife (Protection) Act 1972 (53 of 1972), the Forest (Conservation) Act 1980 (69 of 1980), the Biological Diversity Act, 2002 (18 of 2003) and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007) and the rules made under these Acts, shall have the meanings respectively assigned to them in those Acts and rules.
  3. Management of National Fund.-The National fund shall be managed according to the provisions of the Government Accounting Rule 1990 and the General Financial Rules, 2017 as applicable from time to time.
  4. Management of State Fund.-The State Fund shall be managed according to the provisions of the State Financial Rules or any such rules applicable from time to time in a State.
  5. Manner of utilisation of net present value.-(1) The monies received towards net present value deposited in the State Fund shall be used in the manner provided in sub-rule (2) and sub-rule (3).
  6. Not less than eighty percent of the monies referred to in sub-rule (1) shall be used for following activities for the forest and wildlife management in a State, namely:
    - a. assisted natural regeneration;
    - b. artificial regeneration ;
    - c. silvicultural operations in forests;
    - d. protection of plantations and forests;
    - e. pest and disease control in forest;
    - f. forest fire prevention and control operations;
    - g. soil and moisture conservation works in the forest;
    - h. voluntary relocation of villages from protected areas;
    - i. improvement of wildlife habitat as provided in the approved wildlife management plan or working plan;
    - j. planting and rejuvenation of forest cover on non-forest land falling in wildlife corridors;
    - k. establishment, operation and maintenance of animal rescue centre and veterinary treatment facilities for wild animals;
    - l. supply of wood-saving cooking appliances and other forest produce saving devices in forest fringe villages as specified by the National Authority from time to time;
    - m. management of biological diversity and biological resource.

**Explanation:** In cases where funds towards wildlife management and conservation plans are specifically collected and deposited in State Fund, then the same shall be spent for wildlife management in specified wildlife area and not from the net present value.

7. Not more than twenty per cent. of the monies referred to in sub-rule (1) shall be utilised for strengthening of the forest and wildlife related infrastructure, capacity building of the personnel involved in utilisation of State Fund namely:

- a. establishment, up-gradation and maintenance of modern nurseries and other planting stock production facilities for production of quality planting materials;
- b. promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land and folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.
- c. purchase and maintenance of equipment or devices used for communication and information technology for the purpose of protection of forest and wildlife;
- d. construction, up-gradation and maintenance of inspection paths, forest roads in forest area, fire lines, watch towers, check posts and timber depots;
- e. construction of residential and official buildings in forests for front line staffs deployed for protection of forest and wildlife;
- f. casual engagement of local people or labours to assist regular staff of State Forest Department for works for protection of forest and wildlife undertaken from State Fund;
- g. survey and mapping of forest areas for forest fire control, compensatory afforestation works, soil and moisture conservation, catchment area treatment and wildlife management for preparing annual plans to be executed from the State Fund;
- h. independent concurrent monitoring and evaluation and third party monitoring of various works undertaken from State Fund;
- i. publicity-cum-awareness programme and exhibition on the various schemes being implemented by the State Authority from State Fund;
- j. production and distribution of quality planting material through certified nurseries at subsidised price for promotion of trees outside forests on Government lands promoted by State Government;
- k. forest certification and development of certification standards:

Provided that in case the activities referred to in sub rules (2) and (3) are to be undertaken in the forest land under the administrative control of the Forest Department of State Government, then the said activities shall be carried out as per the working plan:

Provided further that the said activities over forest land under the control of State Forest Department of State Government and being managed as per the working plan shall be taken up in consultation with the Gram Sabha or Village Forest Management Committee, as the case may be, and shall be in consonance with the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007) and the guidelines issued thereunder, wherever applicable:

Provided also that in case the said activities are to be undertaken in areas not covered by the approved working plan then activities referred to in sub rules (2) and (3) shall be taken up in consultation with concerned Gram Sabha or Village Forest Management Committee or any authority having jurisdiction over that area, as the case may be, and shall be in consonance with the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007) and guidelines issued thereunder, wherever applicable.

8. The monies referred to in sub-rule (1) shall not be used for following activities, namely:-
  - a. payment of salary, travelling allowances, medical expenses, etc. to regular, contractual and casual employees of the State Forest Department for implementing programmes in various forest divisions undertaken from the State Fund;
  - b. undertaking foreign visits;
  - c. payment for legal services for defending cases filed in Tribunals or Courts not related to the management of State Authority;

- d. purchase of vehicles or staff cars for officers and heavy vehicles and machines for the State Forest Department for implementing programmes in various forest divisions undertaken from the State Fund;
- e. construction of residential and official buildings for officers above the Forest Range Officer of the State Forest Department for implementing programmes in various forest divisions undertaken from the State Fund;
- f. leasing, hiring and purchase of land for afforestation purposes;
- g. purchase of furniture, office equipment, fixtures including air conditioners, and generator sets for residences and offices of the State Forest Department for implementing programmes in various forest divisions undertaken from the State Fund;
- h. mandatory afforestation as per the working plan in the forest in blanks created by commercial felling of trees for revenue generation undertaken under working plan prescription;
- i. undertaking forest and wildlife conservation and other activities undertaken under other schemes of the Government for the purpose of part financing the scheme for completing left over works or complementary works of such schemes;
- j. establishment, expansion and up-gradation of zoo and wildlife safari;
- k. providing financial support, either by way of grant or equity to existing or for setting up new forest corporations, boards, etc.

**Explanation 1.** While preparing the annual plan of operation for activities referred to in this rule,-

- a. priority shall be given to undertake identified activities in those villages which have been affected due to diversion of forest land;
- b. priority shall be given to undertake those identified activities which has employment potential for local communities and creates community assets for the benefit of local community;
- c. afforestation and plantation of indigenous plant species shall be undertaken in consultation with the local community dependent on forest.

**Explanation 2.:** The mixing of the monies received towards net present value shall not be allowed with any other state schemes under implementation from any other budget either for capital or spill over works and the works undertaken under sub-rule (2) and sub-rule (3) shall be on standalone basis and there shall not be any duplication of permitted works under different components.

9. Utilisation of interest accrued on deposits in State Fund.-The interest accrued on monies in the State Fund shall be used in the following manner:
- a. not less than sixty per cent. of the interest transferred to the State Fund and further accrued on the amount available in the State Fund referred to in sub-rule (1) shall be spent on activities for the purpose of conservation and development of forest and wildlife namely:
    - i. to offset the incremental cost of compensatory afforestation and penal compensatory afforestation at the increased wage rates;
    - ii. to offset the incremental cost of catchment area treatment plan at the increased wage rates;
    - iii. to offset the incremental cost of wildlife management plan at the increased wage rates;
    - iv. for disbursement of salary and allowances of members and staffs, both regular and contractual, of the State Authority;
    - v. for disbursement of sitting fees and allowances to nominated members of the State Authority;
    - vi. activities referred to in sub-rules (2) and (3) of rule 5;
  - b. not more than forty per cent. of the interest transferred to the State Fund and further accrued on the amount available in the State Fund shall be spent for the non-recurring and recurring expenditure of the State Authority, namely:-
    - i management of office establishment;
    - ii. office equipment including computers and peripherals and its maintenance for the State Authority;

- iii. hiring of staff cars for the use of the officers and officials of the State Authority;
- iv. hiring of buildings on lease for the office establishment and residences of the officers of State Authority;
- v. other contingencies for management of the State Authority, with the approval of the steering committee of the State Authority;
- vi. any other activity for management of the forests and wildlife not referred to in sub-rules (2) and (3) with the prior approval of the steering committee of the State Authority and included in the annual plan of operation.

**Explanation.:** Under no circumstances mixing of the interest accrued on the monies in the State Fund shall be allowed with any other State budget either for capital or spill over works and the works undertaken under this rule shall be on standalone basis and there shall not be any duplication of permitted works under different components.

- 10. Appointment of Chief Executive Officer of National Authority.-The Chief Executive Officer of the National Authority referred to in sub-section (5) of section 8 shall be appointed on deputation basis for a period not exceeding five years under Central Staffing Scheme of the Ministry of Environment, Forest and Climate Change.
- 11. Appointment of Officers of National Authority.-The officers referred to in sub-section (4) and sub-section (5) of section 9 shall be appointed on deputation basis from the Central Government, State Government or Union territory under Non-Central Staffing Scheme of the Ministry of Environment, Forest and Climate Change.
- 12. Appointment of Chief Executive Officer of State Authority.-The Chief Executive Officer of the State Authority referred to in sub-section (7) of section 10 shall be appointed on deputation basis for a period not exceeding five years by the State Government.
- 13. Appointment of Officers of State Authority.-The officers referred to in sub-section (4) and sub-section (5) of section 11 shall be appointed on deputation basis by the State Government.
- 14. Pay and allowances of officers.-The officers referred to in rules 7,8,9 and 10 shall be entitled to such pay and allowances as are admissible to the equivalent officers of the Central Government of Group 'A'.
- 15. Pay and Allowances of Officials.-The officials referred to in sub-section (5) of section 9 and sub-section (5) of section 11 and appointed on deputation basis shall be entitled to such pay and allowances as are admissible to the equivalent officials of the Central Government of Group "B" or Group 'C', as the case may be.
- 16. Pay and Allowances of Officials appointed on Contract Basis.-The officials referred to in sub-section (5) of section 9 and sub-section (5) of section 11 and appointed on contract basis shall be entitled to such pay and allowances as are specified in their contract.
- 17. Sitting Fees and Allowances of non-official Members.
  - i. The non-official members of the National Authority and State Authority shall be paid such sitting fees and allowances, for attending the meetings and for any other work assigned to them, as may be specified in the order of their appointment.
  - ii. The sitting fee and allowances to be paid to the non-officials member of the National Authority referred to in the sub-rule (1) shall be paid from the National Fund as provided in sub-clause (i) of clause (b) of section 5.
  - iii. The sitting fee and allowances to be paid to the non-officials member of the State Authority referred in the sub rule (1) shall be paid from the interest referred to in clause (a) of rule 6.

**18. Selection of non-official Members of National Authority**

- i. The Central Government shall seek nomination from various Ministries or Departments of the Central Government, State Government and Union territory Administration for non-official members of National Authority.
- ii. The Ministry or Department referred to in sub-rule (1) shall forward the names of the non-official members with full credentials for consideration to the Central Government.
- iii. The non-official members referred to in sub-rule (1) shall be resident of India holding a Bachelor's Degree from a recognised University or equivalent in related field having work experience of ten years in the related field in the Central Government, State Government, Non-Government Organisation, Recognised Research Institute or University.
- iv. The non-official members referred to in sub-rule (1) shall not be employees of the Government: Provided that educational qualification and experience for the Scheduled Caste and the Schedule Tribe nominee may be relaxed by the Central Government on recommendation of the National Authority.

**19. Selection of non-official Members of State Authority**

- i. The Department of the State Government dealing with forests shall seek nomination from various Departments of the State Government, or Union territory Administration for non-official members of State Authority.
- ii. Departments of the State Government, District Administration of the State or Union territory shall forward the names for the non-official members of the State Authority with full credentials to the Department of the State Government dealing with forests for consideration.
- iii. The non-official members referred to in sub-rule (1) shall be resident of India holding a Bachelor's Degree from a recognised University or equivalent in related field having work experience of ten years in the related field in the Central Government, State Government, Non-Government Organisation, Recognised Research Institute or University.
- iv. The non-official members referred to in sub-rule (1) should not be employees of the Government:

Provided that educational qualification and experience for the Scheduled Caste and the Schedule Tribe nominee may be relaxed by the State Government on recommendation of the State Authority.

**20. Selection Committee.-(1) The Selection Committee to prepare the panel of eligible candidates for appointment of non-official members of the National Authority shall comprise of the following, namely:**

- i. Secretary, Ministry of Environment, Forest and Climate Change, Government of India
- ii. One Secretary from any other Ministry of the Central Government to be nominated by the Ministry of Environment, Forest and Climate Change, Government of India
- iii. One Chief Secretary from the State Government to be nominated by the Ministry of Environment, Forest and Climate Change, Government of India
- iv. Director General of Forests and Special Secretary, Ministry of Environment, Forest and Climate Change, Government of India
- v. Additional Director General of Forests (Forest Conservation), Ministry of Environment, Forest and Climate Change, Government of India
- vi. Additional Director General of Forests (Wildlife), Ministry of Environment, Forest and Climate Change, Government of India-Chairman - member.
- vii. Chief Executive Officer of the National Authority - Member - Secretary.

**2. The Selection Committee to prepare the panel of eligible candidates for appointment of non-official members of the State Authority shall comprise of the following, namely:-**

- i. Chief Secretary of the State - Chairman;
- ii. Additional Chief Secretary or Principal Secretary in-charge of the Forest Department in the State

- iii. One Additional Chief Secretary or Principal Secretary or Secretary in the State Government nominated by the State Government -Member
  - iv. Principal Chief Conservator of Forests (Head of Forest Force) -Member;
  - v. Chief Wildlife Warden of the State - Member;
  - vi. Head of the concerned Regional Office of the Ministry of Environment, Forest and Climate Change -Member
  - vii. Chief Executive Officer of the State Authority -Member- Secretary.
21. Disqualifications of non-official members of National Authority and State Authority
1. A person shall be disqualified for being appointed as a non-official member of the National Authority and State Authority, if he -
    - i. has been convicted and sentenced to imprisonment for an offence which, in the opinion of the Central Government or the State Government, as the case may be, involves moral turpitude; or
    - ii. is an un-discharged insolvent; or
    - iii. is of unsound mind and stands so declared by the competent court; or
    - iv. has been removed or dismissed from the service of the Government or other organisation or undertaking owned by the Government; or
    - v. has, in the opinion of the Central Government or the State Government, as the case may be, such financial or other interest in the National Authority and State Authority, as the case may be, as is likely to affect the duties discharged by him as a member.
  2. No order of removal shall be made by the Central Government or the State Government under this section unless the member concerned has been given a reasonable opportunity of showing cause against the same.
  3. Notwithstanding anything contained in this rule, a member who has been removed under this section shall not be eligible for re-nomination as a member.
  4. If a non-official member of the National Authority or State Authority becomes subject to any of the disqualifications referred to in sub-rule (1), his seat shall become vacant.
22. Meeting of the Governing Body, Executive Committee and monitoring group of the National Authority.
1. The governing body of the National Authority shall meet on such date and place as may be decided by its Chairperson in consultation with the Member-Secretary of the governing body to consider the issues listed in the agenda prepared by the Member-Secretary.
  2. The executive committee of the National Authority shall meet on such date and place as may be decided by its Chairperson in consultation with the Member-Secretary of the executive committee to consider the issues listed in the agenda prepared by the Member-Secretary.
  3. The monitoring group of the National Authority shall meet at on such date and place and agenda as may be decided by the Director General, Forest survey of India, Ministry of Environment, Forests and Climate Change, Government of India.
23. Notice of Meeting.-For any meeting of the governing body, executive committee or monitoring group five days clear notice shall be given to the members, excluding the day of the posting of notice and day of the meeting:
- Provided that in case of urgency, the Member-Secretary of the governing body, executive committee and monitoring group of the National Authority, as the case may be, shall be competent to convene the meeting at a short notice with the approval of the Chairperson of the respective body.
24. **Quorum of Meeting:** One half of the members including the Chairperson shall constitute the quorum at any meeting of the governing body, executive committee or monitoring group, as the case may be, and any fraction shall be rounded off to the next higher number.

25. **Adjournment of Meeting:** Where a quorum is not present within thirty minutes of the time notified for the commencement of the meeting, the same shall stand adjourned to the same day, time and place the following week, and the members present at the adjourned meeting shall form the quorum.
26. **Decision in Meeting:** The decisions in the meeting shall be by a simple majority of the members present and voting.
27. **Meeting to be Chaired by Chairpersons, etc.:** Every meeting of the National Authority shall be chaired by the Chairperson and in his absence, by any member of the concerned body as decided by the said body.
28. **Meetings of Governing Body, Steering Committee and Executive Committee of State Authority:**
1. The governing body of the State Authority shall meet on such date and place as may be decided by its Chairperson in consultation with the Member-Secretary of the governing body to consider the issues listed in the agenda prepared by the Member-Secretary.
  2. The steering committee of the State Authority shall meet on such date and place as may be decided by its Chairperson in consultation with the Member-Secretary of the steering committee to consider the issues listed in the agenda prepared by the Member-Secretary.
  3. The executive committee of the State Authority shall meet on such date and place as may be decided by its Chairperson in consultation with the Member-Secretary of the executive committee to consider the issues listed in the agenda prepared by the Member-Secretary.
29. **Notice of Meeting:** For any meeting of the governing body, steering committee or executive committee five days clear notice shall be given to the members, excluding the day of the posting of notice and the day of the meeting:
- Provided that in case of urgency, the Member-Secretary of the governing body, steering committee or executive committee as the case may be shall be competent to convene the meeting at a short notice with the approval of the chairperson of the respective body.
30. **Quorum of Meeting:** One half of the members including the Chairperson shall constitute the quorum at any meeting of the governing body, steering committee or executive committee, as the case may be, and any fraction shall be rounded off to the next higher number.
31. **Adjournment of Meeting:** Where a quorum is not present within thirty minutes of the time notified for the commencement of the meeting, the same shall stand adjourned to the same day, time and place the following week, and the members present at the adjourned meeting shall form the quorum.
32. **Decision in Meeting:** The decisions in the meeting shall be by a simple majority of the members present and voting.
33. **Meeting to be Chaired by Chairpersons, etc.:** Every meeting of the State Authority shall be chaired by the Chairperson and in his absence, any member of the concerned body as decided by the said body.
34. **Financial regulation and procedures of National Authority:** The financial regulation and procedures, in particular the procedure for drawing up and implementing the budget of the National Authority shall be in accordance with the General Financial Rules 2017 and the orders issued by the Central Government from time to time in this regards.

35. **Preparation of Budget of National Authority:** The National Authority shall prepare its budget for the next financial year showing the estimated receipts and expenditure of National authority in Form- I based on the annual plan of operation including various schemes of the National Authority prepared and approved by the governing body for the next financial year, showing the estimated receipts and expenditure of the National Authority and forward the same to the Central Government in each financial year by the 31st December.
36. **Maintenance of accounts and preparation of annual statement of accounts by National Authority:** The monthly statement of accounts for the receipt and payment and expenditure shall be prepared in Form-II and annual statement of accounts of the National Authority shall be prepared in Form-III, and the National authority shall maintain the records and accounts in Form-IV.
37. **Annual Reports:** The annual report shall be prepared by the National Authority giving brief description of all activities undertaken from National Fund with separate headings and compiled in separate chapters and the reports shall include summary of works undertaken and schemes prepared and approved in annual plan of operation, and the annual report shall be in Form-V.
38. **Financial regulation and procedures of State Authority:** The financial regulation and procedures, in particular the procedure for drawing up and implementing the budget of the State Authority shall be in accordance with the General Financial Rules 2017 and the orders issued by the Central Government and State Government from time to time in this regards.
39. **Preparation of budget of State Authority:** The State Authority shall prepare its budget for the next financial year showing the estimated receipts and expenditure of State Authority in Form-VI based on the annual plan of operation prepared and approved by the governing body for the next financial year, showing the estimated receipts and expenditure of the State Authority and forward the same to the State Government and Central Government in each financial year by the 31st December.
40. **Maintenance of accounts and preparation of annual statement of accounts by State Authority:** The monthly statement of accounts shall be prepared in Form-VII; the monthly statement of the State Authority on physical and financial achievements shall be prepared in Form-VIII and annual statement of accounts of the State Authority shall be prepared in Form-IX, and the State Authority shall maintain its records and accounts in Form-X.
41. **Annual reports:** The annual report shall be prepared by the State Authority giving brief description of all activities undertaken from State Fund with separate headings and compiled in separate chapters and the reports shall include summary of works undertaken and schemes prepared and approved in annual plan of operation, and the annual report shall include the statement in Form-XI.

The annual plan of operation of State Authority.-The annual plan of operation of the State Authority shall be prepared in Form-XII and shall be submitted by the State Authority before the 31st December of every year to the National Authority for the next financial year.

## Form-I

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Annual Budget proposal of National Authority for financial year [see rule 32]

**S.No. Description Current Financial Year (in Rs) Last Financial Year (in Rs)**

1.
  - a. Opening Balance of funds received from adhoc Authority as on 1st April
  - b. Opening Balance of amount received from State Authority as on 1st April
  - c. Opening Balance of loans/grants etc. received as on 1st April
2. Total funds available with National Authority (as on 1st April)(1+2)
3.
  - (i) Annual Expenditure of National Authority out of National Fund
    - a. Recurring Management Expenditure
      - i. Personnel services and benefits
      - ii. Administrative Expenses
      - iii. Other Administrative Expenses
      - iv. Any other expenditure
    - b. Non recurring Management Expenditure like Creation of Capital Asset
    - c. Expenditure on Ongoing Schemes
    - d. Expenditure on New Schemes
    - e. Monitoring and Evaluation Expenditure
  - (ii) Total estimated expenditure out of grants/loans etc.
4.
  - (i) Estimated Gross Total Expenditure {3(i)+3(ii)}
  - (ii) Estimated payments to State Authorities out of funds received from ad hoc Authority.
5. Total closing balance with National Authority
  - a. Closing balance of funds received from ad hoc Authority
  - b. Closing balance out of receipt from State Authority
  - c. Closing balance of grants/loans etc.

**Declaration**

The budget proposal as mentioned above has been approved and adopted by the National Authority.

Date:

## Form-II

Member-Secretary National Authority

Monthly Statement of Accounts of National Authority for the Receipt and Payment/Expenditure  
Month Financial year.\_

[see rule 33] 1      2      3      4      5

S.No. Head Current month (in rupees) Last month (in rupees) Cumulative amount till this month(in rupees)

- I. Total Opening balance of National Fund (a+b+c+d)
  - a. Opening Balance of Principal Amount of National Fund out of 10% share of ad hoc Authority
  - b. Opening balance amount of 10% share received by National Fund from State Fund
  - c. Opening balance amount of interest accrued to National Fund
  - d. Opening balance amount of grants, loans, etc. unspent by National Authority
- II. Opening balance amount of share of State Fund, under ad hoc Authority still lying with National Fund (a+b)
  - a. Opening balance amount of 90% share of ad hoc Authority due to State Fund, still lying with National Fund (Mention names of states)
  - b. Opening balance amount of Interest on 90% share of ad hoc Authority due to State Funds, still lying with National Fund (mention names of states)
- III. Total Amount received by National Fund during the year (a+b)
  - a. Amount of interest accrued to National Fund
  - i. Amount of interest accrued to National Fund out of 10% share of ad hoc Authority and under Act
  - ii. Amount of interest accrued to National Fund out of 90% share of ad hoc Authority still not transferred from National fund to State Fund
  - b. Amount of receipt by National Fund (other than ad hoc Authority) (i + ii)
    - i. Receipt of funds from State Funds (10% as share of National Fund)
    - ii. Amount of grants, loans etc. received
- IV. Amount of 10% share of National Fund collected by States under the Act with interest thereon and not transferred to National Fund (mention names of states)
- V. Total payment by National Fund to State Fund out of ad hoc Authority (a+b) Payments by National Fund to State Fund (Out of 90% of ad hoc Authority) (1+2+3+4+5+6+7+8+9)
  1. Compensatory Afforestation
  2. Additional Compensatory Afforestation
  3. Penal Compensatory Afforestation
  4. Net Present Value
  5. Penal Net Present Value
  6. Catchment Area Treatment Charges
  7. Wildlife Conservation Plan Charges
  8. Safety Zone Treatment Charges
  9. Others (please specify)
  - b. Payment from National Fund to State Fund out of interest accrued on ad hoc Authority

- VI. Total Expenditure by National Authority during the year out of Principal and Interest amount (a+b)
- (a) Administrative Expenditure (i+ii+iii+iv+v+vi)
    - i. Personnel services and benefits
    - ii. Administrative Expenses
    - iii. Other administrative expenses
    - iv. Monitoring and Evaluation Expenditure
    - v. Other administrative expenses
    - vi. Non recurring Management Expenditure like Creation of Capital Asset
  - (b) Expenditure on Schemes (i+ii+iii)
    - i. Expenditure on ongoing schemes
    - ii. Expenditure on New Schemes
    - iii. Others
- VII Total closing balance of National Fund (a+b+c+d)
- a. Closing Balance of Principal Amount of National Fund (10% share of ad hoc Authority)
  - b. Closing balance amount of 10% share received by National Fund from State Funds under the Act.
  - c. Closing balance amount of interest accrued to National Fund
  - d. Closing balance amount of grants, loans, etc. received by National Authority
- VIII
- a. Closing balance amount of 90% share of ad hoc Authority due to State Funds, still lying with National Fund (mention names of States)
  - b. Closing balance amount of Interest on 90% share of ad hoc Authority due to State Funds, still lying with National Fund (mention names of States)

### **Declaration**

The above Report has been verified and found correct. The report has been adopted by National Authority Date:

Signature

Member-Secretary, National Authority.

## Form-III

Annual statement of Accounts of National Authority for Financial Year..... [see rule 33]

As on 31st March \_

1 2 3 4

**Sl. No**      **Description Current Financial Year (in Rs.)**      **Last Financial Year (in Rs.)**

- I. Total Opening balance of National Fund (a+b+c+d+e+f)
  - a. Opening Balance of Principal Amount of National Fund (10% share of ad hoc Authority)
  - b. Opening balance amount of 10% share received by National Fund from State Fund under the Act
  - c. Opening balance amount of interest received by National Fund (Both ad hoc Authority and under the Act)
  - d. Opening balance amount of grants, loans etc. received by National Authority
  - e. Opening balance amount of 90% share of ad hoc Authority due to State Funds, still lying with National Fund (mention names of States)
  - f. Opening balance amount of Interest on 90% share of ad hoc Authority due to State Funds, still lying with National Fund (Mention names of States)
- II. Total Opening balance of State Funds (a+b+c+d)
  - a. Opening balance of principal amount component wise of all states after expenditure (90% share of ad hoc Authority) (1+2+3+4+5+6+7+8+9)
    1. Compensatory Afforestation
    2. Additional Compensatory Afforestation
    3. Penal Compensatory Afforestation
    4. Net Present Value
    5. Penal Net Present Value
    6. Catchment Area Treatment Charges
    7. Wildlife Conservation Plan Charges
    8. Safety Zone Treatment Charges
    9. Others (please specify)
  - b. Opening balance amount of interest received by State Funds (both on ad hoc Authority and deposit under the Act)
  - c. Opening balance amount of grants, loans, etc. received by State Authority
  - d. Opening balance amount of 10% share of National Fund collected under the Act by States and not transferred to National Fund
- III. Total amount received by National Fund during the year (a+b)
  - a. Amount of interest accrued to National Fund
    - i. Amount of interest accrued to National Fund out of 10% share of ad hoc Authority
    - ii. Amount of interest accrued to National Fund out of 90% share of ad hoc Authority still not transferred by National Fund to State Fund
  - b. Amount of receipt by National Fund (Other than ad hoc Authority)  
(i + ii)

- i. Receipt of funds from State Funds (10% as share of National Fund) under the Act
  - ii. Amount of grants, loans etc. received
- IV. Outstanding dues of National Fund, received by State Fund under the Act
  - i. Amount of 10% share of National Fund under the Act collected by States and not transferred to National Fund (Mention names of states)
  - ii. Amount of interest accrued to State Fund (on outstanding National Fund's 10% share not transferred to National Fund)
- V. Total Amount received by State Fund during the year (a+b)
  - a. Amount of interest accrued to State Fund (on State Fund deposits)
  - b. Amount of received by State Fund (Other than ad hoc Authority) (i + ii)
    - i. Receipt of funds by State Fund (90% as share of State Fund under the Act)
    - ii. Amount of grants, loans etc. received by State Fund
- VI. Total payment by National Fund to State Fund out of ad hoc Authority (a+b)
  - a. Payments by National Fund to State Fund (Out of 90% of ad hoc Authority) (1+2+3+4+5+6+7+8+9)
    - 1. Compensatory Afforestation
    - 2. Additional Compensatory Afforestation
    - 3. Penal Compensatory Afforestation
    - 4. Net Present Value
    - 5. Penal Net Present Value
    - 6. Catchment Area Treatment Charges
    - 7. Wildlife Conservation Plan Charges
    - 8. Safety Zone Treatment Charges
    - 9. Others (please specify)
  - b. Payment by National Fund to State Fund out of interest accrued of ad hoc Authority
- VII. Total expenditure by National Authority during the year out of principal and interest amount (a+b)
  - (a) Administrative Expenditure (i+ii+iii+iv+v+vi)
    - i. Personnel services and benefits
    - ii. Administrative Expenses
    - iii. Other administrative expenses
    - iv. Monitoring and Evaluation Expenditure
    - v. Other administrative expenses
    - vi. Non recurring Management Expenditure like Creation of Capital Asset
  - (b) Expenditure on Schemes (i+ii+iii)
    - i. Expenditure on Ongoing Schemes
    - ii. Expenditure on New Schemes
    - iii. Others
- VIII. Total Expenditure from State Fund (i+ii)
  - i. Total expenditure from State Fund out of ad hoc Authority
  - ii. Total expenditure from State Fund under the Act

- IX. Total Closing balance of National Fund (a+b+c+d+e+f)
- a. Closing Balance of principal amount of National Fund (10% share of ad hoc Authority)
  - b. Closing balance amount of 10% share received by National Fund from State Fund under the Act
  - c. Closing balance amount of interest received by National Fund
  - d. Closing balance amount of grants, loans, etc. received by National Authority
  - e. Closing balance amount of 90% share of ad hoc Authority due to State Fund, still lying with National Fund (Mention names of states) (1+2+3+4+5+6+7+8+9)
    - 1. Compensatory Afforestation
    - 2. Additional Compensatory Afforestation
    - 3. Penal Compensatory Afforestation
    - 4. Net Present Value
    - 5. Penal Net Present Value
    - 6. Catchment Area Treatment Charges
    - 7. Wildlife Conservation Plan Charges
    - 8. Safety Zone Treatment Charges
    - 9. Others (please specify)
  - f. Closing balance amount of Interest on 90% share of ad hoc Authority due to State Fund, still lying with National Fund (Mention names of states)
- X. Total Closing balance of State Fund (a+b+c+d)
- a. Closing balance of principal amount component wise of all states after expenditure (90% share of ad hoc Authority) (1+2+3+4+5+6+7+8+9)
  - b. Closing balance amount of interest received by State Fund (both on ad hoc Authority and under the Act)
  - c. Closing balance of grants, loans, etc. received by State Authority
  - d. Closing balance amount of 10% share of National Fund collected by States under the Act and not transferred to National Fund along with interest
- XI. Cumulative figure of National Fund outstanding dues from states (Out of 10% share of National Fund collected by States under the Act and not transferred to National Fund along with interest)

**Declaration**

The above report has been verified and found correct. The report has been adopted by National Authority.

Date

## **Form-IV**

---

Records and Accounts to be maintained by the National Authority [see rule 33]

Signature Member-Secretary, National Authority.

The following accounts / records will be maintained:

1. Cash Book, Ledger, Journal, Public Fund Accounts Register
2. Stock Register, Fixed Asset Register.
3. Registers showing expenditure by Heads of Accounts.
4. Monthly financial statement of Accounts and physical output
5. Quarterly Monitoring Register
6. Register for Annual Share of National Fund from the State Fund (State wise)
7. Register of Grants / Loans etc.
8. Records of schemes approved and executed by the National Authority including statement of funds released to beneficiaries of the scheme.

## Form-V

Statement of Accounts of National Authority for the financial year ending on 31st March, 20... [see rule 34]  
(Separate Forms for other Grants/Loans etc. are to be submitted) As on 31st March

1    2    3    4    5    6    7    8

**S.No.      Head                      Physical output as approved in annual plan of operation**

(in units) Actual physical achievement during the year (in units) Cumulative physical achievement till date.

(in units) Budget allocation during the year (in Rs) Actual amount spent (in Rs) Cumulative amount till date (in Rs)

I      Schemes  
a. Ongoing schemes

i.

ii.

iii.

iv.

v.

b. New Schemes

i.

ii.

iii.

iv.

v.

vi.

c. Others (specify)

i.

ii.

iii.

iv.

Budget Allocation (in Rs.) Actual amount spent during the year (in Rs.) Actual amount spent during last year (in Rs.) Remarks II a. Administrative Charges\*

b. Other Administrative Expenses\*

c. Others\*

III      Monitoring and Evaluation

a. Annual Audit

b. Comptroller and Auditor General Audit

c. E-green

Watch Outcome

d. Third Party

Monitoring

### **Declaration:**

The above Report has been verified and found correct. The Report has been adopted by National Authority

Date:

Signature Member-Secretary, National Authority

### **Notes:**

IIa\* Administrative charges include - Staff salary and wages, Pay and Allowances, Overtime Allowances, Pensionary charges, Medical Treatment, Administrative Expenses, Domestic Travel, Foreign Travel, Office Expenses, Electricity and Power, Water Charges, Rent, Rates and Taxes (including property tax), Hire, Purchase and Maintenance of Staff Car including petroleum, oil and lubricants (POL).

IIb\* Other administrative charges include - Sitting fee and admissible allowances to the non-official members of the National Authority, Expenditure on conference, seminar, workshop, etc., Training Programme, Advertisement & Publicity, Minor works, Professional Services, Other contractual Services.

IIIc\* Others include Cartage and Carriage inwards (on purchase of fixed assets/non-recurring items), Printing and Publications (other than academic), Subscription Expenses (other than academic), Non recurring management expenditure like, creation of Capital Asset of National authority, any other expenditure.

## Form-VI

Annual Budget proposal of State Authority for financial year Submitted along with the Annual Plan of Operation [see rule 35]

- | S.No. | Description                                                                           | Current Financial Year (in Rs) | Last Financial Year (in Rs) |
|-------|---------------------------------------------------------------------------------------|--------------------------------|-----------------------------|
| 1.    | a. Opening Balance of funds received from National Authority as on 1st April          |                                |                             |
|       | b. Opening Balance of loans/grants etc. received as on 1st April                      |                                |                             |
| 2.    | Estimated Annual receipt of State Authority                                           |                                |                             |
|       | a. Receipt of Fund by State Authorities from User agencies                            |                                |                             |
|       | b. Receipt of accrual of interest on State Fund                                       |                                |                             |
|       | c. Receipt of Grants/loans/others of State Authority                                  |                                |                             |
|       | d. Any Other Income                                                                   |                                |                             |
| 3.    | Total estimated funds available with State Authority (as on 1st April)(1+2)           |                                |                             |
| 4.    | i. Annual proposed expenditure of State Authority out of State Fund                   |                                |                             |
|       | Activities to be undertaken from interest (specify) under rule 6                      |                                |                             |
|       | Recurring Management Expenditure                                                      |                                |                             |
|       | i. Personnel services and benefits*                                                   |                                |                             |
|       | ii. Administrative Expenses**                                                         |                                |                             |
|       | iii. Other Administrative Expenses***                                                 |                                |                             |
|       | iv. Any other expenditure                                                             |                                |                             |
|       | Activities to be undertaken from Net Present value (specify) under rule 5             |                                |                             |
|       | a. Non recurring Management Expenditure like Creation of Capital Asset/               |                                |                             |
|       | b. Afforestation and other permissible activities                                     |                                |                             |
|       | c. Expenditure on Ongoing works                                                       |                                |                             |
|       | d. Expenditure on New works                                                           |                                |                             |
|       | e. Monitoring and Evaluation Expenditure                                              |                                |                             |
|       | ii. Compensatory Afforestation works                                                  |                                |                             |
|       | iii. Catchment Area Treatment works                                                   |                                |                             |
|       | iv. Wildlife Management works                                                         |                                |                             |
|       | v. Other (specify)                                                                    |                                |                             |
|       | vi. Total estimated expenditure out of grants/loans etc.                              |                                |                             |
| 5.    | i. Estimated Gross Total Expenditure {4(i)+4(ii)+4(iii)+4(iv)+4(v)+4(vi)}             |                                |                             |
|       | ii. Estimated payments to National Authorities out of funds received from use agency. |                                |                             |
| 6.    | Total closing balance with State Authority                                            |                                |                             |
|       | a. Closing balance of funds received from National Authority                          |                                |                             |
|       | b. Closing balance out of receipt from User agencies                                  |                                |                             |
|       | c. Closing balance of grants/loans etc.                                               |                                |                             |

### Declaration

The budget proposal as mentioned above has been approved and adopted by the State Authority. Date:  
Member-Secretary State Authority

**Note-1:** for the purpose of budget estimate (referred in serial number 1, 2 and 3) for the year under consideration the opening balance refers to the fund available as on the 1st April of the previous year.

Note 2: \*Personnel services and benefits includes -Staff salary and wages, Pay and Allowances, Travelling Allowances, Overtime Allowances, Pensionary charges, Medical Treatment etc.

Notes-2: \*\* Administrative expenses include - Office Expenses, Electricity and Power, Water Charges, Rent, Rates and Taxes (including property tax), Hire, Purchase & Maintenance of Staff Car including petroleum, oil and lubricants (POL) of the State Authority.

Note-3: \*\*\* Other administrative expenses include - Sitting fee and admissible allowances to the non-official members of the National Authority, Expenditure on conference, seminar, workshop, etc. Training Programme, Advertisement and Publicity, Minor works, Professional Services, Other contractual Services.

## Form-VII

Annual Budget proposal of State Authority for financial year Submitted along with the Annual Plan of Operation [see rule 35]

- | S.No. | Description                                                                           | Current Financial Year (in Rs) | Last Financial Year (in Rs) |
|-------|---------------------------------------------------------------------------------------|--------------------------------|-----------------------------|
| 1.    | a. Opening Balance of funds received from National Authority as on 1st April          |                                |                             |
|       | b. Opening Balance of loans / grants etc. received as on 1st April                    |                                |                             |
| 2.    | Estimated Annual receipt of State Authority                                           |                                |                             |
|       | a. Receipt of Fund by State Authorities from User agencies                            |                                |                             |
|       | b. Receipt of accrual of interest on State Fund                                       |                                |                             |
|       | c. Receipt of Grants / loans / others of State Authority                              |                                |                             |
|       | d. Any Other Income                                                                   |                                |                             |
| 3.    | Total estimated funds available with State Authority (as on 1st April)(1+2)           |                                |                             |
| 4.    | i. Annual proposed expenditure of State Authority out of State Fund                   |                                |                             |
|       | Activities to be undertaken from interest (specify) under rule 6                      |                                |                             |
|       | Recurring Management Expenditure                                                      |                                |                             |
|       | i. Personnel services and benefits*                                                   |                                |                             |
|       | ii. Administrative Expenses**                                                         |                                |                             |
|       | iii. Other Administrative Expenses***                                                 |                                |                             |
|       | iv. Any other expenditure                                                             |                                |                             |
|       | Activities to be undertaken from Net Present value (specify) under rule 5             |                                |                             |
|       | a. Non recurring Management Expenditure like Creation of Capital Asset /              |                                |                             |
|       | b. Afforestation and other permissible activities                                     |                                |                             |
|       | c. Expenditure on Ongoing works                                                       |                                |                             |
|       | d. Expenditure on New works                                                           |                                |                             |
|       | e. Monitoring and Evaluation Expenditure                                              |                                |                             |
|       | ii. Compensatory Afforestation works                                                  |                                |                             |
|       | iii. Catchment Area Treatment works                                                   |                                |                             |
|       | iv. Wildlife Management works                                                         |                                |                             |
|       | v. Other (specify)                                                                    |                                |                             |
|       | vi. Total estimated expenditure out of grants / loans etc.                            |                                |                             |
| 5.    | i. Estimated Gross Total Expenditure {4(i)+4(ii)+4(iii)+4(iv)+4(v)+4(vi)}             |                                |                             |
|       | ii. Estimated payments to National Authorities out of funds received from use agency. |                                |                             |
| 6.    | Total closing balance with State Authority                                            |                                |                             |
|       | a. Closing balance of funds received from National Authority                          |                                |                             |
|       | b. Closing balance out of receipt from User agencies                                  |                                |                             |
|       | c. Closing balance of grants / loans etc.                                             |                                |                             |

### Declaration

The budget proposal as mentioned above has been approved and adopted by the State Authority. Date:  
Member-Secretary State Authority

**Note-1:** for the purpose of budget estimate (referred in serial number 1, 2 and 3) for the year under consideration the opening balance refers to the fund available as on the 1st April of the previous year.

Note 2: \*Personnel services and benefits includes -Staff salary and wages, Pay and Allowances, Travelling Allowances, Overtime Allowances, Pensionary charges, Medical Treatment etc.

Notes-2: \*\* Administrative expenses include - Office Expenses, Electricity and Power, Water Charges, Rent, Rates and Taxes (including property tax), Hire, Purchase & Maintenance of Staff Car including petroleum, oil and lubricants (POL) of the State Authority.

Note-3: \*\*\* Other administrative expenses include - Sitting fee and admissible allowances to the non-official members of the National Authority, Expenditure on conference, seminar, workshop, etc. Training Programme, Advertisement and Publicity, Minor works, Professional Services, Other contractual Services.

## Form-VIII

Monthly Statement of State Authority on Physical and Financial achievements by the State [see rule 37]

- | Sl.No. | Description                                                                                                                                     | Physical outcome Target as approved in annual plan of operation (in hectare/ trees) | Actual physical achievement during the year (in hectare/ trees) | Cumulative achievement till date. (in hectare/ trees) | Current Month (in rupees) | Last Month (in rupees) | Cumulative amount till this month (in rupees) |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------|---------------------------|------------------------|-----------------------------------------------|
| I.     | Total Expenditure out of ad hoc Authority funds [Total Component wise works from Principal Amount] (1+2+3+4+5+6+7+8+9)                          |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 1. Compensatory Afforestation                                                                                                                   |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 2. Additional Compensatory Afforestation                                                                                                        |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 3. Penal Compensatory Afforestation                                                                                                             |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 4. Net Present Value                                                                                                                            |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 5. Penal Net Present Value                                                                                                                      |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 6. Catchment Area Treatment Charges                                                                                                             |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 7. Wildlife Conservation Plan Charges                                                                                                           |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 8. Safety Zone Treatment Charges                                                                                                                |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 9. Others (please specify)                                                                                                                      |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
| II.    | Amount of expenditure from State Fund out of 90% share [Total component wise works from principal amount] (1+2+3+4+5+6+7+8+9)                   |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | Total Component wise Principal Amount works                                                                                                     |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 1. Compensatory Afforestation                                                                                                                   |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 2. Additional Compensatory Afforestation                                                                                                        |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 3. Penal Compensatory Afforestation                                                                                                             |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 4. Net Present Value                                                                                                                            |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 5. Penal Net Present Value                                                                                                                      |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 6. Catchment Area Treatment Charges                                                                                                             |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 7. Wildlife Conservation Plan Charges                                                                                                           |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 8. Safety Zone Treatment Charges                                                                                                                |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 9. Others (please specify)                                                                                                                      |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
| III.   | Total Expenditure by State Funds out of interest transferred from ad hoc Authority                                                              |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
| IVa.   | Amount Spent by State Fund (60% of interest accrued)[1+2+3+4+5+6]                                                                               |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 1. to offset the incremental cost of compensatory afforestation and penal compensatory afforestation at the increased wage rates;               |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 2. to offset the incremental cost of catchment area treatment plan at the increased wage rates;                                                 |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 3. to offset the incremental cost of wildlife management plan at the increased wage rates                                                       |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 4. Disbursement of salary and allowances of members and staffs, both regular and contractual, of the State Authority constituted under the Act; |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 5. Disbursement of sitting fees and allowances to nominated members of the State Authority constituted under the Act;                           |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | 6. activities referred in sub rule (2) and (3) of rule 5                                                                                        |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
| IVb.   | Amount Spent by State Fund (40% of Interest accrued)                                                                                            |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | Total Administrative Expenditure (i+ii+iii+iv+v+vi)                                                                                             |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | i. Personnel services and benefits                                                                                                              |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | ii. Administrative Expenses                                                                                                                     |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | iii. Other administrative expenses                                                                                                              |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | iv. Monitoring and Evaluation Expenditure                                                                                                       |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | v. Non recurring management expenditure like creation of capital asset                                                                          |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
|        | vi. Other expenditures referred in sub-rule (b) of rule 6                                                                                       |                                                                                     |                                                                 |                                                       |                           |                        |                                               |
| V.     | Outstanding dues to be paid to National Fund under the Act (out of 10% share and accrued interest on the National Fund share not transferred)   |                                                                                     |                                                                 |                                                       |                           |                        |                                               |

Declaration

The above report has been verified and found correct. The report has been adopted by State Authority.

Date:

## Form-IX

Signature Member-Secretary State Authority

Annual Statement of State Authority on Physical and Financial achievements by the State [see rule 37]

| Sl.No. | Description | Physical Target as approved in annual plan of operation (in units) | Actual physical achievement during the year (in units) | Physical Target (others) | Physical Achievements (others) | Financial Target (in Rs) | Financial Achievement (in Rs) |
|--------|-------------|--------------------------------------------------------------------|--------------------------------------------------------|--------------------------|--------------------------------|--------------------------|-------------------------------|
|--------|-------------|--------------------------------------------------------------------|--------------------------------------------------------|--------------------------|--------------------------------|--------------------------|-------------------------------|

- I. Total expenditure out of ad hoc Authority funds [Total Component wise works from Principal Amount] (1+2+3+4+5+6+7)
  1. Compensatory Afforestation
  2. Additional Compensatory Afforestation
  3. Penal Compensatory Afforestation
  4. Net Present Value
  5. Catchment Area Treatment Charges
  6. Wildlife Conservation Plan Charges
  7. Others (please specify)
- II. Amount of expenditure by State Fund out of 90% share [Total Component wise works from Principal Amount] (1+2+3+4+5+6+7)  
Total Component wise Principal Amount works
  1. Compensatory Afforestation
  2. Additional Compensatory Afforestation
  3. Penal Compensatory Afforestation
  4. Net Present Value
  5. Catchment Area Treatment Charges
  6. Wildlife Conservation Plan Charges
  7. Others (please specify)
- III. Total Expenditure by State Funds out of interest transferred from ad hoc Authority
- IVa. Amount Spent by State Fund (60% of interest accrued)[1+2+3+4+5+6]
  1. to offset the incremental cost of compensatory afforestation and penal compensatory afforestation at the increased wage rates;
  2. to offset the incremental cost of catchment area treatment plan at the increased wage rates;
  3. to offset the incremental cost of wildlife management plan at the increased wage rate
  4. Disbursement of salary and allowances of members and staffs, both regular and contractual, of the State Authority constituted under the Act;
  5. Disbursement of sitting fees and allowances to nominated members of the State Authority constituted under the Act;
  6. activities referred in sub rule (2) and (3) of rule 5
- IVb. Amount Spent by State Fund (40% of Interest accrued)  
Total Administrative Expenditure (i+ii+iii+iv+v+vi)
  - vii. Personnel services and benefits
  - viii. Administrative Expenses
  - ix. Other administrative expenses
  - x. Monitoring and Evaluation Expenditure
  - xi. Non recurring management expenditure like creation of capital asset
  - xii. Other expenditures referred in sub-rule (b) of rule 6
- V. Outstanding dues to be paid to National Fund under the Act (out of 10% share and accrued interest on the National Fund share not transferred)

Declaration

The above report has been verified and found correct. The report has been adopted by State Authority.

Date:

## **Form-X**

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Records and Accounts to be maintained by the State Authority [see rule 37]

Signature Member-Secretary State Authority

The following accounts/ records shall be maintained:

1. Cash Book, Ledger, Journal, and Public Fund Accounts Register.
2. Stock Register and Fixed Asset Register.
3. Registers showing expenditure by Heads of Accounts.
4. Monthly financial statement of Accounts and physical outputs.
5. Quarterly Monitoring Register.
6. Register for Annual Share of National Fund from the State Fund (State wise)
7. Register of Grants/Loans, etc.
8. Work register recording all physical works and corresponding expenditure carried out State Fund.
9. Plantation journal.

## Form-XI

Statement of Accounts of State Authority for the financial year ending on 31st March, [see rule 38]  
(Separate Forms for other Grants/Loans etc. are to be submitted) As on 31st March .....

| 1      | 2    | 3                                                                  | 4                                                     | 5                                                     | 6                                        | 7                           | 8                                   |
|--------|------|--------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|------------------------------------------|-----------------------------|-------------------------------------|
| S. No. | Head | Physical output as approved in annual plan of operation (in units) | Actual physical achievement during the year(in units) | Cumulative physical achievement till date. (in units) | Budget allocation during the year(in Rs) | Actual amount spent (in Rs) | Cumulative amount till date (in Rs) |

**I Schemes**

1. Compensatory Afforestation
2. Additional Compensatory Afforestation
3. Penal Compensatory Afforestation
4. Net Present Value
5. Catchment Area Treatment Charges
6. Improvement/protection of forest
7. Publicity and Education
8. Training
9. Movable assets
  - i
  - ii
  - iii
10. Immovable assets
  - i
  - ii
11. Other (specify)
  - i.
  - ii

Budget Allocation (in Rs.) Actual amount spent during the year (in Rs.) Actual amount spent during last year (in Rs.) Remarks

- II**
- a. Administrative Charges\*
  - b. Other Administrative Expenses\*
  - c. Others\*

**III Monitoring and Evaluation**

- e. Annual Audit
- f. Comptroller and Auditor General Audit
- g. E-green Watch Outcome
- h. Third Party Monitoring

**Declaration**

The above Report has been verified and found correct. The Report has been adopted by State Authority.  
Date:

Signature

Member-Secretary State Authority

**Notes:** **IIa** \*Administrative charges include - Staff salary and wages, Pay and Allowances, Overtime Allowances, Pensionary charges, Medical Treatment, Administrative Expenses, Domestic Travel, Foreign Travel, Office Expenses, Electricity and Power, Water Charges, Rent, Rates and Taxes (including property tax), leasing and hiring of Staff Car including petroleum, oil and lubricants (POL), leasing and hiring of buildings for State Authority

**IIb** \*Other administrative charges include - Expenditure on conference, seminar, workshop, etc. Training Programme, Advertisement and Publicity, Minor works, Professional Services, Other contractual Services.

**IIIc** \*Others include Cartage and Carriage inwards (on purchase of fixed assets/non-recurring items), Printing and Publications (other than academic), Subscription Expenses (other than academic), Non recurring management expenditure like, creation of Capital Asset of State Authority, any other expenditure.

## **Form-XII**

[see rule 39]

Annual Plan of Operation [To be submitted by the 31st December of current year for next financial year]

The annual plan of operation (APO) shall be prepared in the following parts:

1. Part-1: Brief history and past performance Part-I of APO shall contain:
    - (a) Brief description of forests and forestry sector in the State.
    - (b) Compensatory afforestation, other forestry and related schemes (physical and financial) including catchment area treatment, wildlife management and community development works and activities carried out therein in the State in last five years from the State Fund, in tabular form.
    - (c) Forestry and other related schemes (physical and financial) and activities carried out therein in the state in previous years from the fund received under other schemes of the Government in tabular form.
    - (d) Year wise total forest area diverted in the various districts / forest divisions of the State since 1980, in tabular form.
    - (e) Year wise total compensatory afforestation carried out in the State since 1980, in tabular form.
    - (f) Brief description and abstract of the monitoring work done by the Monitoring and Evaluation Wing of the State Forest Department.
    - (g) Brief description and abstract of the monitoring work done by the independent monitor (Third Party Monitoring) in the State
    - (h) Any other important information for consideration relevant for preparing APO.
  2. Part-II: Activities to be undertaken for compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, catchment area treatment plan and for any other site specific scheme may be used as per site-specific schemes submitted by the State along with the approved proposals for diversion of forest land under the Forest (Conservation) Act, 1980 (69 of 1980) referred to in clause (a) of section 6 of the Act:
    - (a) District/ forest division wise details of new compensatory afforestation, catchment area treatment plan works, wildlife management activities to be done as per the conditions imposed under forest clearance granted by the Central Government under the Forest (Conservation) Act, 1980.
    - (b) Location, estimated cost and implementation schedule of each activity proposed to be executed from State Fund to be provided district / division wise.
    - (c) Details of maintenance works in physical and financial terms proposed to be undertaken in the current financial year in the case of compensatory afforestation work, catchment area treatment plan works, wildlife management activities and other such activities undertaken in previous years which need maintenance for its survival and sustainability.
- Note: Details of only those districts may be provided where the compensatory afforestation, penal compensatory afforestation, catchment area treatment, wildlife management and other activities referred to in section 6 of the Act have to be undertaken during the current financial year under consideration.
3. Part-III: Activities to be undertaken from net present value and interest component referred in rule 5 and rule 6:
    - (a) District/ forest division wise details of activities to be done in the State on specified activities referred to in rule 5 and rule 6.
    - (b) Location, estimated cost and implementation schedule of each activity proposed to be executed from State Fund to be provided district / division wise.
    - (c) Details of maintenance works in physical and financial terms, proposed to be undertaken in the current financial year in the case of activities undertaken in the State on specified activities referred to in rule 5 and rule 6 undertaken in previous years which needs maintenance for its survival and sustainability.

Note: Details of only those districts may be provided where these activities referred to in rule 5 and

rules 6 have to be done during the current financial year under consideration.

4. Part-IV: Measurable output of all physical activities and targets of each permissible activity along with the period required for achieving the measurable output:
  - (a) Physical and financial targets of each activity to be undertaken in measurable quantity along with the estimated cost of such activities in tabular form including details provided in part II and part III.
  - (b) Measurable output of all physical activities to be undertaken along with the period required for achieving the measurable output.
  - (c) Details of the concurrent monitoring and evaluation report including third party monitoring undertaken in past with photographs.

Note : The APO duly approved by the State Authority shall be submitted by the State Authority before the 31st December of every year to the National authority for the next financial year.

#### Declaration

The above annual plan of operation has been adopted by the State Authority.

Signature Member-Secretary State Authority

[F. No 11-100/2015-FC (Vol. III)]

DEEPAK KUMAR SINHA, Inspector General of Forests

RAKESH SUKUL

Digitally signed by RAKESH SUKUL

Date: 2018.08.11 16:59:57

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## Appendix-4.2

### Formats for data collection (A)

#### Data collection Format under UK-CAMPA Project

| Sl.No. |                                                                             |                                |                            |
|--------|-----------------------------------------------------------------------------|--------------------------------|----------------------------|
| 1.     | Name of Division                                                            |                                |                            |
| 2.     | Name of Range                                                               |                                |                            |
| 3.     | Name of the Site                                                            |                                |                            |
| 4.     | Name of scheme (CA, CAMAPA etc)                                             |                                |                            |
| 5.     | Name of species planted                                                     | Number as mentioned in journal | Actual number in the field |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
|        |                                                                             |                                |                            |
| 6.     | Plantation area (ha)                                                        | GPS                            | Plantation journal         |
|        |                                                                             |                                |                            |
| 7.     | Suitability of plantation's site for species planted                        |                                |                            |
| 8.     | Type of forest around planting site                                         |                                |                            |
| 9.     | Forest composition (Monoculture/mixed)                                      |                                |                            |
| 10.    | Common weeds in plantations                                                 |                                |                            |
| 11.    | Cultural operations (weeding, hoeing, cleaning, singling, stacking etc.)    |                                |                            |
| 12.    | Planting methods (Pit/Ridge-Trench etc.)<br>Pit size/Trench size<br>Spacing |                                |                            |
| 13.    | Soil and moisture conservation technique (Check dams, bunds, Terraces etc.) |                                |                            |
| 14.    | Irrigation facilities and mode of irrigation and Fertilizer application     |                                |                            |

|     |                                                                                       |  |  |
|-----|---------------------------------------------------------------------------------------|--|--|
| 15. | Type of Biotic factors                                                                |  |  |
| 16. | Protection measures<br>(Fencing & Type of Fencing,<br>watchman, insect-pests etc.)    |  |  |
| 17. | Effectiveness of fencing/<br>control measures                                         |  |  |
| 18. | Fire Protection Measures                                                              |  |  |
|     | a) No. of fire incidences in<br>plantation area in past                               |  |  |
|     | b) Extent of damage by forest Fires<br>(Damage to plantations & forest<br>vegetation) |  |  |
| 19. | c) Fire control Measures                                                              |  |  |
| 20. | Height (m) of plants                                                                  |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
| 21. | Diameter (cm) of plants                                                               |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
| 22. | Insect-pests & Diseases in plantation                                                 |  |  |
| 23. | Survival % of species planted                                                         |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |
|     |                                                                                       |  |  |

### M.R.Format (B)

#### Fencing on plantation area/ Fencing area survey format (Field Notebook)

Name of the Division-                      Name of the Scheme-                      Date of Survey-  
Name of the Range-                      Area -                      Name of the monitoring team-  
Name of the Area-                      Year -                      Circle- Shiwalik-  
Fencing/ Protection -

- 1) Name of the Officer Incharge of the work at the time of work:
- 2) Name of the Range Officer at the time of work:

|  | Remarks |
|--|---------|
|  |         |

Name & Designation of officer/staff at the time of the monitoring:-

Name of the officer/staff of monitoring team:-

## **M.R. Format- I (C)**

### **Information Format: Monitoring & Evaluation work for plantation area**

Name of monitoring team:

Division:

Plantation year/month:

Rang:

Plot/Sub-Plot Name:

Name of the scheme:

Working Circle:

Area:

Date of survey:

G.P.S reading of survey place taken by (survey team) :

1. Long :

2. Lat:

Aspect:

Slope (Flat /Slope /More Slope):

Regarding Maintenance work:

Management done for plantation maintenance:

Distance of plantation from nearest village/colony:

Public Pressure: 1) Biotic pressure: (2) Fuelwood: (3 ) Grazing: (4) Wild animals: (5) Others: -

Name & Designation of the officer/officials present at the time of monitoring:





