STANDARD OPERATING PROCEDURE (SOP)

(SUB TROPICAL PINE FORESTS)

6.1 Introduction

In India, forest fires are a recurrent and serious problem across various forest types. According to the India State of Forest Report (ISFR, 2021), more than 36% of the country's forest cover is prone to frequent forest fires. Of this, 2.81% is classified as extremely fire-prone, while 7.85% is considered very highly fire-prone. Severe fires are especially prevalent in dry deciduous and tropical deciduous forests, which dominate central and southern India. These forests experience pronounced dry seasons, during which vegetation becomes highly flammable. The tropical deciduous forests, found in states like Madhya Pradesh, Chhattisgarh, Odisha, Maharashtra, and parts of Andhra Pradesh and Telangana, are particularly susceptible due to extensive anthropogenic pressures, high fuel loads from dry biomass, and seasonal droughts.

In contrast, evergreen, semi-evergreen, and montane temperate forests are relatively less vulnerable to fires due to their moister microclimates and denser canopies (FSI, 2015).

Another forest type highly susceptible to fires is the sub-tropical chir pine (*Pinus roxburghii*) forest, dominant in the middle elevations of the Himalayan range (1000–2000 m). These forests are distributed across Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, West Bengal (Darjeeling), and Arunachal Pradesh, as well as neighbouring countries like Nepal and Bhutan. The highest concentration of chir pine forest cover is in Uttarakhand (FSI, 2019). Covering an area of 17,427.68 sq km in India (ISFR, 2021), sub-tropical pine forests form the largest coniferous belt in the Indo-Pacific region, stretching over 3,000 km.

Chir pine thrives on dry, sun-facing slopes where few other tree species survive. The species is valued economically for its high resin content; however, the same property, along with its needle litter, makes it highly flammable. Fires in pine forests are both natural and anthropogenic in origin. Villagers often set fire intentionally to clear the dry needle litter, which makes the forest floor slippery and dangerous for movement. Fires are also lit before the monsoon to promote new grass growth for fodder. Accidental fires occur due to negligence, such as discarded cigarette butts, torchwood carried at night, or sparks from road work. In some cases, anti-social activities or resin tapping operations further increase the vulnerability of pine forests to fire damage.

The spread of fire is accelerated by dried pine cones (locally known as *Theeta*), which roll downhill when ignited and cause *Ulti fire*—a reverse fire that climbs back uphill. Additionally, *Sulti fire* refers to fires spreading from agricultural fields, especially during windy days, when wheat stubble is burnt after harvest, coinciding with the peak fire season.

To effectively manage forest fires, a three-tiered approach is essential: pre-fire (preparedness and planning), during fire (suppression and control), and post-fire (mitigation, assessment, and restoration). A well-defined Standard Operating Procedure (SOP) is crucial for guiding forest fire management, particularly in sub-tropical pine forests. The SOP outlines specific responsibilities and operational protocols for Divisional and Range units, as well as firefighting teams. It focuses on early detection, prevention, suppression, and post-fire rehabilitation, providing a structured framework for efficient and coordinated response to forest fire threats.

Table 6.1: Distribution of Sub Tropical Pine Forests in India

S. No.	State/UTs	Area in sq. km.
1.	Arunachal Pradesh	718.82
2.	Assam	119.72
3.	Haryana	12.94
4.	Himachal Pradesh	2759.62
5.	Manipur	632.86
6.	Meghalaya	1169.3
7.	Mizoram	92.75
8.	Nagaland	735.33
9.	Punjab	27.76
10.	Uttarakhand	7338.91
11.	Jammu & Kashmir	3819.67
Total		**17427.68**

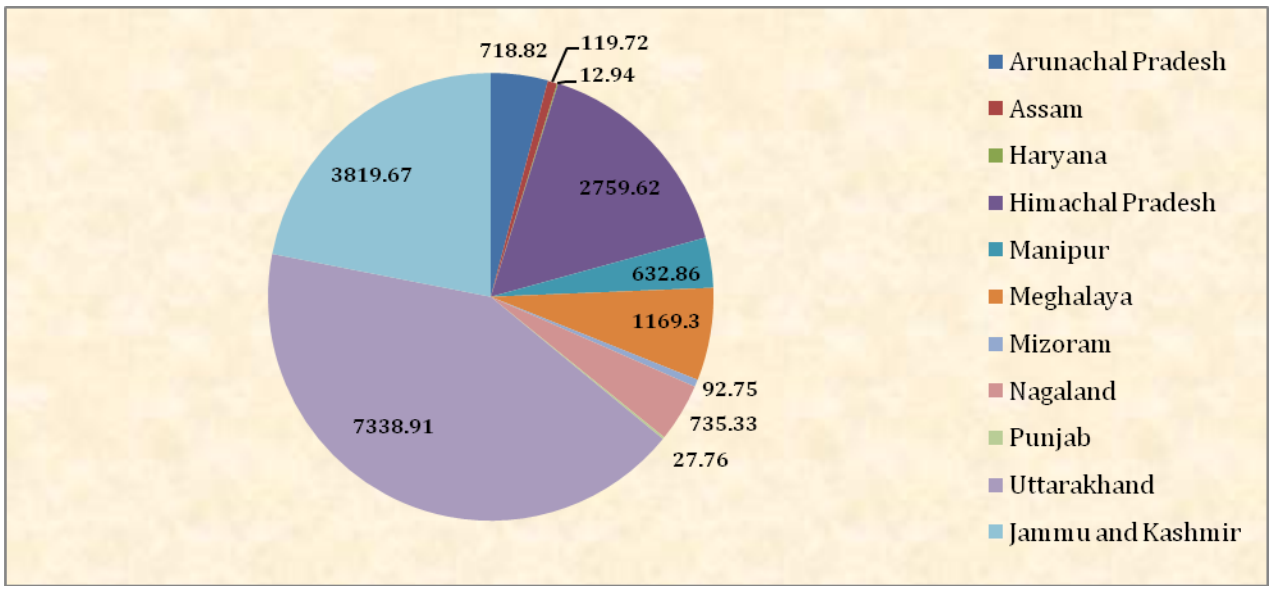

Fig. 6.1: Sub tropical pine forest in India

6.2 Literature Review

The literature on fires in Indian forests shows that they play a vital role throughout the country. They have been mentioned throughout the period of scientific forestry as a major cause of degradation of forests. Very few empirical studies have been done on the reasons for these fires and in most cases their origin remains unclear. Available evidence suggests that fires are employed to maintain the grass layer for cattle grazing and that they facilitate the collection of several non-wood forest products. It can be stated that fires are set to gain a certain benefit or, in other words, to obtain a specific ecosystem service, using the Millenium Assessment's definition of the term to include both tangible products as well as intangible services. The list of tangible products obtained with the help of fire is a long one, and ranges from fodder and NWFP to fuel wood and charcoal. The intangible services obtained with the help of fire are more difficult to assess and so far there have been very few studies on this topic in India. Fires certainly have an adverse effect on biodiversity, carbon sequestration, water regulation and air pollution. These services do not necessarily affect those who set fires, but they matter on a larger scale. Services that are relevant at a local level are of more of a traditional (regeneration of new grassess at Uttarakhand and Himachal Pradesh) or religions nature (e.g., at Kadavakurichi that fires were believed to cause rain when set). The causes of fire generally vary at the local level and can be generalized to a certain extent in the SOP.

Most of our existing knowledge about fires is based onempirical research. Given the scale at which forest fires occur in India, their impact on the vegetation, and also given the large gap between the legal framework and the actual practices of local forest management and in-depth study on understanding forest vegetation dynamics in relation to the fire regime, the role fire plays in the provision of ecosystem services, and the social background behind fire incidences. This will help us to understand the behaviour of local forest dwellers and to plan landscape-level forest fire management accordingly.

6.3 Methodology

ICFRE- FRI team identified and selected the states which are prone to forest fire based on authentic published reports on forest fire in India. States were selected on the basis of two factors; firstly, frequency of forest fire and second area affected by forest fire.

Detail methodology of selection of forest fire prone state, divisions, range and forest fringe villages are given under following sub heads:

6.3.1 Identification of Fire Prone States

Based on the report published by MoEF&CC (2018) and Indian State Forest Report (2021), top 20 districts in term of total number of forest fire detected as well as total area affected for the period of 13 years (2003-2016) were taken to select the fires prone districts in India. Other criteria including accessibility to collect field data, repeated forest fire events were also taken to identify the fire prone districts from the list of top 150 districts identified by National Disaster Management Authority, New Delhi. A total of 19 States and 28 districts have been identified to collect the data for the preparation of Standard Operating Procedure (Table-6.2). Identified fire prone districts were finalized after discussion with forest officials of various states in a consultation workshop organized by ICFRE- Forest Research Institute in November, 2023.

Table 6.2: List of Selected Fire Prone Districts along with Their Respective State

Sl. No.	State	District
1.	Andhra Pradesh	Alluri Sitharama Raju
	Andhra Pradesh	Prakasham
2.	Arunachal Pradesh	West Kameng

3.	Assam	Karbi Anglong
4.	Chhattisgarh	Bijapur
5.	Gujarat	Dangs
6.	Himachal Pradesh	Sirmaur
7.	Jammu And Kashmir	Udhampur
8.	Jharkhand	West Singhbhum
9.	Karnataka	Uttara Kannada
10.	Kerala	Idukki
11.	Madhya Pradesh	Balaghat
	Madhya Pradesh	Chhindwara
	Madhya Pradesh	Betul
12.	Maharashtra	Gadchiroli
	Maharashtra	Chandrapur
13.	Meghalaya	West Khasi Hills
14.	Mizoram	Lunglei
	Mizoram	Aizawl
15.	Odisha	Kandhamal
	Odisha	Koraput
16.	Tamil Nadu	Nilgiris
	Tamil Nadu	Teni
17.	Telangana	Khammam
	Telangana	Adilabad
18.	Uttar Pradesh	Pilibhit
19.	Uttarakhand	Pauri Garhwal
	Uttarakhand	Almora

6.3.2 Identification of Fire Prone Forest Types

A total of five Forest Types including semi- evergreen forests, moist deciduous forests, dry deciduous forests, subtropical broad leaved forests and subtropical pine forests have been identified for this study (Table-6.3). These forest types were identified on the basis of frequency

of occurrence of forest fire, area affected by forest fire and number of forest fire detected. These selected forest types were discussed with officials of State Forest Departments, NDMA, FSI and organizations/universities such as GB Pant National Institute of Himalayan Environment, IIT Roorkee, HNB Garhwal University etc. dealing with forest fire through a Consultation Workshop organized by ICFRE- Forest Research Institute.

Table 6.3: List of Forest Types Identified for the Study

Major Groups	Forest Types
Tropical Forests	1. Semi- Evergreen Forests 2. Moist Deciduous Forests 3. Dry Deciduous Forests
Montane Sub-Tropical Forests	4. Sub Tropical Broad Leaved Forest 5. Sub Tropical Pine Forests

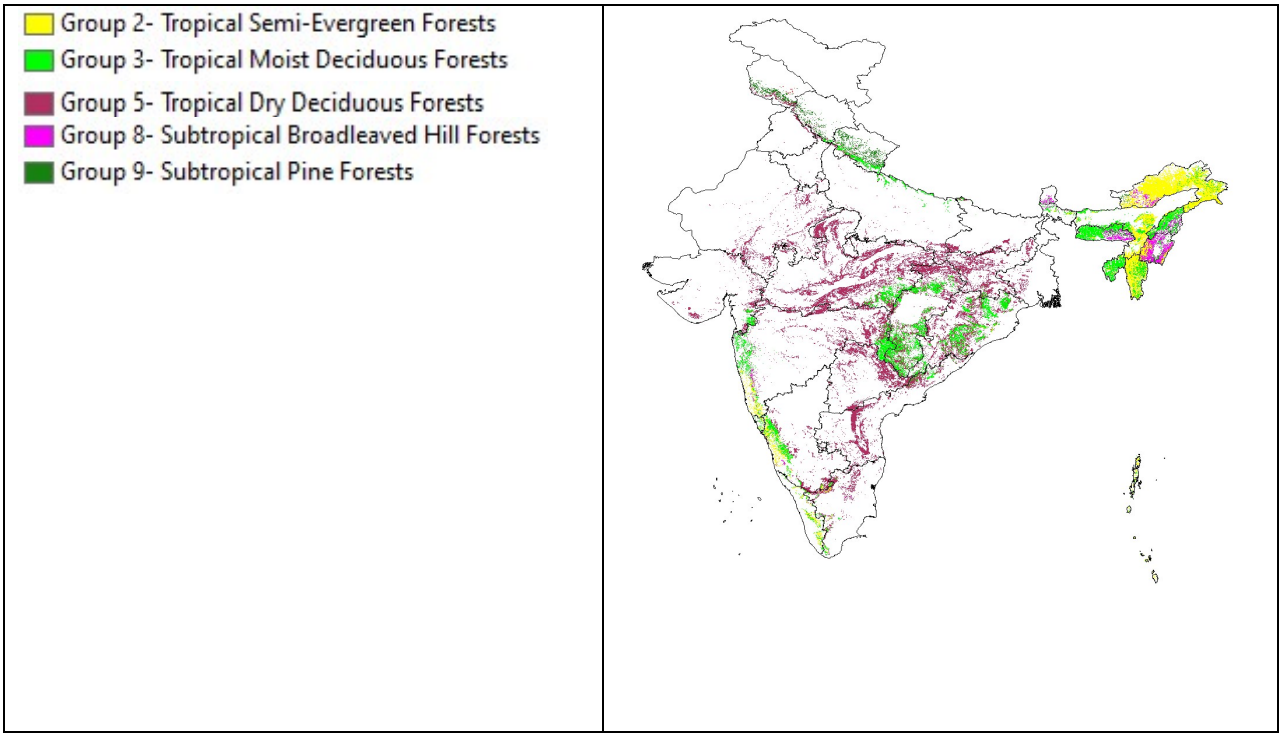

Fig. 6.2: Forest Type Distribution in the Selected States

6.3.3 Identification of Fire Prone Forest Division in Selected Districts

The selection of forest fire prone districts was based on criteria (frequency of occurrence of forest fire, number of forest fire detected and area affected by forest fire) given in MoEF&CC Bank (2018), Indian State Forest Report (2021) which was finalized through ICFRE- FRI Consultation Workshop. The selected forest fire prone Division was visited by the team of ICFRE- FRI to collect data/information on forest fire events which were recorded during previous fire seasons in respective Forest Division. A meeting was conducted with the Divisional Forest Officer (DFO) to finalize selection of two forest fire prone ranges in the forest division. Divisional Forest Officer suggested names of two forest fire prone ranges based on past 10 years events of forest fire.

6.3.4 Identification of Village in the Selected Fire Prone Range

A field visit was carried out by the team of ICFRE-FRI to the selected fire prone ranges. A meeting was conducted with the Range Forest Officer (RFO) of respective range to select ten villages where forest fires were occurring in vicinity in a range. On the basis of suggestions of the field officers, and frequency of occurrence of forest fires, ICFRE- FRI team finalized the names of ten villages. The *Forest Fire Control & Management Action Strategies* of respective range was also reviewed.

6.3.5 Data collection in Selected Village of the Fire Prone Range

A questionnaire was prepared by ICFRE- FRI to collect the information on forest fire from the selected forest fringe villages. The questionnaire was prepared after discussion with the senior officers of selected forest fire States and Nodal Officers of forest fire along with leading institute in the field of forest fire management such as National disaster Management Authority (NDMA), Indian Institute of Technology (IIT) and National Institute of Disaster Management (NIDM).

ICFRE- FRI team visited each selected village along with officials of the respective forest range. A meeting was organized with the group of forest fringe villagers of different age group i.e., 25-60 years to collect the information on existing tools, cause of forest fire, strategies adopted by the people to manage/control forest fire as per attached questionnaire in Annexure-I.

Plate 6.1: Mahila Dal to protect forest in Dwarahat Range of Almora Forest Division

6.3.6 Data collection from Range Units in Selected Fire Prone Range

A questionnaire survey was carried out to collect data from selected forest fire prone ranges.

Plate 6.2: Data collection from Forest staff in Dwarahat Range of Almora Forest Division

ICFRE- FRI team visited selected forest range and discussed with officials of respective forest range to collect the information on existing tools, cause of forest fire, strategies adopted by the staff to manage/control forest fire as per attached questionnaire in Annexure-II. Combined information of all the ranges of particular Forest Division was also collected from the office of Divisional Forest Officer.

6.4 Major Causes of Forest Fire in Sub Tropical Pine Forest

ICFRE- FRI team collected the information on major causes of forest fires in sub tropical pine forests. These causes of forest fire were recorded from the forest fringe villagers and State Forest Department through field visit. The causes of forest fire are as follows:

a) Low rate of pine needle decomposition
b) Agricultural residue burning during fire season
c) Burning of forest floor for regeneration of palatable grass
d) Disposing of unextinguished cigarettes/bidis by the people
e) Unextinguished Campfires, Picnic/parties activities by the people
f) Sparking from the running vehicle
g) Burning herbs/shrubs around houses against the protection from wild animals
h) Sparks from electric lines passes through the forests

Plate 6.3: Cattle grazing in pine forest in Almora Forest Division

Plate 6.4: Picnic and resin collection in pine forest in Almora Forest Division

Plate 6.5: Fuel load (pine needles) on forest floor in pine forest in Almora Forest Division

6.5 Pre Fire Season Activities

Fire season in subtropical pine forests start from mid-**February** to mid-**June** every year in India. Pre fire season activities include creation and maintenance of fire lines, awareness programme, pine needle collections, and installations of hoardings etc. are shown in Table 6.4. These are given under following sub heads:

- Demarcation of Fire Prone Area in a Forest Division
- Preparation of Fire Action Plans of Fire Prone Areas
- Creation/Maintenance of Fire Lines
- Control Burning Practices
- Soil Moisture Conservation works
- Management of Weeds
- Establishment of Watch Towers
- Awareness Programmes
- Establishment of Master Control Room (MCR)
- Establishment of Fire Crew Stations
- Establishment of Forest Weather Stations (FWS)
- Establishment of Forest Fire Danger Rating System (FDRS)
- Training and Capacity Building for Fire Station Fire Fighters
- Mock drills for Forest Fire Fighting and Medical Emergency
- Constitution of Forest Fire Committee
- Role of Community in Forest Fire Management

6.5.1 Demarcation/Mapping of Fire Prone Area in a Forest Division

Forest officials will prepare or demarcate those areas inside the pine forest where occurrence of forest fire is reported frequently. This process should be carried out at the level of zonation based on beats or sections, considering three key attributes: frequency of fire occurrences, area affected, and associated losses. The identified zones should be communicated to field units before the start of the fire season. This data can be prepared with the help of Remote Sensing & GIS or ground truthing. This activity should start from **September** onwards and should be completed by **October** of every year by all the field units of fire prone areas.

6.5.2 Preparation of Fire Action Plan of Fire Prone Areas

Fire Action Plan of fire prone areas shall be prepared well in advance by the respective Forest Divisions. It should be based on the fire prone areas mapping and as per actual field requirements. This activity should start from **October** onwards and should be completed by **November** of every year by all the field units of fire prone areas. Fire Action Plan should be prepared to minimize forest fires from taking place. It should spell out roles and responsibilities of different personnel in forest fire management. Local communities should also be actively involved in fire prevention and firefighting operations. This will substantially reduce the vulnerabilities of forests against fire hazards, enhancing the capabilities of forest and other personnel and institutions in fighting fires, and speed up recovery after a fire event.

Major Components of Fire Action Plan:

1. Division Overview
    i. Fire Zonation
    ii. Previous large Fire Occurrences: Causes of fire, area burnt, treatment done for fire suppression, control measures applied and etc.
2. Range/Fire Crew Station level analysis
    i. Range
    ii. Total Area
    iii. Boundary Description
    iv. Forest type
    v. History of large fires: Year wise record and area burnt
    vi. Fire prone status: Low/Moderate/High
    vii. Communication facilities: Availability of wireless device and mobile network connectivity
    viii. Infrastructure: Details of roads, Fire lines and track paths (including width and length)
    ix. Water Sources
    x. Major fire threats
3. Division Level Resource Assessment
    i. Staff strength

ii. Availability of Vehicles

iii. Firefighting Equipments Inventory

4. Needs and Requirements
    - Pre fire season works (Range-wise)
        i. Type of work: Control burning, track paths, Fire lines, etc.
        ii. Location details: Beat, Section, GPS coordinates
        iii. Quantity of work
    - Required Tools and Equipment (Range-wise)
        i. Range Name
        ii. Equipment/Tool name
        iii. Quantity required
5. Details of Fire Control Rooms
    i. Division-Level Control Rooms: Location, staff details, and contact numbers
    ii. Range-Level Control Rooms: Staff details and contact numbers
6. Details of Fire Crew Stations
    i. Range
    ii. Crew Station Room/Number
    iii. Staff details: Names and Contact details
7. Contact Details of District-level Agencies
    i. Contact details of agencies involved in firefighting should be mentioned such as District Collector, Tehsildar, DDMA Control Room, Fire and Rescue Service, District Medical Officer and Local Hospitals.

6.5.3 Creation/Maintenance of Fire Lines

Forest Divisions will ensure the creation and maintenance of existing fire lines for the prevention and spread of the forest fires from one place to another place. The National Disaster Management Authority (NDMA) website distinguishes between two types of fire lines: *Kachha* or covered fire lines and *Pucca* or open fire lines. Kachha fire lines involve clearing undergrowth and shrubs while preserving trees to decrease the amount of available fuel. Conversely, Pucca fire lines are clear-cut areas that create a barrier between forest compartments or blocks to contain potential fire spread. The length and breadth of the fire line are variable and from 3-10 meters. In old reserve forests, the compartment boundary was also demarcated as a clear-felled

strip of fire lines. Besides such artificial fire lines, forest roads, paths, natural streams, etc. also act as fire lines for the advancing forest fires. The activities including creation of fire lines, removal of weeds/grass and vegetation from the existing fire lines should start from **November** and should be completed by **December** of every year.

Plate 6.6: Fire lines created in pine forest to prevent spreading of forest fire

6.5.4 Control Burning Practices

Control burning also known as prescribed burning, involves setting planned fires to reduce the fuel load. All the Forest Divisions should undertake control burning by collecting/extracting pine needles, twigs, dead herb/grass, fallen pine tree branches etc. to a designated place inside the forest and burn them. Prescribed burns are planned when there is a suitable level of moisture in the landscape to make fire easier to control (usually spring or autumn), and when weather conditions are warm and dry enough for fires to start and spread but not too hot or windy that they could get out of control.

The right combination of fuel load, fuel moisture, temperature, relative humidity, and wind speed is all needed for a prescribed burn to be conducted safely and effectively. The area should be

identified on the basis of fire affected area, frequent fire occurrences and demarcation of fire prone areas already covered in Section 6.5.1. This activity should start from **December** and should be completed by **January** of every year by all the field units of fire prone areas. Fire blowers or beaters should be extensively used to clear away the burnt debris. Control burning should be undertaken early morning when wind is blowing slowly or is absent.

Plate 6.7: Control burning practice inside pine forest

6.5.5 Removal/Collection of Pine Needles from Fire Prone Areas

The high resin content in the pine needles makes them highly flammable, contributing to the spread of fires during the fire season. During summers, the shedding of dry needles (the long, slender leaves that grow in clusters) forms a thick mat on the forest floor, which not only affects the growth of regeneration but also, due to the slow rate of decomposition, the needles act as combustible material during the **peak summer season (April** to **June)**. The resin content in the needles also enhances fast combustion of dry litter during summer, making the forests vulnerable to fire.The cones of pine trees can catch fire and roll down hills, spreading the fire to new areas.

Respective Forest Division will ensure the removal of pine needles/cones from fire prone areas with the help of local people before fire season. In Uttarakhand manual collection of pine needles is done above and below 50-100 m from the road in the month of April and June. These activities, including the removal of pine needles and cones from the forest floor, can be conducted year-round regardless of weather and field conditions.

Plate 6.8: Pine needle collection in pine forest to prevent occurrence of forest fire

Uttarakhand Government Launches *Pirul Lao Paise Pao* Campaign

Uttarakhand Chief Minister launched the *Pirul Lao-Paisa Pao* in the Rudraprayag district in May 2024 to prevent forest fires. Under the Pirul Lao-Paise Pao campaign, the local youth and villagers will collect dry Pirul (Pine tree leaves) in the forest and take them to the designated Pirul collection centre. The Tehsildar in their respective areas will manage the Pirul collection centre under the supervision of the Sub-Divisional Magistrate. The Pirul will be weighed and stored at the collection centre, and the villagers or youth will be paid based on the existing price which will be directly transferred to the bank accounts. The Uttarakhand government has designated the Uttarakhand Pollution Control Board to oversee the *Pirul Lao-Paise Pao* Campaign.

Apart from them, people traditionally using pine needles to make beds for domestic animals, as a fertilizer when mixed with cow dung, and to package fruits. Due to pine needles excellent burning capacity, the Uttarakhand government established a 25-kilowatt power plant in the Chakori Dhanari village in the Dunda Block of Uttarkashi district to produce electricity.

Various State Forest Departments may also initiate such scheme for actively participation of forest fringe villagers to collect Pirul by giving some incentive.

6.5.6 Soil Moisture Conservation Works

Extensive soil moisture conservation (SMC) works including check dams, rock check dams, Pirul check dams, earthen dams, contour trenches and gully plugs etc. should be proposed or renewed or repaired or constructed in fire prone area. Pirul check dams are constructed using Pirul (pine needles) woven with iron wires. After weaving, three quintals of Pirul are filled in the net, which is then firmly tied with a coconut rope to ensure stability. The check dam is constructed in a drain, and planting species like Jatropha and Sinwali around it provides protection, reducing the chances of damage to the structure. These check dams are stronger and less expensive than their cement counterparts. Plantation around the dam provides protection from damage and soil erosion. These dams are effective for big drains and can absorb the flowing debris. Such water bodies will not only provide water for firefighting teams but also will improve the moisture regime of the area. The activities including repair or construction of soil moisture conservation bodies in fire prone areas should start from **October** and should be completed by **February** of every year.

Plate 6.9: Pirul Check Dam

6.5.7 Management of Weeds

Major weeds such as *Carissa spinarum, Lantana camara, Berberis spp.* and *Rubus elliptics* in pine forest act as major fuel load during the fire season. The fuel load in the forms of weeds should be reduced by control burning, weed removal, weed eradication programmes. The activities including removal of weeds from the fire prone areas should start from **October** and should be completed by **November** of every year.

Plate 6.10: Lush growth of major weeds inside pine forest causes of forest fire

6.5.8 Establishment of Watch Towers

A large forest area can be monitored through the established watch tower with 24-hour facility for watchers in forest fire prone areas. This is the most effective way for early detection of active forest fires by monitoring forest area from fire lookout towers, especially in fire-sensitive areas of pine forest. Fire watchtowers should be built on high peaks and vantage monitoring points so that the smoke rising from the ground can be seen during the fire. Watchtowers need to be spaced out optimally for maximum coverage for forest fire monitoring, taking into account terrain conditions and the effective detection range of the cameras mounted on watchtowers at

various heights. As soon as the fire is detected from the watch towers, the staff will immediately inform/alert about the active fire to the nearest fire crew station. Monitoring of forest fire through watch towers by the staff will start from mid- **February** to mid-**June** i.e., fire season.

6.5.9 Establishment of Communication Networks

Beats or sections lacking mobile network coverage should be identified during fire-prone area mapping. A reliable wireless communication system should be established in these areas before the fire season. All the communication channels including wireless network, mobile phones etc. should be checked and kept in readiness.

6.5.10 Awareness Programmes

Most forest fire incidences in India are human induced (anthropogenic) and deliberate. Local people often set fire inside pine forest to promote a new flush of grass in the dry season for their cattle.

State Forest Department should conduct extensive awareness programs and workshops targeting the groups responsible for forest fires. The target groups may include school and college students, women folk who go to forest areas to collect fuelwood and fodder, community leaders and village elders, farmers who work in the vicinity of forests, and tribals and nomads living in and around forest areas. Society and local people should be educated about the ill effects of forest fire and negative impact on their health as well as health of forest ecosystem.

Plate 6.11: Poster distributed to local people by Almora Forest Division on forest fire

These can be done through printed materials like posters, pamphlets, booklets, sensitization through local TV channels, use of multimedia, video film etc. These printed materials describe the do's and don'ts, precautions and instructions regarding forest fire. The printed materials should be distributed in forest fringe villages, Van panchayat meetings, schools, etc. Wall writing or hoardings is also a common practice for creating awareness regarding forest fires to passenger passage from pine forest. Hoardings should be installed along roadside for information dissemination regarding forest fires. The publicity material provides guidance to local people on measures to be taken in case of occurrence of forest fire. The activities including extensive awareness programs, workshops, installation of hoardings, wall paintings and distribution of printing materials on forest fires should start from **January** onwards and to be continued till onset of **monsoon** every year.

6.5.11 Establishment of Master Control Room (MCR)

MCR is to be established at Division level with the following duties and responsibilities:

i. The phone number of all the officers and employees of State Forest Department, police department, Health Department, Fire Brigade and the public representatives such as Gram Pradhans, social leaders should be maintained in offices and crew stations so that they can be contacted immediately when needed for assistance.
ii. Details of all the related crew stations and command areas should be kept in place; also, the route details for all these should be kept in the premises for information.
iii. Information about the daily forest safety routine should be displayed in the premises.
iv. Calculating the Fire Danger Rating Index and releasing the information-bulletin every day at 2 pm and providing the task details to each and every range/crew stations.
v. Deploying the forest fire security team to the fire spot quickly to help the local staff and respective crew station employees and workers in case of any fire accidents.
vi. As per the need the food materials, water and other amenities should be supplied to the other fire security teams. Also, a medical kit should be kept to help any injured employee or worker.
vii. To establish linkages among the different government agencies like Gram Sabha, block level administrative (BDO) and police officials and other key line departments. Quarterly

meetings with them to be initiated before start of fire season. Roles and responsibilities of line departments to be specified. Meeting to be held at Forest Division level.

viii. Evaluating and effective monitoring of the forest fire accidents and recording the causes of the accidents.

ix. Maintaining all the records. After the fire period is over, the process of investigating and analyzing the fire accidents should be ensured.

6.5.12 Establishment of Fire Crew Stations

Appropriate number of fire crew stations should be established to combat and monitor the events of forest fire in forest fire prone area. Each forest fire crew station should have a staff of minimum of **4-5 people** in case of sensitive zone and at least **8-10 people** in case of most sensitive zone, who should have all types of fire extinguishing equipment. Each fire crew station should have a vehicle to mobilize the fire crew team from fire crew station to active forest fire point, wireless set, fire protection gear (fire safety unit, goggles and boots). Apart from this, all the crew members should be trained which are to be posted at fire crew station through joint mock drill by selecting suitable fire prone site before starting the fire season. In the event of a large fire, trained personnel from all departments should actively participate in firefighting efforts. Additionally, schools in the area should be engaged, with teachers and students educated on fire prevention measures so they can assist forest staff when needed. Fire drills should be conducted in key locations once every week in pre-fire season.

The activities including mock drill, testing of fires equipment/tools and training should be completed by **January** of every year.

6.5.13 Establishment of Forest Weather Stations (FWS)

Forest Weather Stations at range level can be established in fire prone areas to monitor climate conditions and to prevent occurrence of forest fires through weather analysis of respective forest type. These weather stations would be equipped with sensors for temperature, humidity, wind speed, wind direction, precipitation, etc., and would be capable of monitoring weather conditions in real time. By analyzing this data, the likelihood of fire spread can be assessed. A team of expert members will monitor/track daily or weekly weather data for temperature, humidity, and wind speed which would help in assessing fire risks and guide fire prevention strategies. Forest

Weather Stations establishment works can be completed before starting of fire season in fire prone areas.

6.5.14 Establishment of Forest Fire Danger Rating System (FDRS)

The Forest Fire Danger Rating System will enable State Forest Department to assess the fire risk for a specific area, either for the current day or the following day. It will indicate conditions that represent the potential for a fire to ignite, spread, and demand suppression efforts over a wide region. The system will integrate the current and anticipated conditions of key fire danger factors into one or more qualitative or numerical indices, reflecting the fire protection requirements of a given area.

6.5.14.1 Components of the Fire Danger Rating System

Forest Fire Danger Rating System will include following components:

6.5.14.1.1 Establishment of Base Station

Appropriate number of Base Stations can be established for a division as per the fire prone zonation. The Base Station should be equipped with wireless set and weather station. Wireless set is to send and receive information from crew station, Master Control Room, and other sources. The weather station should comprise of rain gauge for measuring precipitation along with instruments for measuring Humidity, Temperature and Dew Point. On daily basis, Base station should record the weather parameters of forest fire prone areas and send it to the MCR by 12:00 noon for calculating the Fire Danger Rating Index and Fire Danger Levels for all the Base Stations. On receival of the Fire Danger Levels (Nil, Moderate, High and Extreme), the Base Station should immediately pass on and alert the respective Crew Stations to act.

6.5.14.1.2 Weather Data Collection

The FDRS relies heavily on real-time meteorological data. Therefore, Base Stations should record following weather parameters:

- **Temperature:** High temperatures dry out vegetation, making it more flammable.
- **Relative Humidity:** Lower humidity increases the likelihood of fire ignition as dry air extracts moisture from fuels.

- **Wind Speed and Direction:** Wind can spread fires quickly by carrying embers and intensifying flames.
- **Precipitation:** Rainfall helps dampen fuels, reducing fire risk, while extended dry periods increase fire danger.
- **Dew Point**

6.5.14.2 How the Fire Danger Rating System Works

6.5.14.2.1 Data Input and Processing

Weather data (temperature, humidity, Dew point, and precipitation) is fed into the established formula for calculating the Fire Danger Rating Index. In modern FDR systems, automated weather stations and satellite-based sensors continuously provide real-time data.

FIRE DANGER RATING INDEX

A simple Fire Danger Rating Index developed by Nesterov (1949) should be used in MCR. The Fire Danger Rating Index is based on the following parameters.

1. Days without rains.
2. Dry bulb temperature.
3. Dew point temperature (Calculated from relative humidity & temperature)

$$N=\varepsilon(ti-Di) \times t + W$$

Where, i = 1, N= Nesterov Index, t=Temperature °C

W= Number of days since the last rainfall > 3 mm, D= Dew point temperature °C

The Index requires daily observation of **temperature, humidity & precipitation**. The difference between the daily temperature and dew point temperature is multiplied by temperature and cumulatively added over the days since the last rainfall. The system is divided into the following Fire Danger Levels:

FIRE DANGER LEVELS	
0-300	Nil
301-1000	Moderate
1001-4000	High
4001+	Extreme

For calculating the Fire Danger Levels on the basis of recorded temperature, humidity and precipitation, along with detailed illustrations kindly refer to the following spreadsheet in the following link:

LINK: *https://drive.google.com/drive/folders/13JfYSkEePjdTYWry7lUqV0HatBqHgImB*

These Fire Danger Levels are qualitative and simplistic for on ground Crew Station staff and communicated to all the Base Stations. On receival of the Fire Danger Levels (Nil, Moderate, High and Extreme), the Base Station should immediately pass on and alert the respective Crew Stations to act.

- This data is processed to assess current conditions and predict near-future scenarios.

It is also suggested that till such time the Forest Department is unable to set up the departmental FDRS, they can follow FDRS developed by FSI on **VAN AGNI GEOPORTAL**.

6.5.14.2.2 Fire Danger Classes

The processed data is used to assign a fire danger rating, typically divided into different levels:

- **Nil (Green):** If the Fire Danger Rating Index is between 0 and 300.
- **Moderate (Yellow):** If the Fire Danger Rating Index is between 301-1000.
- **High (Pink):** If the Fire Danger Rating Index is between 1001-4000.
- **Extreme (Red):** If the Fire Danger Rating Index is above 4001

A Fire Danger Class should be given to each base station based on the FDRI value. These ratings should be displayed on public signage, websites, and apps to inform the general public and relevant authorities.

6.5.13.2.3 Fire Danger Map

Many fire danger rating systems generate fire danger maps, which visually depict areas of varying fire risk using color-coded zones like Least Sensitive, Sensitive, and Most Sensitive. These maps are vital for fire authorities and land managers to allocate resources and focus on high-risk areas.

6.5.13.2.4 Digital Forest Fire Monitoring

When the fire danger rating reaches a certain level, early warning systems may trigger public alerts through various platforms, such as television, radio and social media. Mobile application can be developed and used by the forest staff to log the status of various forest fire incidents to State Level Database. These logs should include time stamped and geo tagged images. Officials can log in to a portal and view a dashboard with summary reports automatically generated from

this database. The local public should also be granted access to the mobile application to report fire incidents. To ensure access and functionality, users must register on the app.

6.5.14.2.5 Pre-Determined Actions taken according to the Fire Danger Rating Index

i. When the Fire Danger Index is Minimum/Nil

When the fire danger index is minimum then following actions should be taken by the crew stations:

1) Conduct regular maintenance and necessary repairs of all fire-fighting tools and equipment to ensure they are in optimal working condition.

2) Organize awareness meetings in local villages, civil areas, and Van Panchayats.

3) Affix all the torn posters. Write forest safety slogans on the walls at various places in the region.

4) Inform Gram Pradhans, Regional Panchayat members, other public representatives including the Patwaris, and Tehsildars about the safety of their critical areas and their responsibilities in Forest Fire Protection.

5) All the Panchayats where combustible materials are stored in huge quantities should be informed about the safety. The meetings should be conducted to provide them technical knowledge and steps to be taken accordingly by them when incident occur.

6) Engage with local community-based groups such as Mahila Mangal Dals and Yuvak Mangal Dals to seek their support in maintaining forest safety.

7) Review and investigate past fire incidents to determine causes and take corrective measures to avoid recurrence.

ii. When the Fire Danger Index is Moderate

When the fire danger index is moderate then following actions should be taken by the crew stations:

1. Carry out systematic cleaning and controlled burning along designated fire lines, routes and highways to prevent the spread of fire.
2. Inform the local groups such as Mahila Mangal Dals, Yuvak Mangal Dals, and other security committees to remain alert at the areas such as old plantation, critical areas and at the places where the accidents have taken place in the past.

3. Different schools under the area should be contacted and the teachers and students are addressed for fire protection so that they may help the forest staffs when needed.
4. Fire drills should be conducted at all important areas in rotation.

iii. When the Fire Danger Index is High

When the fire danger index is high then following actions should be taken by the crew stations:

1. Continuous patrolling and fire drills should be compulsorily conducted every day.
2. All the local people should be contacted and are informed about the increased fire index so they stay alert to prevent fire.
3. People residing in nearby areas who have vehicles (taxi or car) should be contacted in advance and convinced to be ready to help the crew stations with their vehicle in any emergency.
4. The written information about fire index should be issued to all Gram pradhans and Patwaris, describing their roles and responsibilities in preventing the fire accidents in their respective area.

iv. When the Fire Danger Index is Extreme

When the fire danger index is extreme then following actions should be taken by the crew stations:

1. The actions done in case of high fire danger index should be repeated and in addition all the critical areas falling under the command area should be patrolled day & night compulsorily.
2. As per the need in the crew stations additional work force should be arranged in advance.
3. Facility of additional rented taxis and vehicles as per the need in the area should be kept at the disposal of the crew station beforehand.

6.5.15 Training and Capacity Building for Fire Station Fire Fighters

Training programs should be conducted, and firefighters at the fire station should undergo certified courses offered by various institutes.

6.5.16 Mock Drills for Forest Fire Fighting and Medical Emergency

Mock drills simulating emergency forest-fire fighting situations should be conducted prior to the fire season. Apart from the State Forest Department, the drills should involve the concerned line departments at the district level, including the Revenue Department personnel, the Fire and Rescue Department, and the District Medical Officer. The DDMA should also be involved in the said exercises for advanced preparedness. Firefighting team may sustain serious injury from active fire during the firefighting due to dehydration (body water loss), suffocation and burning of skin (body contact with active fire) etc. A mock drill on medical emergency related to forest fire can be practiced (such as CPR, artificial respiration) by organizing a mock drill by medical officers of respective forest division in the month of **January** of every year. Insurance coverage can also be provided for crew station members.

6.5.17 Constitution of Forest Fire Committee

6.5.17.1 State Level Forest Fire Committee (SLFFC)

A State Level Forest Fire Committee (SLFFC) will review the progress of District Level Forest Fire Committee (DLFFC) in the month of November/December for pre fire season activates and in the month of July/August for post fire season activities completed by the DLFFC.

State Level Forest Fire Committee (SLFFC) will be organized under the chairmanship of Chief Secretary. Following will be members of SLFFC:

- Chief Secretary – Chairperson
- Principal Secretary (Forest) – Member
- Principal Secretary (Home) – Member
- Principal Secretary (Panchyati Raj) – Member
- Principal Secretary (Rural Work Department) – Member
- Principal Secretary (Health) – Member
- Principal Secretary (Education) – Member
- Secretary (Disaster Management) – Member
- Principal Chief Conservator of Forest/HoFF - Member Secretary

Other departments may be co-opted as per requirement. The role of the proposed SLFFC would be to ensure effective coordination among the different related departments and their active participation in the control and management of forest fire.

6.5.17.2 District Level Forest Fire Committee (DLFFC)

DLFFC will review the progress of forest fire action plan prepared by respective members of the committee in the month of November (pre fire season), June (during fire season) and August (post fire season) of every year.

District Level Forest Fire Committee (DLFFC) will be organized under the chairmanship of Chief Conservator of Forest. Following will be members of DLFFC:

- Chief Conservator of Forest (CCF)- Chairperson
- District Magistrate (DM) – Member
- Senior Superintendent of Police (SSP)– Member
- Chief Medical Officer (CMO) – Member
- District Disaster Management Officer– Member
- Nodal Officer Forest Fire - Member
- Deputy Conservator of Forest (DCF)- Member Secretary

Other departments may be co-opted as per requirement. The role of the DLFFC would be to ensure following:

- ✓ Implementation of Forest Fire Action Plan
- ✓ Availability of resources (vehicle/manpower/tools/source of water) with Forest Departments/line departments
- ✓ Medical facilities available for fire fighting team (FFT)
- ✓ Awareness programme/capacity buildings conducted by Forest Department (FD)

District Level Forest Fire Committee (DLFFC) will forward the information to State Level Forest Fire Committee (SLFFC) in Format III in the first week of November and July of every year.

6.5.18 Role of Community in Forest Fire Management

In India, Joint Forest Management (JFM) Committees have been established at the village level to involve people in forest protection and conservation. The JFMC is also known by different

names in different States, such as Forest Protection Community (FPC), Village Forest Committee (VFC), Van Sanrakshan Samiti (VSS), Van Panchayat Samiti (VPS) and Eco-Development Committees (EDCs) etc. Currently, there are over 1,18,000 JFMCs protecting roughly 22.93 million hectares of forest land, involving around 14.5 million families (MoEF&CC, 2010). The Committees also have been given responsibilities to protect the forests from fires.

Panchayat should be involved by respective Forest Division in plantation activities and beating/dousing of active forest fire in nearby forest areas. Forest Department will carry out capacity building of local forest fringe villagers through training/mock drill, provisioning firefighting equipment for forest fire prevention and management.

A resource assessment mapping should be carried out by the Range Forest Officer along with the Panchayat Pradhan as per the attached Proforma-I and II. The resource assessment should include details of water sources in and around the forest fringe villages along with vehicles, manpower, tools etc.

6.6 During Forest Fire Season Activities

It includes detection and management of active forest fire during the fire season. These activities are given under following sub heads (as shown in Table 6.4):

- Deployment of Fire Watchers
- Mobilization of Firefighting Team
- Escalation Matrix
- Real Time Monitoring of Forest Fire Alerts
- Beating or Dousing Active Forest Fire
- Post Beating or Dousing Active Forest Fire Activities
- Precautions taken by Forest Staff or Local People during Fire Beating or Dousing
- Reporting and Record Keeping

6.6.1 Deployment of Fire Watchers

There should be increased surveillance through adequate number (as per fire severity and occurrence of forest fire) of firewatchers during the months of February to June. This was the practice in earlier years also. This will help in carrying out frequent patrolling in forest fire prone

areas by the fire watchers/forest officials during the fire season. Forest firefighters, from DFOs to fire watchers, should be registered with the FSI alert system. Drones can be used for monitoring forest fires, and training should be provided for their operation. Drones play a crucial role in firefighting operations by providing aerial surveillance. With real-time data and visuals, drones capture the dynamic nature of fires, allowing accurate assessment of size, spread, and behavior. High-resolution cameras on drones help firefighters make informed decisions on resource allocation, evacuation, and firefighting strategies. Additionally, thermal drones detect hotspots and locate trapped individuals. This information helps prioritize efforts, deploy resources effectively, and potentially save lives by identifying those in need of immediate rescue.

6.6.2 Mobilization of Fire Fighting Team

A forest fire fighting team of 4-5 members will reach at the site of active fire. This firefighting team will keep with them wireless, firefighting kit, leaf blower, water bottle and food packets. A medical safety kit having emergency medicines suggested by the medical officer during mock drill on fire related emergencies must be kept with them. After reaching at the active fire site, firefighting team will start beating or dousing forest fire with the help of equipments/tools available in firefighting kit.

6.6.3 Escalation Matrix

There are two types of forest fires occur in sub tropical pine forests viz., crown fire and surface fire.

Surface Fires: Surface fire is the most common type of forest fire in the pine forests. Surface fires occur on or near the ground and burn surface litter, grasses and regeneration. As it runs on the ground surface it requires continuous contact with the ground and fuel material lying on the forest floor. Surface fires are generally not very severe but they burn the seedlings and thus recurring surface fires affects the regeneration of forests and proliferates invasion and spread of unpalatable weed plants.

Crown Fires: A Crown fire is defined as a forest fire that spreads through the crown of trees. Crown fire burns through the tops of the vegetation i.e., the crown of trees, consuming foliage and branches, usually killing the trees. Crown fires occur most frequently in pine forests in the Shivaliks and Himalayas.

To enhance effectiveness and ensure coordination in firefighting efforts, the chain of command established by the National Disaster Management Authority (NDMA) should be followed. This includes coordination with the District Disaster Management Authority (DDMA), State Disaster Management Authority (SDMA), State Disaster Response Force (SDRF), National Disaster Response Force (NDRF), and the Indian Air Force (IAF).

Forest fire situations can be divided into following five levels based on severity, duration, and assigning specific roles to corresponding administrative units in sub tropical pine forests.

All forest fires categorized by the FSI Forest Fire Alert System (Large Forest Fires Monitoring Programme) as Large Forest Fires are to be included for the purpose of this chain of escalation:

Level 1 (Forest Beat/Range): All active surface fires should be managed by the frontline staff of respective range at this level. The response here should focus on the suppression of all active surface fires occurring in the beat or range.

Level 2 (Forest Division): When fires escalate to large forest fires and it continues until 3 days. At this level, the emphasis should be on suppression of active surface fires at forest division level by involving the frontline staff of respective forest division.

Level 3 (District Disaster Management Authority) (DDMA): The DDMA should be involved in forest fire suppression efforts when a large fire persists for 4–6 days or in cases of crown fires lasting up to 2 days. SDRF should be called if such fires continue in Protected Areas.

Level 4 (State Disaster Management Authority/State Disaster Response Force):The SDMA/SDRF should be mobilized when large forest fires extend beyond 6 days or when crown fires persist for more than 2 to 4 days. NDRF should be called if such fires continue in Protected Areas. The Indian Air Force (IAF) may also be involved at this stage, depending on ground realities.

Level 5 (National Disaster Response Authority/National Disaster Response Force): NDRF should be involved when large forest fires continue for more than 10 days, or there are multiple large forest fires in a forest division or across a state or Union Territory. Crown fires lasting beyond 4 days may also require involvement of NDMA. At this stage, Indian Air Force may also be involved.

6.6.4 Beating or Dousing Active Forest Fire

A team of 4/5 members will start beating or dousing active fire with the help of available tools when the wind is blowing slowly.

If the wind is blowing at high speed, two to three team members will extinguish the active fire using available tools. Meanwhile other members will start to clean or sweep the forest floor in the form of a linear strip of width of one meter from a distance of 15-20 meters from beating point. Fuel load from forest floor can be swept with the help of fire raker, fire broom, panja and leaf blower.

Sometimes active fire could not be stopped with the help of cutting fire line locally known as *batiya* in the form of linear strip. Then, counter fire practice could be adopted to control active fire. Counter fire will be initiated from opposite direction of active fire at a distance of 20-30 meter from the point of active fire. When the active fire will reach at these points then due to non-availability of fuel it will stop further spreading out.

If intensity of active fire is very high then forest official should also involve help from local people to control forest fire through above detailed methods.

6.6.5 Post Beating or Dousing Active Forest Fire Activities

Once active fire has been doused completely then, the firefighting team will ensure that all other inflammable materials including twigs, cones (locally known as *theeta*) and fallen woods are doused completely. This can be ensured with the help of fire beater by beating the burnt area. If any smoking materials lying on burnt area are smoldering then it should be doused out completely with the help of fire beater. This will prevent further spreading of forest fire from burnt area.

6.6.6 Precautions Taken by Forest Staff or Local People during Fire Beating or Dousing

Intensity of forest fire may increase or decrease during beating of dousing active forest fire. Therefore, it is necessary to take proper precautions during controlling or dousing active forest fire. These are given as:

- Wearing of fire proof dress including gloves, goggles, boots etc. by firefighting team
- Availability of drinking water for the firefighting team
- Availability of first aid facilities including ambulance
- Ensure beating from a distance to avoid dehydration

- Knowledge of alternate path inside the forest during emergency
- Availability of active or functional communication channels in case of any emergency

6.6.7 Reporting and Record Keeping

Formats should be developed and utilized in the field for daily, weekly, and monthly reporting (attached in Annexure-III).

6.7 Post Forest Fire Season Activities

Post fire activities play an important role in restoration and assessment of fire affected areas etc. are shown in Table 6.4. These activities are given under following sub heads:

- Burnt Area Assessment
- Restoration of Fire Affected Areas
- Post restoration Monitoring of Fire Affected Areas
- Award to best performing Van Suraksha Samiti/JFMCs/Van Panchayat

6.7.1 Burnt Area Assessment

Range Forest Officer will collect information on the entire fire incident in their particular range. Range Forest Officer will assess the area and damage caused by forest fire. Assistant Conservator of Forest (ACF/SDO) will prepare a report on area by forest fire and will submit this report to Divisional Forest Officer (DFO) immediate after suppression of each forest fire events during the fire season. This report would be reviewed by Divisional Forest Officer. Divisional Forest officer will authenticate/finalize this report before submitting it to PCCF & HoFF office within a month after receiving this report from Sub Divisional Officer.

6.7.2 Restoration of Fire Affected Areas

Assistant Conservator of Forest (ACF/SDO) will collect information of all the fire affected sites for all the respective ranges. Divisional Forest Officer will assess the damage caused by forest fires in the Division. Divisional Forest Officer will submit a detailed report of assessment either range wise or combined report to Conservator of Forest (CF). If considerable damage to existing flora has taken place, then respective Forest Division shall take suitable actions to restore the burnt area through appropriate schemes such as plantations or plantation of fire-resistant species,

restoration models, silvicultural practices, SMC works and enclosure the area for naturally regeneration etc.

6.7.3 Post Restoration Monitoring of Fire Affected Areas

Range Forest Officer will prepare a map of fire affected sites with the help of concerned range staff. All the recorded site will be mapped using appropriate software or with the help of GIS technology. Yearly data including GPS location, area (burnt or un-burnt) in hectare, name of beat/compartment will be recorded separately in a prescribed data collection format. The prepared data shall be uploaded on FSI portal or respective Division portal by the office staff of DFO. These all above activities will be ongoing throughout the year and frequent monitoring of restored sites will be continued to till 03 years.

6.7.4 Award to best performing JFMCs/Van Panchayat

Van Panchayats (VP) are autonomous local institutions controlling forests in India. Van Panchayats are responsible for protecting forests including pine needle collection, awareness campaign, control burning practices and conservation and improvement of forests. Award should be given to best performing by JFMCs/Van Panchayat every year for control of forest fire.

6.8. Calendar for Pre Fire, During Fire and Post Fire Activities

Table 6.4: Calendar for Pre Fire, During Fire and Post Fire Activities

SN	Particulars	Month	Action to be taken
	PRE FIRE ACTIVITIES		
1.	Demarcation of Fire Prone Area in a Forest Division	September–October	Divisional Forest Officer
2.	Preparation of Fire Action Plans of fire prone areas and review by state fire committee	Before starting of fire season i.e., October-November	Divisional Forest Officer
3.	Creation/Maintenance of Fire Lines	November- December	Divisional Forest Officer

4.	Control Burning Practices	December – January	Range Forest Officer
5.	Removal of pine needles from fire prone areas	October onwards & completed by January	Range Forest Officer
6.	Soil Moisture Conservation works	October – February	Range Forest Officer
7.	Management of Weeds	October– November	Range Forest Officer
8.	Establishment of Watch Towers	February onwards to till ending of fire season	Divisional Forest Officer
9.	Establishment of Communication Networks	Before January	Divisional Forest Officer
10.	Awareness Programmes	January onwards & to be continued till onset of monsoon	DFO/Range Forest Officer
11.	Establishment of Master Control Room	Before February	Divisional Forest Officer
12.	Establishment of fire crew stations	January	Divisional Forest Officer
13.	Establishment of Forest Weather Stations (FWS)	By January	Divisional Forest Officer
14.	Establishment of Forest Fire Danger Rating System (FDRS)	By January	Divisional Forest Officer
15.	Training and Capacity Building for Fire Station firefighters	January- February	Divisional Forest Officer
16.	Mock drill for firefighting and medical emergency	By January	Divisional Forest Officer
17.	Constitution of Forest Fire Committee	-	-
18.	Role of Community in Forest Fire Management	January onwards & to be continued till onset of monsoon	Divisional Forest Officer
DURING FIRE ACTIVITIES			

19.	Deployment of Fire Watchers	February-July	Beat Incharge
20.	Mobilization of firefighting team	February-July	Range Forest Officer
21.	Escalation Matrix	February-July	Divisional Forest Officer
22.	Beating or dousing active forest fire	February-July	Beat Incharge/Range Forest Officer
23.	Post beating or dousing active forest fire activities	February-July	ACF/Ranger Forest officer
24.	Precautions taken by forest staff or local people during fire beating or dousing	February-July	Range Forest Officer
25.	Reporting and Record Keeping	February-July	ACF/Range Forest Officer
POST FIRE ACTIVITIES			
26.	Burnt Area Assessment	Immediate after suppression of each event of forest fire	Assistant Conservator of Forest/Divisional Forest Officer
27.	Restoration of fire affected areas	July-September	Divisional Forest Officer
28.	Post restoration monitoring of fire affected areas	Up to 03 years	Range Forest Officer
29.	Award to best performing JFMCs/Van Panchayat	December	Divisional Forest Officer

* These activities are indicative and can be customized by the State Forest Departments based on actual field conditions.