

NATIONAL ACTION PLAN ON FOREST FIRE

FOREST PROTECTION DIVISION

MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE

GOVERNMENT OF INDIA

NATIONAL ACTION PLAN ON FOREST FIRE

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List of Abbreviations

1. NAPFF: National Action Plan on Forest Fire
2. MoEF&CC: Ministry of Environment, Forest and Climate Change
3. SFD: State Forest Department
4. DFO: Divisional/District Forest Officer
5. FSI: Forest Survey of India, Dehradun
6. ICFRE: Indian Council for Forestry Research and Education, Dehradun
7. NDMA; National Disaster Management Authority
8. SDMA: State Disaster Management Authority
9. DDMA: District Disaster Management Authority
10. NDRF: National Disaster Response Force
11. SDRF: State Disaster Response Force
12. DFE: Directorate of Forest Education, Dehradun
13. CAMPA: Compensatory Afforestation Fund Management and Planning Authority
14. JFMC: Joint Forest Management Committee
15. SOP: Standard Operating Procedure
16. ICT: Information and Communication Technology
17. NTFP: Non Timber Forest Produce
18. EDC: Eco-development Committee
19. FRA: Forest Rights Act (Scheduled Tribes and other Traditional Forest Dwellers { Recognition of Forest Right Act, 2006}
20. WPO: Working Plan Officer
21. IT Cell: Information Technology Cell
22. SHG: Self Help Group
23. MNREGA: Mahatma Gandhi National Rural Employment Guarantee Act.

National Action Plan on Forest Fires

1. Statement of Purpose

Fires, both accidental and deliberate, have always played a very important role in shaping forests since ancient times. In India most of the forest fires are attributable to anthropogenic reasons. Communities use it to prepare lands for shifting cultivation, clear forest floor for NTFP collection, promote grass growth for grazing. Criminal gangs of poachers use it to force wild animals come out of safe hiding places, while unintentional fires caused by careless throwing of burning matchsticks and escape of cooking fire from temporary shelters for road workers also account for many forest fires. Forest Survey of India has reported that 54.40% of forests in India are exposed to occasional fires, 7.49% to moderately frequent fires and 2.40% to high incidence levels while 35.71% of India's forests have not yet been exposed to fires of any real significance. Major affected areas lie in the North East India and in the forests on the Deccan plateau. Prolonged droughts make forests vulnerable to fires and the changing climate further aggravates their vulnerability. The fragmentation of most of Indian forests, interspersed with habitations of all sizes, results in high human presence in most forested areas which adds to their vulnerability to fires.

The objective of this National Action Plan on Forest Fires, hereinafter referred to by its abbreviations NAPFF, is to minimize forest fires from taking place by informing, enabling and empowering forest fringe communities and may be incentivizing them to work in tandem with the forest departments. This will substantially reduce the vulnerabilities of forests across the diverse forest ecosystems in the Indian subcontinent against fire hazards, enhancing the capabilities of forest and other personnel and institutions in fighting fires, and speed up recovery after a fire event.

2. General Principles

- i. The prescribed actions in this NAPFF are intended to guide and assist the policy makers, administrators, forest officers, frontline staff, forest user agencies, forest

fringe communities, visitors to forests, and civil society, for a holistic management of fires in forests.

- ii. Preventing fires from taking place and improving resilience of the forests against fire hazards shall form priority in forest management policies, strategies and programs with well-defined aims of conservation of biodiversity, wildlife and forest wealth.
- iii. The safety of the people, both resident and transient, firefighters, and fire managers shall always be accorded the highest priority during fire events.
- iv. There shall be a clear line of command for assuming the lead role and duties in the event of a forest fire.
- v. Districts shall form the units for Forest Fire Management planning and implementation for ease in coordination with the Disaster Management Authorities at the national, state and district levels.

3. Fire Risk Zonation and mapping

Forest fire risk zonation provides a scientific basis for identifying areas of priority for management interventions, allocating resources to priority areas, and monitoring the effectiveness of measures to reduce or control fire risk. These risk zones shall be reviewed and updated at least once every five years to respond to any changes in the abovementioned factors.

3.1 Risk factors

The following factors, among other locally relevant, may be considered for identifying and quantifying fire risks:

- i. *Fuels*, including forest cover and type as a broad indicator of fuel type. Optionally, states may perform field-based studies to measure fuel load and type;
- ii. *Proximity to infrastructure, property, and other assets*, including roads, habitations and other buildings, agricultural lands, transmission lines, and railways;

- iii. *Topography*, including slope, aspect, elevation, terrain ruggedness and other characteristics;
- iv. *Social indicators*, including local dependence on forests for livelihoods, poverty, and traditional land use practices;
- v. *Historic fire occurrence and patterns* may be used to identify areas that are most prone to fires. Fire records prior to 2003 may be geo-referenced and mapped. This historical data can be used to validate the results of analysis.;
- vi. *Areas of special ecological or cultural importance*, including protected areas, historic sites, designated heritage sites, temples, pilgrimage routes, etc.; and
- vii. *Special ecological conditions*, for example, bamboo flowering, may be considered and provided weights.

3.2 Use of fire risk zones in forest planning

The results of the forest fire risk zonation shall be translated into concrete management actions under the forest working plans. The Working Plan Officers (DFOs in the case of Plans already in operation) shall identify activities or interventions to mitigate fire risks or reduce impact of the fire hazards in high-risk areas. These may include creation of additional fire lines, watch towers and other infrastructure in vulnerable areas. The same shall be examined speedily by the appropriate authorities for approval and making provisions for financing the approved activities. The Annual Plan of Operations for all forest divisions and circles, and protected areas, shall include the approved activities and interventions mentioned above. The state planning and finance departments shall prioritize resource allocation for forest fire management.

(Action by SFDs)

(Monitoring by SFDs and MoEFCC)

4. Preventing forest fires

Most forest fires are manmade and are linked to socio-economic and livelihood issues of the forest fringe communities. It should, therefore, be possible to greatly reduce the forest fire incidences by making these communities aware of the many tangible and intangible benefits lost to them, both individually and collectively, due to forest fires. Following actions are proposed to be taken in this regard:

4.1 Effective communication strategy for awareness generation

A mass communication strategy with adequate financial provisions for five years shall be framed by each SFD within two months for vigorous publicity and sensitization of the state in general and local communities in particular. It should be specifically targeted at students, farmers, women groups, cattle herders, NTFP collectors, infrastructure related professionals, urban dwellers, tourists and pilgrims, among others. Information on forest fire and its adverse effects should also be included in the school curriculum at several levels. The strategy would identify most effective means for reaching out to different target groups like school campaigns, campaigns on Radio, TV, and social media, mobile campaigns during festival season, organization of music festivals, and setting up information portals, among others.

(Action by SFDs)

(Monitoring by SFDs and MoEFCC)

4.2 Empowering Communities to deliver on their responsibilities

The existing forest laws mandate the forest officials to seek participation of local communities in fire management. Under the FRA the forest areas recognized under community rights are mandated to be sustainably used by the right holding forest dweller community which places on them the responsibility of conservation of these areas. Similar responsibilities rest on the communities practicing shifting cultivation for protection of forests against damage by fires under their respective state laws. Similar expectations are also placed on the JFMCs and Van Panchayats in relation to the forest lands under their jurisdictions. These

communities would be better placed to shoulder these responsibilities if they are adequately empowered with delegated authority and funds. The communities could also be incentivized for their cooperation in fire prevention and control measures in the form of money, rewards, social recognition, preference in Government schemes, etc. The SFDs may evolve state specific mechanisms for this purpose in tune with relevant laws and traditional practices.

(Action by SFDs)

(Monitoring by SFDs and MoEFCC)

4.3 Capacity building of communities

The capacity of community organizations in prevention and control of forest fires should be enhanced by periodical training and capacity building programmes. Forest fire alerts information should also be provided to JFMC/EDC/Van Panchayat members and they should also be provided with firefighting equipment including leaf litter blowers, other tools and protective clothing. The community members should be duly involved during the mock drills on forest fire before fire season. In the Micro plan of the JFMCs, there should be a separate chapter for forest fire management which should contain the details of vulnerable areas, location of natural & man-made water sources, other infrastructure available for fire prevention and management etc.

(Action by SFDs)

(Monitoring by SFDs and MoEFCC)

5. Increasing the resilience of forests to fires

Management interventions for increasing resilience to forest fires may be planned according to the vulnerability to forest fires as reflected in the risk zonation maps. Following are some of the measures which could be adopted in this context.

5.1 Moisture and water conservation

As fire hazard is more in drier and deciduous habitats and areas with predominance of grasses, management action would need to aim at moisture retention for longer time after rains and appropriate preventive measures to ensure that minor fire incidences do not escalate into major fire events. A long-term plan for improving the water regime of the forest areas based on opportunities and feasibility will be useful in reducing vulnerability to fires. Several existing programs for eco-rehabilitation and catchment area treatment plans provide scope for this kind of work.

(Action by SFDs)

(Policy support by MoEFCC)

5.2 Forest floor biomass management

When necessary management interventions may be planned aiming at minimizing accumulation of dry fuel material on forest floor in the fire season. The litter and other biomass on the forest floor leading to fire danger could be gainfully utilised for the benefit of the society in identified areas. A framework for biomass management is suggested below and SFDs are encouraged to experiment with appropriate caution.

- a. Collection of forest floor biomass such as fallen pine needles for use in briquets may be encouraged by the waiver of royalty and transit fee for such collections.
- b. Policies for promoting biomass based off-grid micro power plants in remote areas may be put in place. Space heating in high altitude areas could be tried using excess biomass from forest floors vulnerable to fires.
- c. Guidelines may to be framed for sustainable removal of dead bamboo in the event of mass flowering to reduce risk of fire and also to conserve biodiversity.
- d. Policies for permitting women SHG to use forest floor biomass with appropriate safeguards for micro entrepreneurship may be put in place by the SFDs.

(Action by SFDs)

(Policy support by MoEFCC)

5.3 Weed Management

Invasive weeds such as Lantana need to be controlled as they contribute significantly to the fire danger and pose a threat to native biodiversity. The following actions are recommended:

- i. A baseline study to quantify the extent and spread of invasive weeds may be initiated by SFDs in consultation with scientific institutions such as ICFRE.
- ii. Lantana removal strategies adopted should ensure it does not regrow on treated lands. Removal should be organized as an attractive economic opportunity for the local communities.
- iii. Rehabilitation of treated areas with appropriate species and soil and moisture conservation measures should form part of the weed removal plan.

(Action SFDs and ICFRE)

(Monitoring by MoEFCC)

6. Forest Fire Preparedness

Preparedness in forest fire management leads to effective response to fire disasters resulting in reduced impact and quicker recovery. The following steps may form the basis of preparedness against forest fires:

6.1 Forest fire detection and alert

Satellite based Forest Fire Alerts are already operational across the country led by FSI. The following steps may be taken to improve the efficacy of the FSI fire alert system:

- i. ***Digitization of forest boundaries:*** In the absence of digitized boundaries in many forests across the country, the FSI screens fire detections using approximations leading to reduced efficacy of the alert system. The states may, therefore, complete the digitization of forest boundaries at the earliest.
- ii. ***Promoting greater adoption of the Forest Fire Alert System:*** FSI has put in place a robust forest fire alert system. The States shall encourage the involvement of all field functionaries in the same, so that the forest fire alert system can percolate down to beat level in least possible time. This may be institutionalized through a protocol.
- iii. ***Improving Ground based Detection:*** Even with the advances in new remote sensing technologies for fire detection, ground-based detection continues to be essential and should be sufficiently resourced. The SFDs shall perform an assessment of the efficacy of the existing network of watchtowers by a review of the level of functionality and operational use of the existing towers. The WPOs (DFOs in the case of divisions where approved working plans are already in existence) may propose new locations for fire watchtowers based on coverage, visibility, ignition sources, and other relevant factors.
- iv. ***Strengthening engagement with local communities:*** Local communities are often the first to spot fires and alert the forest department. Locally suitable mechanisms should be developed by the SFDs for sourcing reliable and quick information from local communities.
- v. ***Dedicated phone line:*** A toll-free telephone number for fire detections and other required support needs to be established at state level to

obtain information on forest fires from tourists, passersby and local people.

- vi. **Monitoring and evaluation:** FSI has put in place a system to review all fire alert detections, and their ground verification. This is a critical step and may be monitored by MoEFCC in the month of December every year. SFDs must ensure that feedbacks on fire alerts are sent to FSI for validation.
- vii. **Wireless network:** In most remote forest areas mobile telephony is not well developed and frontline staff are unable to get the information coming on the Forest Fire Alert Alarms. In such cases, forests communication system may be supplemented by a dedicated wireless network.

(Action: SFDs)

(Monitoring by FSI and MoEFCC)

6.2 Digitize the location of critical resources and assets

The IT Cells of the state forest departments shall conduct inventory mapping of critical resources for forest fire prevention and management and make relevant information available to the forest divisions. Resources and assets to be inventoried may include forest department resources, such as watchtowers, ground crew stations, controls rooms and fire lines as well as non-department resources, such as the locations of fire stations, fire tenderers and National and State Disaster Response Forces, and army and paramilitary camps. They may also include important infrastructure such as roads, railways, and telecommunications networks and natural resources such as water bodies and natural fire breaks that could assist in preparedness and planning for response to forest fires.

(Action by SFDs)

(Monitoring by MoEFCC)

6.3 Forest Fire Lines

SFDs may undertake the mapping and digitizing of the location of existing fire lines and other infrastructure such as roads, transmission lines, and rail lines that may function as fire breaks. A review of the maintenance status, functionality, and adequacy of these fire lines, and an assessment of the need for new fire lines, may be undertaken considering past fire data, forest types, habitations, and other relevant factors. Proposals for new fire lines should be made on a scientific basis considering their potential efficacy in reducing fire risk and their proximity to people, property, and areas of special concern (e.g., protected areas). Plantations should not be raised on existing or proposed fire lines.

(Action by SFDs)

6.4 Control Burning

Control burning may be necessary in some places for preventing spread of fire. The following actions are recommended to improve the consistent performance and effectiveness of control burning wherever necessary:

- i. Prioritization of areas for control burning as part of the fire risk zonation analysis;
- ii. Monitoring of the performance of control burning at the Circle level, and integration of monitoring data into a database maintained by the SFDs;
- iii. Timely release of funds for control burning prior to the onset of the peak fire season and the provision of advance/ad-hoc release as needed;
- iv. Development of state-specific guidelines for control and prescribed burns to be notified and revised as may be necessary.

(Action by SFDs)

(Monitoring by SFDs)

7. Fire Suppression

Immediate response to forest fires after receipt of information is of utmost importance. The SFDs must develop a culture of emergent response to fire alerts under which all available resources are used to douse the fire. This needs intense training at all levels, strengthening of infrastructure, and coordination with other relevant agencies.

7.1 Training for field staff, firewatchers, and community firefighters

The principal need for forest fire suppression is to have adequate competent, trained, and equipped workforce on the ground, ready to respond and take immediate action. Training should be provided to field officers, seasonal firewatchers, and community volunteers involved in firefighting. All these firefighters should understand basic principles of forest fire management for using the most effective suppression technique at their disposal and know when retreat is necessary. The type of training provided to firefighters should be tailored according to the landscape, nature of terrain, their level of responsibility and role in the command structure in responding to fires.

- i. A modern and standardized training curriculum should be developed by the SFDs with the guidance of Directorate of Forest Education (DFE) of the MoEFCC. Other agencies involved in fire response, including National Disaster Management Authority (NDMA), NDRF, and the State Disaster Management Authorities may be involved in a consultative role.
- ii. Mock drills should be organized before fire season at various fire prone areas involving all the stakeholders such as District Administration, Police, Fire Department, NDRF, SDRF personnel, community organizations etc. for identification of gaps in the existing mechanism and better preparedness during crisis time.
- iii. Provision of training, equipment, and coordination should extend beyond state-managed forests to community institutions in regions such as the

Northeast, where communities are responsible for managing most of the forest estate.

(Action by SFDs and DFE)

(Monitoring by the MoEFCC)

7.2 Equipping the firefighters

- i. The firefighting squad including field staff, seasonal firewatchers, and community firefighters should be provided with adequate firefighting equipment including leaf litter blowers, and protective clothing.
- ii. The SFDs should take the lead in this process of identifying and providing firefighting equipment suitable to local needs in consultation with the Indian Council of Forestry, Research & Education (ICFRE), Dehradun.
- iii. The ICFRE should focus on development of user friendly fire fighting equipments, tools and protective clothing suitable for various regions of the country.
- iv. There should be sufficient practice sessions for the fire fighting personnel in the use of the fire fighting equipments including leaf litter blowers, and protective clothing so as to enhance their efficiency in actual fire fighting.

(Action: SFDs, ICFRE)

(Monitoring by the MoEFCC)

7.3 Development of adequate infrastructure for fire suppression

- i. An effective communication network should be ensured in all fire prone forest areas using wireless where necessary.
- ii. SFDs should develop, and enforce, a protocol for ensuring prompt access to field vehicles from nearby forest divisions for movement of firefighting personnel to the fire spots at the earliest.

- iii. Advance technologies such as use of drones should be explored in identification of exact location, intensity & direction of fire to facilitate fire extinguishment at the earliest.
- iv. Forest road network should be properly maintained for quick movement of firefighting forces to the fire site.

(Action: SFDs)

(Monitoring by MoEFCC)

7.4 Arrangements for adequate manpower in fire prone areas

- i. The SFDs should fill all vacancies especially at the level of frontline forest officials in the fire prone areas on priority basis.
- ii. Trained manpower may also be mobilized from other agencies such as Police, District Fire services, NDRF, SDRF etc.
- iii. The Communities living near the fire prone areas should also be sensitized and may be incentivized towards fire suppression activities.
- iv. There should be a mechanism for mobilization of forest fire fighting volunteers and providing them with adequate training on an urgent basis. A database of the firefighting volunteers should be maintained at district level.

(Action: SFDs)

8. Post Fire management

8.1 Assessment of loss due to forest fires

- i. FSI may develop a national level database for burnt area assessment on an yearly basis. Standardized protocols and procedures are needed to facilitate the reporting of the area affected and losses due to forest fire which may be developed by the ICFRE in association with FSI and other institutions.

- ii. MoEFCC may assign ICFRE the responsibility of developing and standardizing methodologies for assessing losses due to forest fire including loss of intangibles such as ecosystem services.
- iii. Based on standardized methodologies, the ICFRE may further standardize protocols for estimating area affected and losses due to forest fire and reporting the same at successive levels.
- iv. The ICFRE may assist the DFE in designing and organizing adequate training programs for forest officials at various level for this purpose.

(Action: SFDs, ICFRE and FSI)

(Monitoring by MoEFCC)

8.2 Proper investigation of the causes

The SFD shall ensure that the causes for every fire incident are properly investigated and adequate measures taken immediately including legal actions where necessary.

8.3 Restoration of fire affected areas

- i. A proper restoration plan should be prepared at once for the fire affected areas with the objective of restoring to its natural profile. Appropriate silviculture practices should be prescribed taking into account the ecological successional dynamics.
- ii. Adequate soil moisture conservation measures may be taken up in the fire affected areas for enhancing the moisture retention capacity of the land.
- iii. Indigenous vegetative barriers may be identified and planted around the fire affected areas.

(Action: SFDs)

9. Coordination with Other Agencies:

Forest fire management is a multifarious activity in which a frictionless interface with a range of institutions and social groups becomes very important for effective functioning.

The SFDs are already working in coordination with the FSI for past many years. Forest fires of disastrous proportions already come under the purview of the National Disaster Management Authority (NDMA) and the Disaster Management Authorities at the state and district levels and institutional mechanisms for combating forest fires at disaster scale has already been formalized for incorporation in the National, State, and District level disaster management plans. Institutionalization of close coordination with relevant institutions is thus already a reality but it needs to be strengthened further. For this purpose there are existing procedures developed by the DMAs at all levels and the SFDs may take urgent steps to update, upgrade and integrate their systems with those of the DMAs. In addition the following steps may be taken by the SFDs.

- i. Functioning of the Crisis Management Groups for Forest Fires at all levels may be reviewed to ensure that Standard Operating Procedures (SOPs) are in place related to command and control, compilation of availability of extent and location of resources required in case of occurrence of fires and for monitoring its spread.
- ii. Organizing mock drills is a very efficient way of ensuring preparedness. MoEFCC and NDMA may provide guidance for action at the state level. Joint trainings and mock exercises with all relevant agencies may be organized to facilitate coordination during a fire event.
- iii. Assistance of Defense agencies located in the vicinity becomes critical in certain situations where quick and concerted action can make a difference. MoEFCC may need to coordinate at the Ministerial level with the the Ministry of Defense to obtain suitable directions for their field formations so that such extension of assistance becomes a routine matter.
- iv. An escalation matrix may be developed at the state level by the SFDs in consultation with the SDMA to decide at what stage of aggravation of fire crisis the help from SDRF and NDRF should be sought.

(Action: MoEFCC, SFDs, NDMA, SDMA, DDMA)

(Monitoring by MoEFCC)

10. Centre of Excellence for Forest Fires

A Centre of Excellence is needed to be established to undertake data collection and analysis, frontline research in all aspects of forest fires, and development of firefighting equipment and tools. For the past two decades the FSI has been providing excellent leadership in forest fires and it would be most appropriate to set up this institute under the control of the FSI with strong linkages with ICFRE and leading universities across the country. Sufficient additional personnel and financial allocations would be required to enable FSI to undertake this task.

(Action by FSI and MoEFCC)

11. Mobilization of Financial resources

Forest fires pose the foremost threat to India's forests and the threat is projected to become more serious with the changing climate. Therefore, emphasis on the adequate protection of existing forest resources from fire hazards should become high priority attracting adequate funding. Specifically,

- i. The SFDs should make sufficient financial resources available at district, range and local level well in advance of fire season with enough imprest money for ensuring that lack of money does not hamper emergent fire management works.
- ii. While budgetary allocations for fire protection must be earmarked it should be possible to make fire protection integral to many other programs of forest protection. Community development works and entry point activities in forest enclosures and fringes could develop fire protection arrangements on the borders of habitations.
- iii. Climate funds under existing global bilateral or multilateral mechanisms for activities leading to adaptation to the changing climate can be a good source for money and must be accessed.
- iv. For promotion of use of Information and Communication Technology (ICT) standing instructions are already in place for mandatory use of a minimum

- proportion of total sectoral allocation in ICT in the respective sector. This should be made use of for ICT part of the forest fire detection and protection activities.
- v. MNREGA and community development/welfare programs aimed at generating employment through creation of assets with labour intensive activities are a good source of funding for some aspects of forest fire protection and should be made use of.
 - vi. Community Forest Rights have been recognized in forests under The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The Act also empowers the right holders to sustainably use the resources under the community forest rights thus recognized. Activities related to sustainable use of community right forests must also include protection of such areas from overuse and destruction by disasters like fire also. For this purpose Forest Administration needs to come to assist the stakeholder communities in planning and managing the community rights areas on priority. As the areas under community rights are expected to experience regular human presence, vulnerability to fire hazard is high and is needed to be minimized.
 - vii. India has technical cooperation arrangements with several countries where technical and financial assistance can be tapped for augmenting forest fire management capabilities. External financial aid should be accessed for investment on infrastructure for this purpose.
 - viii. In the large infrastructure projects particularly river valley projects, Environmental Management Plans and Catchment Area Treatment Plans are mandatorily prepared and implemented at the cost of the user agencies. Such activities can be very useful in augmenting moisture retention capacity of the catchments thus minimizing fire hazards.
 - ix. Crowd Funding is a popular means of financial resource mobilization for any common cause where interested people can contribute. Environmental causes like forest fire protection can garner enormous support from public. Local community organizations working in vicinity of vulnerable forests can

thus be encouraged to organize crowd funding for work at community level. This could be particularly effective in and around areas of tourist, cultural or religious significance located near or within forests etc. MoEFCC could explore the possibility of encouraging this as a policy for people's participation in forest fire protection and management.

Action: SFDs, State governments and MoEFCC
