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# FOREST FIRE IN INDIA

*Prepared by Dr. Jayadev Sahu, Additional Director (23035025) and Shri Sai Ram C.V., Junior Library Assistant of Lok Sabha Secretariat under the supervision of Smt. Kalpana Sharma, Joint Secretary and Smt. Anita Khanna, Director.*

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## Forest Fire in India: An Overview

### Introduction

Fire has been a major influencing factor on the development and management of many of the world's forests. Some forest ecosystems have evolved in response to frequent fires from natural causes, but most others are susceptible to the effects of wild fire. Forest fire may be defined as an unclosed and freely spreading combustion that consumes the natural fuels. When a fire burns out of control it is known as Wild Fire<sup>1</sup>.

There have been forest fires throughout historic time ignited and burned naturally through the forest. Fire effects on forests however are not equal. Fire may be beneficial for one ecosystem and may be dreadful for the other, depending upon the climatic conditions and type of vegetation. Each year, millions of hectares of the world's forests are consumed by fire, which results in enormous economic losses because of burnt timber; degraded real estate; high costs of suppression; damage to environmental, recreational and amnesty values; and loss of life.

### Types of Forest Fire

Forest fires are not always same; they may differ, depending upon its nature, size, spreading speed, behavior etc. Basically forest fires can be sub grouped into four types depending upon their nature and size –

- a) **Surface fires:** Surface fire is the most common forest fires that burn undergrowth and dead material along the floor of the forest. It is the type of fire that burns surface litter, other loose debris of the forest floor and small vegetation. In general, it is very useful for the forest growth and regeneration. But if grown in size, this fire not only burns ground flora but also engulf the undergrowth and the middle storey of the forest.
  
- b) **Underground fires:** The fires of low intensity, consuming the organic matter beneath and the surface litter of forest floor are sub-grouped as underground fire. In most of the dense forests a thick mantle of organic

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<sup>1</sup> Forest fire Disaster Management, NIDM, Ministry of Home Affair, Govt. of India, p.54-55.

matter is found on top of the mineral soil. This fire spreads in by consuming such material. These fires usually spread entirely underground and burn for some meters below the surface. This fire spreads very slowly and in most of the cases it becomes very hard to detect and control such type of fires. It may continue to burn for months and destroy vegetative cover of the soil. The other terminology for this type of fire is *Muck fires*.

- c) **Ground fires:** There is no clear distinction between underground and ground fires. The smoldering underground fire sometime changes into ground fire. This fire burns root and other material on or beneath the surface *i.e.* burns the herbaceous growth on forest floor together with the layer of organic matter in various stages of decay. They are more damaging than surface fires, as they can destroy vegetation completely. These fires are often hard to detect and are the least spectacular and slowest moving. Fighting such fire is very difficult.
- d) **Crown fires:** Crown fire is the most unpredictable fires that burn the top of trees and spread rapidly by wind. In most of the cases these fires are invariably ignited by surface fires. This is one of the most spectacular kinds of forest fires which usually advance from top to down of trees or shrubs, more or less interdependent of surface fires. In dense conifer stands with a brisk wind, the crown fire may race ahead of the supporting surface fire. Since it is over the heads of ground force it is uncontrollable until it again drops to the ground, and since it is usually fast moving, it poses grave danger to the fire fighters becoming trapped and burned.

### Causes of Forest fire

More than ninety five percent forest fires are caused either by negligence or unknowingly by the human being. The rest of the fires are caused by natural reasons *i.e.* lightning, extreme rise in the temperature etc., which are very rare. In general all over the world, the main causes of forest fires are anthropogenic. The natural causes of forest fires are common in remote areas only.

There are basically three components *i.e.* fuel, heat and oxygen that are needed in right combination to produce fire. Combination of these components, produces the "**fire triangle**". Out of three essential components of fire triangle, two components *i.e.* fuel and oxygen are naturally available in forest. It is the

third component *i.e.* heat that really initiates fire in the forest. Heat may be supplied by either natural or artificial reasons. Depending upon the source of the heat, the causes for forest fire may be classified as natural or artificial. While lightning, volcanic explosion, friction of rolling stone etc., are the natural causes for forest fire; the anthropogenic causes may be subdivided into two categories *i.e.* deliberate causes and unintentional or accidental causes.

Natural		Anthropogenic	
		Deliberate causes	Accidental causes
1. Lightning		1 Shifting Cultivation	1 Collection of Non Timber Forest Produce
2. Friction of rolling stone		2 To flush growth of <i>tendu</i> leaves	2 Burning farm residues
3. Rubbing of dry bamboo clumps		3 To have good growth of grass and fodder	3 Driving away wild animals
4. Volcanic explosion		4 To settle score with forest department or personal rivalry	4 Throwing burning <i>bidi</i> / cigarettes
.		5 To clear path by villagers	5. Camp fires by picnickers
.		6 To encroach upon the forest land	6. Sparks from vehicle –exhaust
.		7. For concealing illicit felling	7. Sparks from transformers
.		8. Tribal traditions/ customs	8. Uncontrolled prescribed burning
.		.	9. Resin tapping
.			10. Making charcoal in forests
.			11 Extracting wine in forest
.			12. Sparks from cooking near the forest
.			13 Heating coal tar for road construction in forest

## Forest Fire in India

India constitutes one of the mega bio-diversity zones of the world, abundant with unique and diversified floral and faunal wealth. The total Recorded forest area<sup>2</sup> of the country is 7,64,566 square kilometers.<sup>3</sup>

Due to increasing population pressure, this exemplary land ecosystem of the world is struggling for its survival. Increasing human interference in the natural forest ecosystem has also tremendously increased the forest fire incidences. Every year one or other part of the forests in India comes under fire. The forest fire season throughout the country is not same. Depending upon the type of vegetation, the climate and various other factors, the fire season varies from place to place. Though the major forest fire season in the country varies from February to June, some forests are not safe from fires throughout the year. According to the India State of Forest Report (ISFR) 2015, the estimated fire prone areas under heavy, moderate and mild fire are 2.40 per cent, 7.49 per cent and 54.40 per cent respectively, making the total forest fire prone area as 64.29 percent of the total Recorded Forest Area.<sup>4</sup>

Forest fire spreading over a large forest area in the country causes immense loss to the environment and the property. Ecological, economic and social impacts of the forest fire in India in brief may be enlisted as: loss of timber, loss of bio-diversity, loss of the wild life habitat, global warming, soil erosion and depletion of soil quality, loss of fuel wood and fodder, damage to water and the other natural resources, loss of natural regeneration, loss of Non Timber Forest Products, Ozone layer depletion, change in micro-climate leading to health problems, other health problems due to smoke, soil erosion and floods, loss of livelihood for the people living in or near the forest, etc. As per the

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<sup>2</sup> Geographical areas recorded as "Forests" in government record is 'Recorded Forest Area' (or Forest Area). Recorded Forest Area largely consist of Reserved Forests and Protected Forests, which have been constituted under the provision of Indian Forest Act 1927. Geographical areas which have been recorded as forest in the revenue records or have been constituted under any State Act or Local law is also included in the Recorded Forest.

<sup>3</sup> India Statistical Year Book India, 2017.

<sup>4</sup> Rajya Sabha Starred Question No. 375 dated 02 April, 2018.

information available from answer to Lok Sabha question, Forest Survey of India does not report the number of forest fire incidences on the ground. It only disseminates the satellite based forest fire alerts to all the State Forest Departments and other registered users. The information regarding the area affected in hectares and the loss in terms of money due to forest fire are not maintained at the level of Central Ministry. The details of State/Union Territory wise number of forest fire alerts reported by Forest Survey of India, during the last three years are given in **Annexure-I**.<sup>5</sup>

### **Initiatives of the Government of India in Managing Forest Fire**

The Protection and management of forests from various threats, including forest fire is within the purview of respective State/Union Territory Governments. The Ministry of Environment, Forest & Climate Change issues advisories to State/UT Governments for taking effective steps for prevention and management of forest fires. The Forest Survey of India, Dehradun, disseminates satellite based forest fire alerts on location of forest fires to all States/UTs Forest Departments and other registered users through SMS and email for taking effective steps for controlling the fire at the initial stage itself so as to minimize the damages and losses. Further, the Government of India supplements the efforts of State/Union Territory Governments in prevention and control of forest fire by providing financial assistance under the Centrally Sponsored Forest Fire Prevention and Management (FPM) Scheme.

The main objectives and funding pattern of the Forest Fire Prevention and Management (FPM) Scheme are;

- To minimise forest fire incidence and assist in restoring productivity of forests in affected areas.
- To institutionalise the partnership with forest fringe communities for forest protection.
- To contribute to the larger goal of maintaining environmental stability.

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<sup>5</sup> Answer to Lok Sabha Unstarred Question No.160 dated, 02 February, 2018.

- To prepare fire danger rating system and devise forest fire forecasting system.
- To encourage the States/UTs for optimal use of modern technology (such as Remote Sensing, GPS, and GIS) in planning, developing and operationalising fire prevention and management system.
- To develop knowledge on impacts and dynamics of forest fire, etc.

### **Funding Pattern**

<b>Category of States/UTs</b>	<b>Central share</b>	<b>State share</b>
Union Territories	100%	0
NE States, Special category states of Himachal Pradesh, Jammu & Kashmir and Uttarakhand	90%	10%
Rest of the States	60%	40%

The Scheme has two heads of expenditure. The funds under the central Sector head of the Scheme will be utilized by the Forest Protection Division of the Ministry of Environment, Forest and Climate Change. The State component of the Scheme will be implemented by the Forest Department of the concerned State Government and UTs.<sup>6</sup>

### **Conclusion**

Forest fires have been a local issue with global impact, which may happen more frequently than the recent past due to impact of rising temperature and global warming. Most of the forest fires in Indian States are anthropogenic in nature. Changes in the attitudes and actions of individuals, stakeholder groups, the private sector, and governments are required for action and implementation of sustainable forest fire prevention policies. Prevention of forest fire will require long term coordinated efforts by public and private authorities with robust planning and informed policy implementation.

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<sup>6</sup> FPM Operational Guidelines, Ministry of Environment, Forest & Climate Change, dated 6 December, 2017.

## **Sources Consulted**

1. Forest Fire Disaster Management, National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India, 2014.
2. India State of Forest Report, Forest Survey of India, Ministry of Environment, Forest & Climate Change, 2015.
3. Statistical Year Book India 2017, Ministry of Statistics and Programme Implementation, Government of India.
4. Operational Guideline of Forest Fire Prevention & Management Scheme, Forest Protection Division, Ministry of Environment, Forest & Climate Change, December, 2017.
5. Reply to Lok Sabha and Rajya Sabha Questions.

**State/UTs wise number of Forest Fire alert reported by Forest Survey of India in the last three years<sup>7</sup>**

S. No.	States/UTs	2015	2016	2017
1	Andaman & Nicobar Islands	1	24	8
2	Andhra Pradesh	1,075	1,699	1877
3	Arunachal Pradesh	358	293	733
4	Assam	1,656	1,766	1877
5	Bihar	45	321	272
6	Chandigarh	0	-	1
7	Chhattisgarh	1,272	2,808	4373
8	Dadra & Nagar Haveli	0	0	0
9	Daman & Diu	0	0	0
10	Delhi	0	2	5
11	Goa	0	10	32
12	Gujarat	117	262	574
13	Haryana	6	43	185
14	Himachal Pradesh	22	199	170
15	Jammu & Kashmir	13	217	113
16	Jharkhand	457	740	1133
17	Karnataka	295	831	1333
18	Kerala	91	165	456
19	Lakshadweep	0	0	0
20	Madhya Pradesh	294	2,675	4781
21	Maharashtra	721	1,874	3487
22	Manipur	1,286	1,105	1094
23	Meghalaya	1,373	966	1454
24	Mizoram	2,468	1,318	1587
25	Nagaland	722	678	930
26	Odisha	1,467	2,763	4416
27	Puducherry	0	0	9
28	Punjab	7	45	320
29	Rajasthan	90	66	260
30	Sikkim	3	0	8
31	Tamil Nadu	95	113	301
32	Telangana *	1,052	1,154	1748
33	Tripura	476	346	431
34	Uttar Pradesh	130	691	1170
35	Uttarakhand	207	1,501	376
36	West Bengal	138	142	364
	<b>Grand Total</b>	<b>15,937</b>	<b>24,817</b>	<b>35,888</b>

<sup>7</sup> Lok Sabha Unstarred Question No.160, dated 02 February, 2018.