Forest Fires - Anthropogenic or Biogenic

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"Fire is a good servant but a bad master", the saying is true for forest fire too. Limited and controlled forest fires have been very useful and essential for healthy forest growth. But uncontrolled forest fire may engulf and destroy healthy thick forest cover within no time. Besides direct loss of forest cover, forest fires also kill wildlife, degrade soil quality and retrogrades forest regeneration. Since historical times, forest throughout the world has been adversely affected by fire. Fire always causes many direct or indirect effects on the forest ecosystem. They may merely be beneficial, but at most of the times these effects are deteriorating. The damage to a forest by fire depends mainly on the size of the fire.

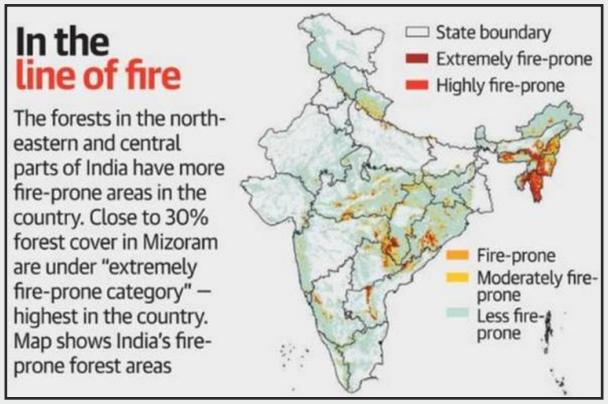
The fires raging across Australia, Amazon rainforest in 2019, and the ones in California in 2018 have brought global attention to wildfires in the recent years. Around 6.3 million hectares of forests in Australia and around 0.72 million hectares of forest and grassland in California were destroyed by fires. In India, wildfires have raged on in the past few years as well, causing extensive damage. In February 2018, it took five days and the mobilization of huge resources, to douse the fire at Bandipur Tiger Reserve in Karnataka. An estimated 4,800 hectares of forests along with the wildlife were lost in the incident.

Incidence of forest fires globally and locally has become very frequent. When we hear such incidents we feel sorry for the loss of valuable biodiversity, including the endemic flora and fauna and for the people/tribe dependent on the forest for their livelihood. Then we are back to our routine day to day activity. So when are we going to learn? It is high time to take action to save valuable resources of earth from fire on local and global level.

Uncontrolled fires are a complex problem that requires a comprehensive and long-term policy. This requires more effective coordination with local communities. These fires should be treated as disasters, so that disaster management authorities can play a major role in prevention. The National Forest Commission of 2006 has suggested that all fires that burn an area larger than 20 km2, should be declared a state disaster. The new Real Time Forest Alert System of India, that lists potential fire spots across the country, must be taken seriously by the state forest departments.

The forest fires are caused by natural causes as well as manmade causes:

- Natural causes - Many forest fires start from natural causes such as lightning which set trees on fire. Friction of rolling stone, rubbing of dry bamboo clumps and volcanic explosion



offer favorable circumstances for a fire to start.

- Manmade causes - Burning farm residues, throwing burning beedi/cigarettes, camp fires, sparks from vehicle exhaust/ transformers/cooking near forests, uncontrolled burning and so on.

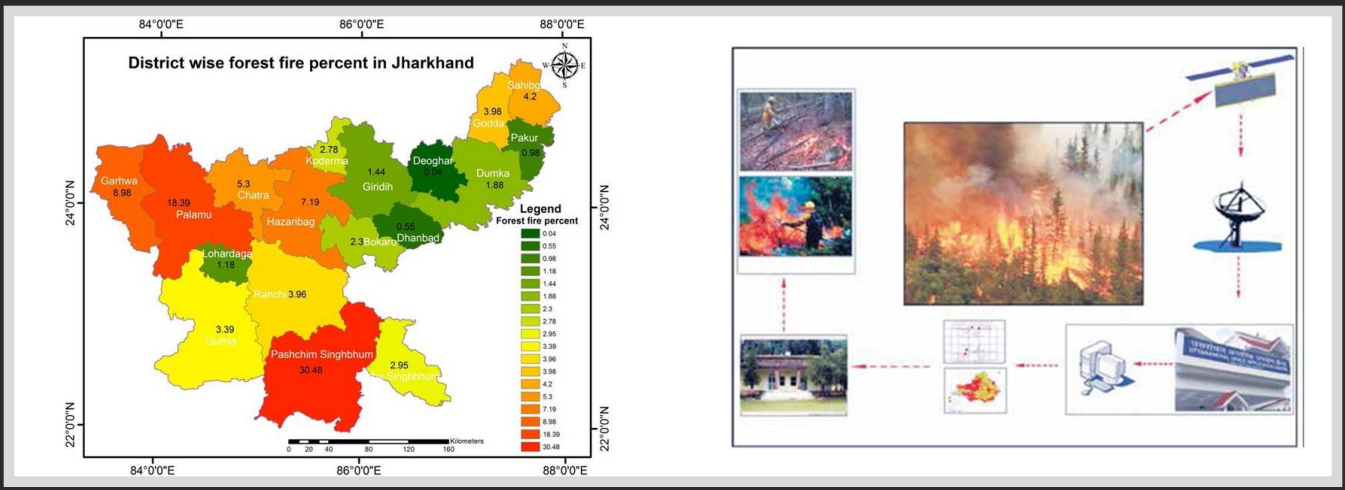
Status of forest fire in India

In the years 2015 and 2016, high temporal data from Indian Remote Sensing (IRS) and Advanced Wide Field Sensor (AWiFS) having a spatial resolution of 56 m was used to delineate burnt scars. The overall green cover has increased in the country, the forest cover in the northeast, particularly in Mizoram, Arunachal Pradesh and Nagaland has decreased due to forest fires. Central Indian States also recorded a high number of forest fire alerts, with Madhya Pradesh accounting for 2,723 alerts; Maharashtra 2,516; Odisha 2,213 and Chattisgarh 1,008 alerts between November 2018 to June 2019. The total number of alerts issued for each state based on Moderate Resolution Imaging Spectro-Radiometer (MODIS) data from November 2018 to June 2019 was 29,547 and interestingly, Mizoram recorded the highest number of fire alerts (2,795). The seven States of the north-eastern region accounted for 10,210 fire alerts, which make up about one-third of alerts in the country.

One of the major reasons for forest fires in the northeast is slash-and-burn cultivation, commonly called Jhoomor Jhum cultivation. The fires happen between the months of January and March. The northeast has tropical evergreen forests and, unlike the dry deciduous forests of central India, these are not likely to catch fire easily. Slash and burn methods are used to clear the forest for agriculture, livestock, logging and mining. It is often seen that these so called "controlled" fires lose control and propagate into forest regions, which then becomes difficult to control. Most fires in Amazon are anthropogenic, but not always. Biogenic causes include dry environment, lightening strikes and volcanic eruptions. Since forest fires are dangerous and difficult to predict in advance, they are primarily studied using satellite instruments.

According to the India State of Forest Report 2019, over 30,000 incidents of forest fires were reported in India in 2019. Additionally, more than 36 percent of the Indian forest cover (657,000 km2) is prone to frequent forest fires and of this, 10% are highly prone, according to a Forest Survey of India (FSI) report on fire-prone forest areas. Around 21% of the total forest cover is highly to extremely fire-prone, adds the latest forest survey. The dry deciduous forests, which receive low rainfall, face 5-6 dry months and have nutrient poor soil, such as those in tropical and subtropical latitude, is more vulnerable to fire compared to others. These areas are in Odisha, Chhattisgarh, Madhya Pradesh and in the southern states. Chirr pine forests in hilly states are equally fire-prone.

Over 40 percent of Uttar Pradesh forests are susceptible to fire. Among the major forests of Vindhya region, Bundelkhand and Terai, the subtropical forests of Terai region (which lies alongside the Nepal border) is the most fire-prone and as per the FSI technical study, about 37.5% of forest cover in Uttar Pradesh is between moderate to extremely fire-prone



Near Real Time monitoring of forest fires being used by FSI

Gaps in forest fire management

a) Lack of appropriate policy and planning to tackle forest fire - No clear guidelines for forest fire management.

b) Lack of proper institutional mechanism and emphasis on response only

Negligible importance to mitigation, preparedness, human resource development, providing scientific input, awareness creation.

c) Lack of scientific approach to collect fire data and document for forest fire management:

Started by The Forest Survey of India but at State level still there is a need for strict implementation to collect and compile fire related information, damage to forest, environment and wild life. The forest department is also required to develop forest fire vulnerability map at beat level based on forest vegetation and past history.

d) Lack of funding: Financial support under CSS scheme, no separate budget.

e) Not many initiatives to involve local community: only few states involve community in forest fire management.

f) Poor response to HRD: lack of training by forest officials to deal with forest fire even though forest fire is in the list of disasters.

g) Lack of proper contingency plans: Rehearsal and fire suppression exercise not given much importance at state level.

h) Need for implementation of Modern Warning Techniques.

I) Lack of preventive and preparedness measures: Removal of dried wood / leaves and drill practice by forest officials.

j) Lack of coordination: There is lack of proper coordination among research institutes in forestry sector and the service provider. Poor coordination at local and regional levels with the meteorological, fire, disaster management.

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Fire protection plans

A Fire Protection Plan is must to carry out preparedness and response activities. A well developed plan must include:

Forest fire being extinguished by bush beating, Dudhwa National Park, Uttar Pradesh. Photo courtesy UP forest department (owing to the unpreparedness, lack of proper drill and training the forest department is facing causalities in terms of man power)

- An assessment of the threat to human life, property, forest, other wooded land and other land assets and values, in conjunction with the management objectives for the area.
- Preparedness for the fire suppression must reflect the variable nature of fire dangers.
- Developing appropriate modern early warning capability of wild-land fire danger.
- Initiate prevention activities to reduce the hazards and potential losses.
- Must ensure a measured fire suppression response that reflects the threat, the safety of fire fighting personnel and the public, and the impact on the environment.
- Must formalize a single management structure for all personnel.
- Trained, well equipped, assessed and accredited personnel must be appointed.
- Striving for consistent funding that enables fire managers to adequately meet the goals o f the guiding principles safely and efficiently.

Forest fires are a regular phenomenon in our country and every year large areas of forests are affected by fires of varying intensity and extent.

Based on the forest inventory records, 54.40% of forests in India are exposed to occasional fires, 7.49% to moderately frequent fires and 2.405 to high incidence levels. Precious forest resources, including carbon locked in the biomass are lost due to forest fires every year, which adversely impact the flow of goods and services from forests. Satellite based remote sensing technology and GIS tools have been effective in better prevention and management of fires through creation of early warning for fire prone areas, monitoring fires on real time basis and estimation of burnt scars. While it is important to timely detect the forest fire for taking remedial measures it is equally important to assess the forest area affected by the forest fires to assess the damage to forest and biodiversity as well as to plan restoration measures.

The World Bank has pointed out that forest fires also pose a serious threat to India's ability to expand its forest and tree cover by 2030 creating an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent. Increased deforestation, land grabbing is being reported in 2020 from Amazon along with forecast of less rain, high temperature, prone to fire, smoke poisoning all pointing to a disaster brewing up.

Further reading

Meena Janardhan (2003) Forest fires: A burning issue for India. Gulf today

https://www.gulftoday.ae/opinion/2019/05/14/forest-fires-a-burning-issue-for-india

http://fsi.nic.in/forest-fire-activities

Satendra and Kaushik, A.D. (2014) Forest Fire Disaster Management. National Institute of Disaster Management, Ministry of Home Affairs, New Delhi

Forest fire disaster management: https://nidm.gov.in/pdf/pubs/forest%20fire.pdf

Amazon fires may be worse in 2020 as deforestation and land grabbing spikes:

https://news.mongabay.com/2020/05/amazon-fires-may-be-worse-in-2020-as-deforestation-and-land-grabbing-spikes/