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Forest Fires In India: A Case Study Of Sunderbani Forest Range In Foothills Of Himalayas

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Introduction

Forest Fires are as old as the forests themselves. They are most common hazard in the forest. Forest fires pose a threat not only to the forest but also to the entire regime of flora and fauna seriously disturbing the biodiversity and ecology and environment of the region. It is one of the most alarming challenges of our times.

According to a report by Parliamentary Standing Committee on Science and technology, India, the country has seen a 55% rise in the number of forest fires as on December 2016. The Himalayan regions and the dry deciduous forests of India, particularly in Andhra Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra and Odisha are ecologically sensitive areas and are most affected by these fires. Sometimes the forest fires are good for the ecology as well as for regeneration. They often help the forest to get rid of its natural wastes like dry grass, tree needles and thick bushes.

But as the saying goes: fire is a good servant but a bad master. A problem erupts when the fire becomes untamed and destroys the entire or most of the flora and fauna of the region, hence severely affecting the ecological balance.

Forest fires are caused both due to natural as well as man-made causes which are as listed below:

Natural causes:

- Lightening
- Rubbing of dry sticks
- Friction due to rolling stones

Man-made causes:

- Shifting cultivation
- Covering up illicit felling of trees
- Clearing path through the forest
- Tribal traditions

FOREST FIRES ARE OF TWO TYPES:

Surface Fire: A forest fire may burn primarily as a surface fire, spreading along the ground as the surface litter (senescent leaves and twigs and dry grasses etc.)on the forest floor and engulfed by the spreading flames.

Crown Fire: The other type of forest fire is crown fire in which the crown of trees and shrubs burn often sustained by a surface fire. A crown fire is particularly very dangerous in a coniferous forest because resinous material given off during burning burns very furiously. On hill slopes if the fire starts downhill, it spreads up fast as heated air adjacent to a slope tends to flow up the slope spreading flames along with it. If the fire starts uphill, there is less likelihood of it spreading downwards.

RESEARCH OBJECTIVES:

Forests are an immensely valuable natural resource. They play a very crucial role in sustaining life and ecosystems. The objectives of the present study are:

- To have an idea about forest fires occurring in different parts of the country
- To study different types of fires and their effects
- To study fires that have occurred in the study area in the recent past
- To suggest ways and means for timely control and to minimize damage from forest fires.

METHODOLOGY:

This paper is primarily based on secondary quantitative data as well as some primary data. Data from various government websites has been used for reference, analysis and to draw conclusions. Published articles, books and reports from various government agencies have been used as a primary source of information. Being a burning issue and a pressing problem of the present times, a reasonable amount of work has already been done on this topic. The present paper utilizes information from these sources to discuss forest fires, their types, effects and ways and means of redressal of this problem.

EFFECTS OF FOREST FIRES

1. **Loss of ecosystem and biodiversity:**

Forest fires destroy the habitats and the intricate relationships of diverse flora and fauna leading to loss of ecosystems and biodiversity. Forest fires simply damage the habitable and adaptable land for specific animal and plant species. It alters or kills the plant life features which support thousands of wildlife thereby forcing the animals out of the regions or even killing them.

Smaller and rare animals including birds, squirrels, insects, rabbits and snakes are mainly at high risks of death, whereas some plant species are burnt to ashes. Forest fires can lead to extinction of certain

animals.

Severe forest fires decimate the habitat and critical relationships of plants and animals causing loss of ecosystem. Most animals are able to detect oncoming fires and migrate early. Those that cannot move faster are killed. Since plant life that supports life in that area is burnt down, animals have to look for habitat elsewhere.

2. Effect on soil:

Forest fire has a great impact on soil. Researchers have made great effort to know the effect of forest fire on soil. Various researchers have pointed out that fire had no noticeable effect on soil texture or pH but changes were observed in organic carbon, exchangeable bases and exchangeable acidity. Forest fires also reduce the water holding capacity of the soil, organic carbon, phosphorus and nitrogen contents and increase the pH, EC and potassium content. These changes in the soil properties could lead to adverse effect on the normal growth of the forest flora and increased soil erosion However it was found that these effects are more pronounced at 0-20 cm depth than at lower depth.

3. Effect on plants:

Fire has long been the part of the environment and has an important role in shaping the flora and fauna, which are the vast reservoirs of organic carbon. Although, the fire of the" right " intensity and timing can trigger a successful survival response to particular species but uncontrolled fires are generally a stress and damage many other compounds present in the forest which are of great importance to plants and human beings.

4. Forest Degradation:

Forest fires like those occurring in dry tropical forests are a major cause of forest degradation. Thousands of acres of trees and vegetation cover are wiped out. Forest fires persistently reduce the quality of certain forest features like soil fertility, biodiversity and ecosystems.

5. Climate Change:

By causing the release of greenhouse gases (GHG), forest fires contribute significantly to climate change. Warmer climate leads to forests becoming dryer and degraded, which increases their vulnerability to fire. The number and scale of fires increase, thereby creating a positive feedback loop.15% of the global GHG emissions are attributed to forest fires. Forest fires cause 32% of global carbon monoxide and 10% of methane emissions, as well as over 86% of soot emissions.

Different studies assume that climate change will increase the number of hot and dry days with high fire risk, extend the fire season and increase the frequency of electrical storm. This will increase the frequency of forest fires as well as affected forest area. `

6. Effects On Human Health:

Inhalation of smoke from a forest fire can be a health hazard. The smoke is composed of carbon dioxide, water vapor, particulate matter, organic 280 chemicals, nitrogen oxides and other compounds. The principal health concern is the inhalation of particulate matter and carbon monoxide. The fine particles

present in the particulate matter are more problematic because when inhaled, they can be deposited deep into lungs, where they are absorbed into the bloodstream. This is particularly hazardous to the very young, elderly and those with chronic conditions such as asthma and cardiovascular conditions. Carbon monoxide in smoke can be inhaled into lungs where it is absorbed into the bloodstream and reduces oxygen delivery to the body's vital organs. At high concentrations, it can cause headache, weakness, dizziness, confusion, nausea, disorientation, visual impairment, coma and even death. Even at low concentrations, it can cause chest pain and cardiac arrhythmia.

Another less explored aspect is psychiatric and psychological disorders faced by people living in areas close to fire prone forests.

THE INDIAN SCENARIO

India constitutes one of the mega -diversity zones of the world abundant with unique and diversified floral and faunal wealth. Including environmental benefits, the forests of the country are economically also very rich. If we take the example of conifers only, India has about 1.7mh of productive conifer forest, with various valuable timber species i.e., fir, spruce, deodar, kail, teak, sal and chir pine. In the country, with about 17% of the world human and 18% of cattle population, forests meet nearly 40% of the energy and 30% of the fodder needs. It is estimated that about 270 million tons of fuel wood, 280 million tons of fodder, 12 million cubic meters of timber and a large quantity of Non-Timber Forest Produce (NTFP) are removed from the forests annually. Increasing human interference in the natural forest ecosystem has also tremendously increased the forest fire incidences. Forest fire is one of the causative factors which periodically covers large forest areas destroying timber, other properties and wild life etc. The ecosystems are under severe threat due to recurrent fires, which is attributed to the forest degradation, soil erosion, reduced productivity etc. Every year, one or other part of the forests in India is facing the agony in the cruel hands of mankind by putting fire intentionally or unintentionally in the forests causing severe damage to the regeneration as well as to the soils.

Forest Survey of India (FSI) is conducting field investigations since 1965 in different parts of the country to keep records of forest fires in its sample plots. According to an estimate, 6.14%of the forests in the country are prone to severe fire damage. The vulnerability of the Indian forests towards fire varies from place to place depending on the type of vegetation, the climate and various other factors-both natural as well as manmade. The coniferous forests in the Himalayan region comprising of Fir, Spruce, Cedrus deodara, Pinus roxburgii and P. wallichiana etc. is very prone to fire. The most vulnerable stretches of the world to forest fire are the youngest mountain ranges of Himalayas. Because of more rain density, the forests of Eastern Himalayas are less vulnerable to forest fires as compared to those in Western Himalayas. With large scale expansion of of chir forests in Himalayan Mountains, the frequency and intensity of forest fires have increased alarmingly.

FOREST FIRES IN SUNDERBANI FOREST RANGE:

Sunderbani Forest Range is a part of Nowshera Forest Division. The total area of Sunderbani range is 24110 Hectares comprising of 139 compartments and 18 beats. Further this range has been divided into four blocks namely Sunderbani block, Dharamsal block, Devak block and Kangri block. There are 3 forest check posts, two forest nurseries and one central resin depot falling under this range.

DOMINANT PLANT SPECIES:

The dominant plant species found in this range include: Pinus roxburgii, Emblica officinalis, Syzygium cumini, Bombax ceiba, Wedlandia heynei, Mallotus phillipensis, Lannea grandus, Pyzus lamata, Grevia optiva, Cassia fistula, Acacia catechu, Acacia nilotica, Toona ciliata, Dalbergia sissoo, zizyphus jujuba, Morus alba and Leucopenia leucocephala.

As per data procured from Forest Department Sunderbani,the details of fire incidents in sunderbani Forest Range since 2012 is as under:

S.No	Year	Total nos. of fire incidence	Total areas burnt (in Acres)
1	2012-13	30	84.5
2	2013-14	03	07
3	2014-15	08	26
4	2015-16	12	59
5	2016-17	22	168
6	2017-18	05	11.5

Although the authorities refuse to admit, there is large scale loss of flora and fauna whenever these fires occur. According to estimates, majority of fires which occur in this range are manmade.

CONTROL OF FOREST FIRES:

The National Forest Policy addresses the problem of forest fires in the following specific terms

"The incidence of the forest fires in the country is high. Standing trees and fodder are destroyed on a large scale and natural regeneration annihilated by such fires. Special precautions should be taken during the fire season. Improved and modern management practices should be adopted to deal with forest fires"

However, the issue of effective fire management in the countries like India, where so many issues are clubbed with forest management is not so simple. Due to population explosion and its ever-increasing pressure on forest, the problem of managing forest fire has become more complicated in comparison to the past, where the fire situation in the country was totally different. A number of initiatives have been taken by Govt. of India in cooperation with several international organizations.

The main strategies which can be adopted for effective forest fire management are as under:

As prevention is better than cure, a preventive program of zoning, danger rating, early warning and real time monitoring has to be designed and installed. At the strategy level, coordination with Government agencies like National Remote Sensing Agency, Forest Survey Of India, The National Meteorological Department, The All India Radio and the state owned television should be promoted by the Forest Departments of the states to plan their actions in the fire season.

A national awareness campaign on fire damage prevention, detection, communication and suppression should be launched involving schools, Joint Forest Management Committees (JFM), Non-government

and other voluntary organizations during the onset of fire season every year.

A central fire management, research and training institute for foresters and public agencies should be set up for providing knowledge and skills for fire managers, including trainers at JFM unit levels.

There should be increased vigilance by appointment of adequate number of firewatchers during the month of April, May and June which used to be the practice earlier. Clearing and maintenance practice of fire lines, which have been virtually abandoned due to shortage of funds must be carried out regularly. The practice of controlled burning to deal with accumulation of combustible pine needles should be supported by the Government so as to demonstrate their economic viability. This will help to reduce the accumulation of combustible material on the forest floor.

The forest department staff should be provided with complete communication network through wireless to enable quick response in dealing with forest fires and also with the problem of illicit felling.

The communication network has to be supported with improved mobility to enable quick transport of humans and materials from one area to another. Certain activities should be restricted within and around forest areas during the fire season e.g., collection of non-timber forest produce particularly honey as it involves production of smoke to drive away honey bees, recreational activities like camping when there is high risk of fires, grass cutting and felling of trees on high fire risk days.

Where villagers do not come to assist the forest department in extinguishing forest fires, their timber rights should be curtailed if not forfeited. The state Governments must ensure that adequate funds are provided to the Forest Department for proper care, maintenance and protection of the forests. The steady reduction in such funds has seriously affected the activities of the Forest Department. These funds should be provided through a centrally sponsored scheme for this purpose.

Educating the masses is another indirect public oriented fire preventive measure. The masses have to be educated regarding the causes and damages caused by forest fires and what role they can play. The target group here can 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.

CONCLUSION:

The fact that forests are lungs of earth hold very true in context of present-day atmospheric conditions. With falling air quality indexes all over the world, conservation of forest becomes utmost important for human survival. There are wide range of factors involved in forest fires be it ecological or socio-economic factors and systematic assessment of these will yield meaningful results for controlling the drastic events like forest fires. The use of advancements in the field of technology can be significantly used for effective management of forest fires. The measures suggested to control forest fires should be taken into consideration while formulating policies envisioning various long term as well as short term strategies as imagining earth without forests will be dreadful and detrimental for existence of humanity.

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