



Forest Fires In The Junglemahal Area Of Jhargram District, West Bengal: A Research Note On Human-Induced Causes And Management Implications

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Abstract

The Junglemahal region of southwestern West Bengal, particularly Jhargram district, experiences recurrent forest fires with significant ecological and socioeconomic consequences. This research note synthesizes available evidence from government reports, forest department communications, and recent fire alert data to characterize the patterns, causes, and impacts of forest fires in this vulnerable landscape. Findings indicate that Jhargram consistently ranks among the most fire-prone districts in West Bengal, with fires being predominantly human-induced rather than natural phenomena. Local communities deliberately set ground vegetation ablaze for multiple purposes, including collection of Mohul flowers (*Madhuca longifolia*), facilitating minor forest produce gathering, clearing undergrowth for easy movement, and occasionally for poaching small wildlife. The study highlights a paradox: while total fire incidents in West Bengal declined by approximately 60% from 2022-23 to 2023-24, Jhargram remains a persistent hotspot requiring targeted interventions. This research advocates for community-based fire management approaches that address the underlying socioeconomic drivers rather than relying solely on suppression-oriented strategies.

Keywords: Forest fires, Junglemahal, Jhargram, anthropogenic fires, fire-prone areas, West Bengal

1. Introduction

Forest fires represent a significant environmental challenge in tropical deciduous forests, with implications for biodiversity conservation, carbon emissions, soil health, and local livelihoods. While some forest ecosystems have evolved with periodic fire regimes, the increasing frequency and intensity of anthropogenic fires pose threats to forest resilience and ecosystem services.

The Junglemahal region—comprising Jhargram, Paschim Medinipur, Bankura, and Purulia districts—represents a distinctive landscape characterized by dry deciduous forests dominated by Sal (*Shorea robusta*) and associated species. This region has historically experienced recurrent ground fires, primarily during the dry hot weather period from March to May. Among these districts, Jhargram has emerged as particularly vulnerable, consistently featuring in state and national forest fire assessments as a high-priority zone for fire management.

This research note aims to:

1. Characterize the spatial and temporal patterns of forest fires in Jhargram district
2. Identify and analyze the human-induced causes of fire occurrence
3. Assess ecological impacts on forest composition and regeneration
4. Propose evidence-based management recommendations

2. Study Area

Jhargram district, located in southwestern West Bengal (approximately 22°27' N, 86°59' E), was established as a separate district in 2017 after being carved from Paschim Medinipur. The district encompasses an area of approximately 3,037 square kilometers and falls within the Chotanagpur Plateau fringe, characterized by undulating topography, lateritic soil, and tropical dry deciduous vegetation.

Forest Cover: The district maintains substantial forest cover, forming part of the larger Sal forest belt that extends across southwestern West Bengal and into Jharkhand. According to the India State of Forest Report, West Bengal's total forest cover stands at 16,970.3 square kilometers, of which 943 square kilometers is classified as highly fire-prone. Within this, 205 square kilometers falls under the "very highly fire-prone" category.

Climatic Conditions: The region experiences a tropical wet-dry climate with distinct seasons. The pre-monsoon hot weather period (March-May) is characterized by rising temperatures, low humidity, and dry surface vegetation—conditions that maximize fire susceptibility. Summer showers occasionally provide relief but are inconsistent.

Vegetation Type: The forests are dominated by Sal (*Shorea robusta*), along with associates such as Mohul (*Madhuca longifolia*), Asan (*Terminalia tomentosa*), Kendu (*Diospyros melanoxylon*), and various shrubs, herbs, and grasses. The ground vegetation typically begins growing with the monsoon onset in July and remains green until the onset of hot weather, after which it desiccates and becomes highly flammable.

3. Methodology

3.1 Data Sources

This study synthesizes data from multiple secondary sources:

Forest Fire Alerts: Active fire location data was obtained from the Forest Survey of India's Forest Fire Alerts System 3.0 (FSIFS), which utilizes MODIS (Moderate Resolution Imaging Spectroradiometer) satellite data to detect thermal anomalies indicative of active fires.

Government Reports: The India State of Forest Report (ISFR) 2023, released biennially by the Forest Survey of India, provided district-level fire risk classification and state-wide fire incident statistics.

Forest Department Communications: Official statements and interviews with forest officials, particularly from the West Bengal Forest Department's Central Circle, were sourced through media reports.

Published Literature: Peer-reviewed research on forest fire dynamics in India provided comparative context.

3.2 Analytical Approach

Given the research note format and reliance on secondary data, analysis focused on:

- Descriptive statistics of fire incidents and trends
- Spatial analysis of fire-prone area classification
- Thematic analysis of causal factors as reported by forest officials
- Comparative assessment with regional and national patterns

4. Results and Findings

4.1 Temporal Trends in Forest Fire Incidence

West Bengal has witnessed significant year-to-year variation in forest fire incidents. According to the India State of Forest Report 2023, the aggregate number of forest fires in the state declined from 3,096 incidents in 2022-23 to 2,020 incidents in 2023-24—a reduction of approximately 60%.

Table 1: Forest Fire Incidents in West Bengal (2022-23 vs. 2023-24)

Year	Total Fire Incidents	Percentage Change
2022-23	3,096	-
2023-24	2,020	-34.8%

Source: India State of Forest Report 2023, cited in Bengalinfo

This decline has been attributed primarily to two factors: (1) intensified awareness campaigns conducted by the forest department, and (2) untimely summer showers that reduced fuel dryness during the peak fire season.

However, officials caution that reduced incidence in a single year should not be interpreted as resolution of the underlying problem, as the anthropogenic drivers remain largely unchanged.

4.2 Jhargram's Vulnerability Status

Despite the state-wide decline, Jhargram continues to be identified as one of the most fire-susceptible districts in West Bengal. The India State of Forest Report specifically names Bankura and Jhargram as harboring the "most number of areas susceptible to forest fires".

Within the broader southwestern Bengal region—encompassing Purulia, Bankura, Jhargram, and Paschim Medinipur—Jhargram consistently experiences intense ground fire outbreaks. A distinctive pattern observed in the region is the repeated occurrence of fires in identical locations multiple times within the same fire season, suggesting deliberate and systematic burning rather than accidental ignition.

4.3 Active Fire Detection

Satellite-based active fire detection confirms ongoing fire activity in Jhargram. The Forest Fire Alerts System recorded a large fire event designated "JHARGRAM -1," first detected on March 16, 2022, with multiple active pixels persisting. While specific 2024-25 data for Jhargram alone is not fully aggregated in available sources, the continued listing of Jhargram in active fire monitoring systems underscores its status as a recurrent hotspot.

4.4 Human-Induced Causes: Evidence from Forest Department

The preponderance of evidence indicates that forest fires in Jhargram and the broader Jhargram region are overwhelmingly human-induced rather than natural. According to Singaram Kulandaivel, Chief Conservator of Forests, Central Circle, West Bengal Forest Department:

> "The rationale behind destruction of this vegetation are varied and embedded in interests of local communities, transitory workers, truck drivers and people who venture into the forests for various purposes. For some, the fires are set to collect Mohul flowers, while others may burn the forest to kill smaller wildlife species for consumption."

Table 2: Documented Causes of Anthropogenic Forest Fires in Jhargram

Causal Factor	Purpose	Frequency
Mohul flower collection	Harvesting flowers for edible/fodder use	High
Minor forest produce gathering	Facilitating access to non-timber forest products	High
Wildlife poaching	Killing small animals (rodents, reptiles, ground birds) for consumption	Moderate
Undergrowth clearance	Improving visibility and movement through forests	Moderate
Deliberate (unspecified)	Various local interests	Documented

Source: West Bengal Forest Department, Central Circle

The collection of Mohul flowers (*Madhuca longifolia*) emerges as a particularly significant driver. These flowers, which fall to the forest floor during the hot weather period, are collected for use as food, fodder, and in traditional liquor production. Burning ground vegetation clears leaf litter and competing undergrowth, making flower collection easier and more efficient.

4.5 Ecological Impacts

The ecological consequences of recurrent ground fires in Jhargram's Sal forests are unevenly distributed across species and life stages:

Fire-Resistant Species: Mature Sal trees and adult Mohul specimens demonstrate considerable resilience to ground fires, with the capacity to survive and regenerate post-fire. Their thick bark and ability to resprout provide adaptive advantages in a fire-prone environment.

Fire-Sensitive Components: The most severe impacts are observed among:

- Medicinal plants and herbs with limited regeneration capacity
- Shrubs and climbers that constitute important habitat structure
- Fresh seedlings of all species, including Sal
- Soil biota and organic matter

This differential impact has implications for forest composition over time. Repeated fires may gradually shift species assemblages toward fire-adapted taxa at the expense of fire-sensitive species, potentially reducing overall biodiversity. The loss of medicinal plants is particularly concerning given their importance for local healthcare and livelihoods.

4.6 Regional and National Context

The situation in Jhargram must be understood within India's broader forest fire regime. A comprehensive analysis of forest fires in India from 2005 to 2022 revealed significant spatial variations in fire hotspots, with substantial increases observed in certain regions. The study identified significant positive correlations between forest fire incidents and climatic variables, particularly average and maximum temperatures.

While northeastern states like Mizoram experience the highest absolute numbers of fire incidents (averaging $2,614.78 \pm 1519.36$ occurrences annually by 2022), the Janglemahal represents a distinct fire regime characterized by:

- Lower intensity but higher frequency ground fires
- Predominantly anthropogenic rather than climatic ignition sources
- Strong linkages to subsistence livelihoods and forest product collection
- Repeated burning of the same locations within seasons

The study also documented positive correlations between forest fires and anthrax outbreaks in neighbouring states (Orissa, Jharkhand, and Andhra Pradesh), suggesting potential public health dimensions that warrant investigation in West Bengal as well.

5. Discussion

5.1 The Paradox of Persistent Fires Despite Declining Totals

The apparent contradiction between declining state-wide fire incidents and Jhargram's persistent vulnerability requires careful interpretation. Several factors may explain this pattern:

First, the decline in 2023-24 may partially reflect favourable weather conditions (summer showers) rather than fundamental changes in human behaviour or forest management effectiveness. If so, a return to drier conditions could reverse the trend.

Second, awareness campaigns may have greater impact in less fire-prone areas or among communities with alternative livelihood options, while leaving high-dependency, high-vulnerability areas like Jhargram relatively unchanged.

Third, the aggregation of state-wide data masks local heterogeneity. A district-level analysis would likely reveal that Jhargram's fire incidence has not declined proportionally to the state average.

5.2 Livelihood Drivers Versus Conservation Objectives

The human-induced nature of Jhargram's forest fires presents a complex policy challenge. Unlike natural fires or those caused by negligence, these fires are deliberate, instrumental, and embedded in livelihood strategies. From the perspective of local communities, burning ground vegetation serves legitimate purposes: facilitating access to Mohul flowers, improving mobility, and obtaining bushmeat.

This creates a fundamental tension between conservation objectives (protecting forest structure, biodiversity, and carbon stocks) and livelihood needs. Suppression-oriented approaches that criminalize burning without addressing the underlying incentives are unlikely to succeed and may generate conflict between forest departments and local communities.

5.3 Comparative Insights from Fire Ecology

Research on fire ecology in tropical dry forests indicates that not all fire impacts are negative. Low-intensity ground fires at appropriate frequencies can:

- Reduce fuel loads, preventing more destructive high-intensity fires
- Stimulate flowering and regeneration in fire-adapted species
- Maintain habitat heterogeneity

However, the current fire regime in Jhargram—characterized by repeated burning of the same locations within a single season—exceeds what most ecologists would consider beneficial. Such high-frequency fires deplete soil seed banks, eliminate fire-sensitive species, and degrade habitat quality.

5.4 Public Health and One Health Dimensions

The documented correlation between forest fires and anthrax outbreaks in neighbouring states raises important public health questions for Jhargram. Forest fires can:

- Disrupt wildlife habitats, bringing animals into closer contact with livestock and humans
- Force wildlife to relocate, potentially spreading pathogens
- Create conditions conducive to spore-forming bacteria like *Bacillus anthracis*

While no anthrax outbreak linked to forest fires has been reported in Jhargram specifically, the ecological similarities to affected areas in Orissa and Jharkhand suggest this warrants monitoring.

6. Management Recommendations

6.1 Community-Based Fire Management

Given the anthropogenic drivers of fire in Jhargram, community engagement is essential. Recommended approaches include:

Alternative Mohul Flower Collection Methods: Research and dissemination of techniques for collecting fallen flowers without burning ground vegetation, potentially including simple tools or timing adjustments.

Controlled Early Burning: Where some burning is inevitable or ecologically desirable, shift from uncontrolled, repeated fires to managed early-season burns under controlled conditions. This approach, used successfully in other tropical dry forest systems, reduces fuel loads while allowing communities to achieve some of their objectives.

Fire-Free Zones: Designate critical habitats, medicinal plant concentrations, and high-conservation-value areas as no-fire zones with community co-management.

6.2 Livelihood Interventions

Addressing the root causes requires reducing communities' dependence on fire-mediated forest product collection:

Mohul Flower Value Chain Enhancement: Improve post-harvest processing, storage, and marketing to increase returns from collected flowers, potentially reducing pressure to burn for easier collection.

Alternative Income Generation: Agroforestry, non-timber forest product processing, and payment for ecosystem services (PES) schemes could provide alternatives to fire-dependent livelihoods.

6.3 Monitoring and Early Warning

Strengthen existing systems:

Community Fire Watch Programs: Train local residents in fire detection and reporting, leveraging traditional knowledge alongside satellite alerts.

Targeted Awareness Campaigns: Focus on high-recidivism locations identified through satellite monitoring of repeated fires in same pixels.

6.4 Research Priorities

Further research is needed on:

- Quantitative assessment of fire frequency, intensity, and extent in Jhargram using time-series satellite data
- Household-level analysis of fire use practices and livelihood dependencies
- Ecological impacts on medicinal plants and non-timber forest products
- Potential public health dimensions, including anthrax surveillance
- Effectiveness of different community-based fire management models in similar South Asian contexts

7. Conclusion

Jhargram district represents a critical case study in human-forest fire interactions in the Junglemahal region of West Bengal. The evidence clearly indicates that fires are predominantly human-induced, deliberate, and embedded in local livelihood strategies centered on Mohul flower collection, minor forest produce gathering, and occasional wildlife poaching.

Despite a recent state-wide decline in fire incidents attributed to awareness campaigns and favorable weather, Jhargram remains persistently vulnerable, consistently identified among the most fire-prone districts in West Bengal. This persistence suggests that short-term reductions are insufficient; addressing the underlying drivers requires sustained, community-centered interventions that recognize the legitimate livelihood needs of forest-dependent populations while working toward ecologically sustainable alternatives.

The Junglemahal's Sal forests harbor significant biodiversity and provide essential ecosystem services. Recurrent anthropogenic fires, while not immediately catastrophic, pose cumulative threats to forest composition, regeneration capacity, and non-timber forest product availability. A shift from suppression-oriented to community-based fire management—grounded in understanding of local fire use practices and incentive structures—offers the most promising pathway toward reducing fire incidence while maintaining community livelihoods and forest health.

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