



Evaluation of role of JFMC's in Forest Fire Management within the jurisdiction of Panchet Division and Kangsabati South Division under Integrated Fire Management Scheme (CSS)

Final Report

March 2023

Research Wing, Directorate of Forests,
Govt. of West Bengal

**Evaluation of role of JFMC's in Forest Fire Management
within the jurisdiction of Panchet Division and Kangsabati
South Division under Integrated Fire Management
Scheme (CSS)**

Final Report

March 2023

Conducted by

Research Wing, Directorate of Forests,

Government of West Bengal

and

Nature Environment & Wildlife Society (NEWS)

Executing Team

Dr. J. R. B. Alfred, President, Nature Environment & Wildlife Society

Mr. Biswajit Roy Choudhury, Secretary, Nature Environment & Wildlife Society

Dr. Asitava Chatterjee, IFS, Divisional Forest Officer, Kangsabati South Division, Directorate of Forests, Govt. of West Bengal

Mr. Anjan Guha, IFS, Divisional Forest Officer, Panchet Division, Directorate of Forests, Govt. of West Bengal

Ms. Ranjana Saha, Field Biologist, Nature Environment & Wildlife Society

Dr. Saikat Manna, Field Botanist, Nature Environment & Wildlife Society

Mr. Tayan Das, Field assistant, Nature Environment & Wildlife Society

Mr. Ayan Roy Chowdhury, Field assistant, Nature Environment & Wildlife Society

Acknowledgements

We are grateful to the Directorate of Forests, Govt. of West Bengal for assigning this project to NEWS. We are indebted especially to Mr. Piar Chand, IFS, Principal Chief Conservator of Forests, Research Monitoring and Development Wing, Govt. of West Bengal for his constant support and according the necessary approvals to undertake the work in this project.

We are thankful for the help given by Mrs. Pratibha Raj, IFS, Additional Principal Chief Conservator of Forests, Research and Monitoring, Directorate of Forests, Govt. of West Bengal.

We are also thankful to Dr. Debanshu Mallick, IFS, Chief Conservator of Forests, Research and Development, Directorate of Forests, Govt. of West Bengal for his support in the present project.

We are very grateful to Mr. Bidyut Sarkar, IFS, Conservator of Forests, Research Circle, Directorate of Forests, Govt. of West Bengal, for all the help rendered in our work and specially for providing all the necessary arrangements.

We are thankful to Mr. Bhaskar J.V., IFS, Conservator of Forests, Working Plan & GIS, Directorate of Forests, Govt. of West Bengal, for proving us the necessary maps and archive data, related to this project.

We also thank Dr. Asitava Chatterjee, IFS, Divisional Forest Officer, Purulia and Kangsabati South Division, Directorate of Forests, Govt. of West Bengal, Mr. Anjan Guha, IFS, Divisional Forest Officer, Panchet Forest Division, Directorate of Forests, Govt. of West Bengal, for their guidance and for providing us the necessary permission, related to this project.

We are grateful to all the Ranger Officers, Beat officers and other Departmental staffs for their spontaneous guidance and information to conduct the field surveys.

Last but not the least we express our sincere gratitude to all the JFMC members and the resource persons and the local people for providing valuable information and sharing their experience regarding the forest fire and their management strategies.

Index of Contents

Sl. No.	Content	Page No.
1.	Introduction	1-2
2.	Objectives	2
3.	Materials and methods	3-6
	3.1. Study area	3-4
	3.2. Methodology	5-6
4.	Results	7-11
	4.1. Assessment of most vulnerable area Range wise	7-9
	4.2. Evaluation of role of JFMC's in forest fire management	10-11
5.	Discussion	11-12
	5.1. Assessment of most vulnerable area	11
	5.2. Evaluation of role of JFMC's in Forest Fire Management	11-12
6.	References	13
	Annexure I	14-15
	Annexure II	16-20
	Annexure III	21-25
	Annexure IV	26
	Annexure V	27
	Annexure VI	28

1. Introduction

Fire is one of the most destructive threats faced by our forests. Fire is good servant but a bad master. Wildfires destroy not only flora (tree, herbs, grassland, forbs, etc.) and their diversity but also considerable long term negative impact on fauna including wild endangered species. Repeated fires can convert some shrub-lands to grass and fire exclusion converts some grassland to shrub-land and forest. Fires affect animals mainly through effects on their habitat. The extent of fire effects on animal communities generally depends on the extent of change in habitat structure and species composition caused by fire (Jhariya and Raj 2014).

Forest fires are common in almost all types of vegetation. In the temperate and northern boreal forests, it occurs regularly during the dry summers. Though equatorial rain forests are moist, however extreme droughts associated with other human induced activities make it vulnerable to fire hazard. In tropical forests, fire is a regular phenomenon at the short interval of one to five years. The Tropical Submontane Conifers Forests due its specific vegetation (pine), rich in resin and susceptible to fire, are subjected to forest fire regularly. Dry tropical forests are considered to be more vulnerable to recurrent fires than any other forest across the world mostly during the dry season when deciduous/semi-deciduous trees shed their leaves (Murphy and Lugo, 1986; Kauffman et al., 2003; Janzen 1988).

Due to various natural and human induced factors, the severity of forest fires in general is increasing day by day. The adverse impacts of increased forest fire and its severity have placed this in the category of other natural disasters like floods, droughts, earthquakes etc., especially the recent decades witnessing frequent fires with high intensity causing permanent changes to the ecosystem and its components (Cha et al., 2020).

Among South Asian countries, India has the second highest number of forest fire hotspots (32%) following Bangladesh (34%) (Reddy et al. 2020b). According to a Forest Survey of India report, about 50 percent of forest areas in the country are fire-prone and about 6 percent of the forests are prone to severe fire damage.

Studies suggest that 90% of vegetation fires in India may be man-made, and about 3.73 million ha of forest areas are affected by forest fires annually (Srivastava and Garg 2013). The annual losses from forest fires in India for the entire country have been moderately estimated at Rs 440 crores. This estimate does not include the loss suffered in the form of biodiversity, nutrient and soil moisture and other intangible benefits. India witnessed the most severe forest fires during the summer of 1995 in the hills of Uttaranchal and Himachal Pradesh in north west Himalaya. An area of 677,700 ha was affected by fires. The quantifiable timber loss was around Rs. 17.50 crores.

In India, 8,645 forest fire incidences have been reported during 2004-2005; 20,567 during 2005-2006; 16,779 during 2006-2007; 17,264 during 2007-2008; 26,180 during 2008-2009; 30,892 during 2009-2010 and 13,898 during 2010-2011, respectively. The country also reported with 3,45,989 forest fire events during November 2020-June 2021 with Odisha recorded the highest fire events (51,968) followed by Madhya Pradesh (47,795), Chhattisgarh (38,106), Maharashtra (34,025), Jharkhand (21,713) and Uttarakhand with 21,487 events

(Anon., 2021b). Forest fire occurrence is mostly seen during summer between February and May and the most affected forest type is the tropical deciduous forest found in Odisha, Chhattisgarh, Bihar, Telangana, Andhra Pradesh, Jharkhand, and West Bengal (Priyadarshini and Mohapatra 2022). In West Bengal, 0.98% of total forest cover is very highly fire prone while 4.33% is highly fire prone and 10.72% is moderately fire prone and 33% of forest area is subject to repeated annual fires (Lal 2004).

A Joint Forest Management Committee (JFMC) is a democratic, decentralized and transparent local institution of forest and forest fringe dwelling communities that is constituted in consultation with the Karmadhakshya of the Bon on Bhumi Sthayee Samity of the Panchayat Samity and set up as per the provisions of applicable JFM Resolutions of the state.

It is a community-based initiative that aims to involve local people in the management and conservation of forests in India. It is a collaborative effort between Forest Officials and local communities to jointly manage forest resources.

JFMCs can play an important role in preventing and managing forest fires. JFMCs can help in preventing forest fires by raising awareness about the dangers of fire and promoting sustainable forest use practices. They can also participate in regular monitoring and patrolling of forest areas to detect and prevent any fire incidents. In case of a fire, JFMCs can coordinate with forest officials and other stakeholders to mobilize resources for fire-fighting and management of the aftermath.

To evaluate the role of JFMC's in forest fire in West Bengal, the State Forest Department has taken the initiative to prepare a comprehensive document under Panchet Forest Division and Kangsabati South Forest Division with specified objectives.

2. Objectives

1. To document the current practices of forest fire prevention and how to improve them.
2. To increase awareness of forest fires in and measures to address them in everyday life.
3. To reduce the risk of forest fire in fire prone areas.

3. Materials and methods

3.1. Study area

West Bengal has a significant forest cover of 16,902 km² which is 19.04 % of the total geographic area of the state. The forests of the state are constituted into Very Dense Forests (3018.52 km²), Moderately Dense Forests (4160.26 km²) and Open Forests (9722.73 km²).

This study area is in the Tropical Dry Deciduous Forests at the Western plateau region at Kangsabati South Forest Divisions which fall under Purulia district and Panchet Forest Divisions falling under Bankura district (Figure 1).

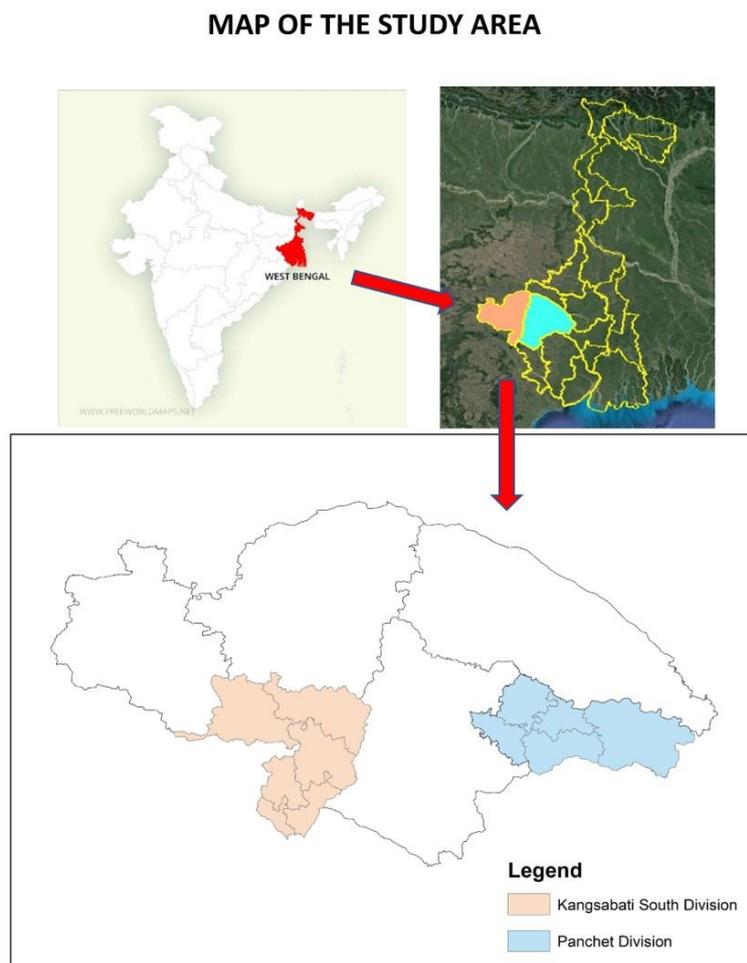


Figure 1: The Study Area

I. Location and boundary - The project site is confined to the geographical range of 85°52' E to 82°45' E longitude and 23°41' N to 22°37' N latitude covering an area of 13141 km² at the Western part of the State West Bengal, India. The Eastern boundary of the area is demarcated by the districts of Purba Bardhaman and Nadia. The Northern boundary is demarcated by Paschim Bardhaman district and the neighboring state of Jharkhand. The state of Jharkhand also demarcates the Western boundary, while the Southern boundary of the area is demarcated by Jhargram and Paschim Medinipur districts and the neighboring state Odisha.

II. Topography - The area shares the eastern part of Chhotanagpur plateau region. The landscape is characterized by undulating topography with rugged hilly terrains of Eastern Plateau and Hills descending from the table land of Chhotanagpur and at the western boundary, the high ridges capped by laterites and are separated by valleys.

III. Climate - Being a part of tropics the climate of the area is generally hot and humid and experiences three distinct seasons – Summer, Monsoon and Winter. There is marked difference between the winter and the summer temperatures. The district has a sub-tropical climate and is characterized by high evaporation and low precipitation. Temperature varies over a wide range from 7° Celsius in winter to 48.5° Celsius in the summer. During monsoons from June to September, wind blows from the south-west direction recognized as the south-west monsoon. The average annual rainfall ranges from 1100 mm – 1500 mm, 90% of which falling only in the monsoon months.

IV. Soil - The soils are mostly sedentary in nature. Soils of undulated uplands are shallow, gravelly, coarse having low water holding capacity. These lands are either severely eroded or very susceptible to erosion. Three types of soils have been recognized in this region viz. (1) Red soil derived from weathering of granites, gneisses and schist (2) Lateritic soil in the upland area (3) Alluvial soil found only in valley bottom in very narrow strips along the rivers, mostly in the fringe areas and in the valleys. Almost entire district soil is acidic.

V. River systems – The major perennial rivers viz. Damodar, Darkeswar, Kangsabati with all their tributaries (Silabati, Gandheswari, Sali, Joyponda, Birai, Amoda, Kumari, Bandhu and Silajit) flow from the North-West to the South-East direction roughly parallel to one another and ultimately merge with the Hooghly River. All these rivers are mostly rain water fed and originate from the hills of the West (Jharkhand state).

VI. Forest - Total Forest cover is estimated 2714 km² which is 20.65% of total geographical area of the two districts. The forests are mainly tropical dry deciduous type with predominance of Sal tree (*Shorea robusta*). Other tree species found in the forests are Mahua (*Madhuca longifolia*), Piyal (*Buchanania lanzan*), Vella (*Semecarpus anacardium*), Dhaw (*Anogeissus latifolia*), Kendu (*Diospyros excelsa*), Piyasal (*Pterocarpus marsupium*), Bahera (*Terminalia bellerica*), Haritaki (*Terminalia chebula*), Amloki (*Phyllanthus emblica*) etc. The landscape has a rich wildlife heritage of mammals including carnivores like Leopard (*Panthera pardus fusca*), Sloth bear (*Melursus ursinus*), striped hyena (*Hyaena hyaena*), Indian grey wolf (*Canis lupus pallipes*), Bengal fox (*Vulpes bengalensis*), Golden jackal (*Canis aureus*) and other smaller mammals like Indian wild boar (*Sus scrofa cristatus*), Indian pangolin (*Manis crassicaudata*), Porcupine (*Hystrix brachyura*), Indian hare (*Lepus nigricollis*) etc.

3.2. Methodology:

I. Archive data collection from the GIS cell and analysis:

Archive data on forest fire for the last three consecutive years for the two Forest Divisions viz. Panchet, and Kangsabati (S) has been collected from the GIS cell, Forest Department and analyzed accordingly.

II. Preparation of GIS map:

From the collected archive data, a general purpose, fire affected area map (Figure:2) and fire vulnerable ranges map for the two Forest Divisions was prepared with the help of Google Earth and Arc GIS.

Table 1: Software Used

Software	Functions
Arc GIS 10.8	Preparation of thematic map, Analysis, Conversion of KML files to shape files
Google Earth Imagery Pro	Vector layer creation, creating KML files and verifying of GPS generated points

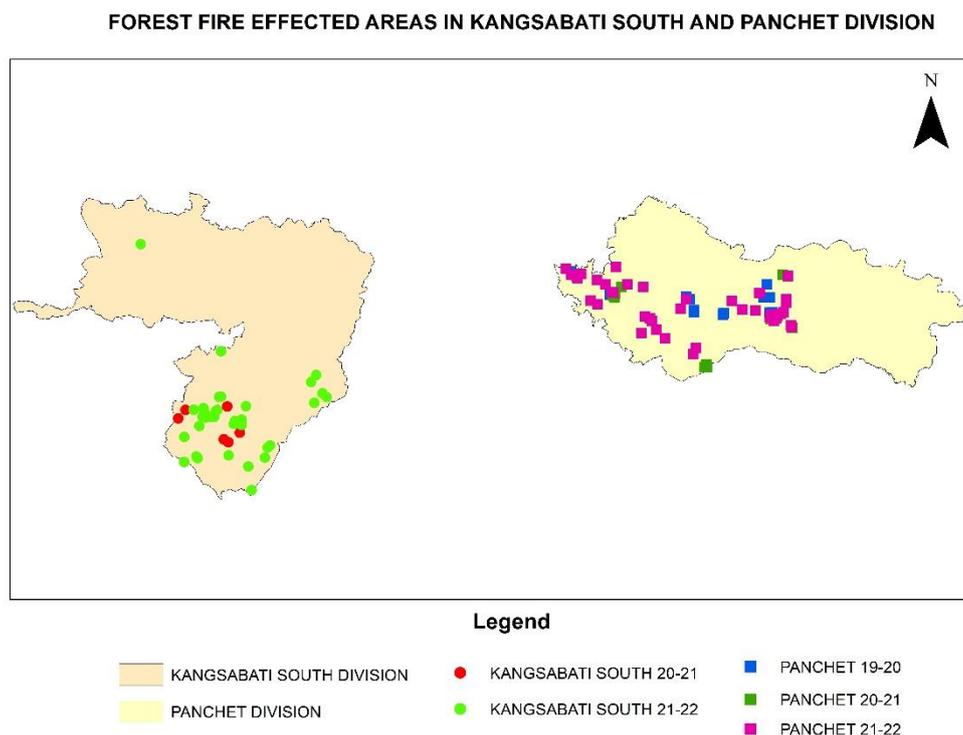


Figure 2: Forest Fire affected areas of consecutive three years in Panchet and Kangsabati South Division

III. Preparation of semi structure questionnaire format:

A semi structured questionnaire format has been prepared both in English and in vernacular language (Annexure I) to obtain ground information about all the aspects of Forest Fire that has occurred till date from the JFMC members as well as the forest officials and ground staff. This will help generate comprehensive data set to evaluate the role of JMFC members in Forest

Fire Management and help in obtaining possible suggestions for an efficient and timely fire management strategy.

a. Methodology for evaluating the role of JFMC's in Forest Fire management

- Selection of sampling sites

At least 10 people (including JFMC members and Forest Department staffs) has been interviewed with the help of semi structured questionnaire format (Annexure II and III) from one individual Range. Seven such beats under Four ranges viz. Bankadaha and Joypur Ranges under Panchet Forest Division and Bandwan I and II Ranges from Kangsabati South Forest Division were chosen for the study, as these were the most affected with Forest Fire within the Kangsabati South Forest Division year after year.

Table 2: Forest area visited for evaluating the role of JFMC's in forest fire management

Forest Division	Range	Area Affected (Ha)		
		2019-2020	2020-2021	2021-2022
Panchet	Bankadaha	22	23.3	55.57
	Joypur	3	5	16
Kangsabati South	Bandwan I	0	5.25	27.5
	Bandwan II	0	0	4

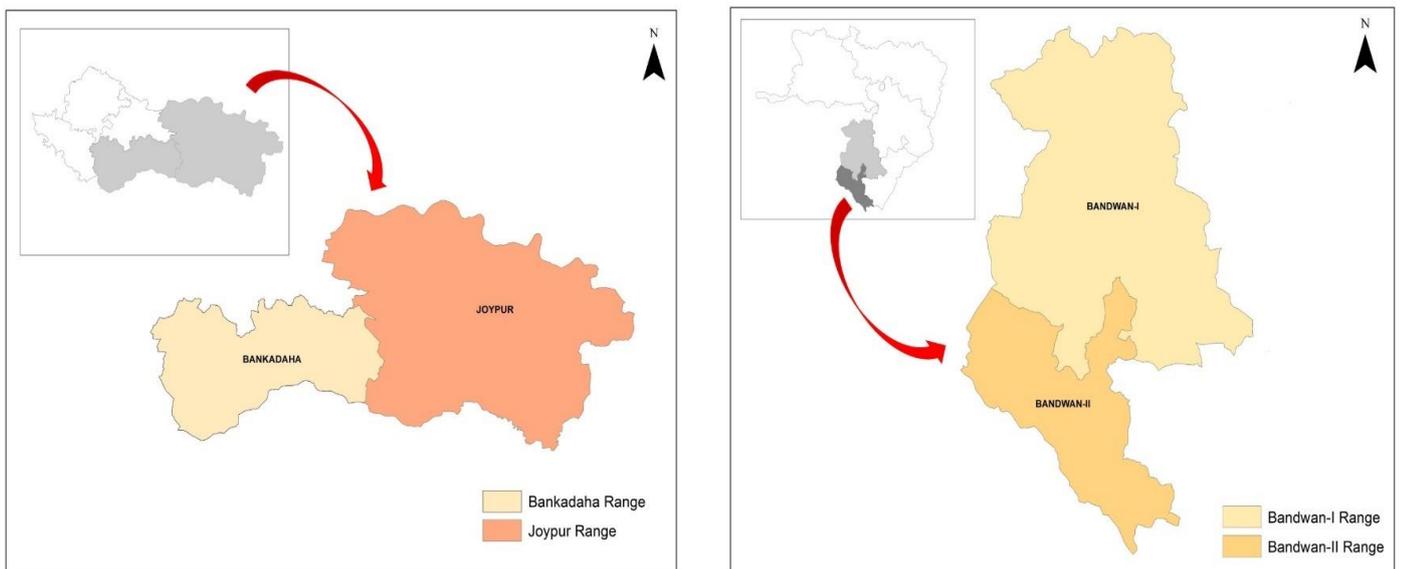


Figure 3: Ranges visited to evaluate the role of JFMC in Forest Fire Management

4. Results:

4.1. Assessment of most vulnerable area Range wise:

From the recorded data it is observed that for the last three years (2019 to 2022) most of the Fire incidents occurred during forest fire season in the Panchet Forest Division (77), while Kangsabati South Forest Division had the lowest number (48) (Figure: 4).

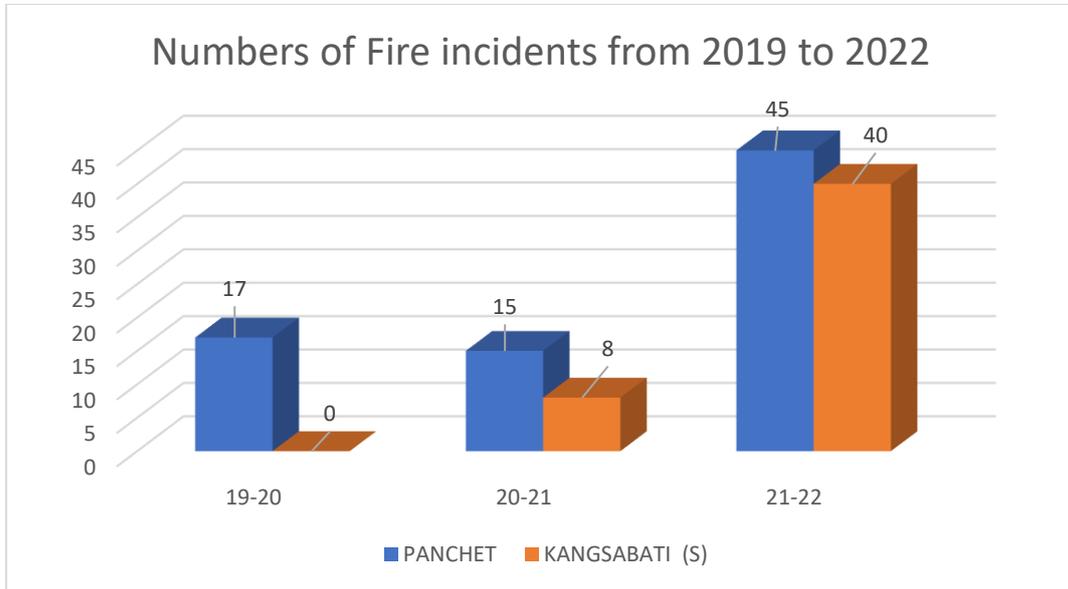


Figure 4: Numbers of Fire incidents in six Forest Divisions

The data has been further analysed range wise where the most affected ranges within a Forest Division are tabulated and presented graphically.

It was seen that the Bankadaha Range in Panchet Forest Division was affected by Forest Fire continuously for three years and in the last year (2021-22) almost 55 ha area was affected. Other than these the Bankadaha, Taldangra, Onda and Joypur Ranges were also affected continuously.

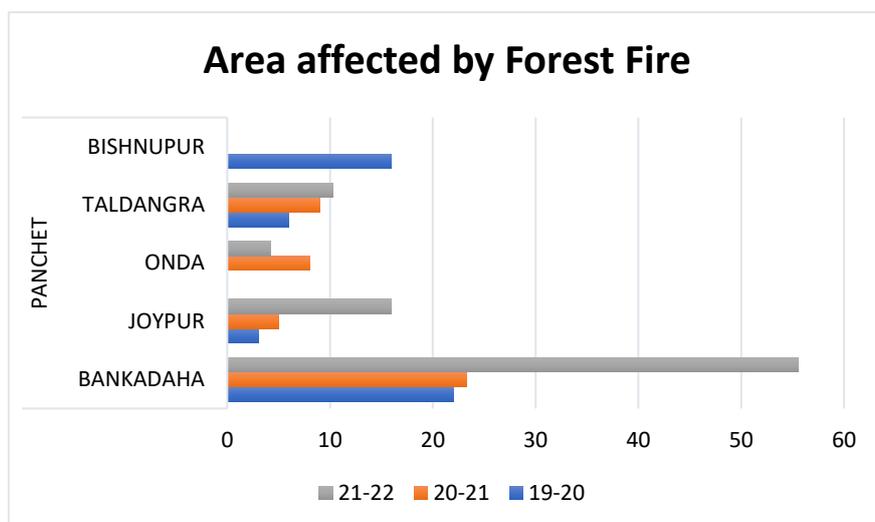


Figure 5: Area affected by Forest Fire in Panchet Division

The incidence of Forest Fire in Kangsabati South Division is the lowest among all the six Divisions. Only Bandwan I Range was affected by Forest Fire mostly in 2021-22. The affected area was 27 ha.

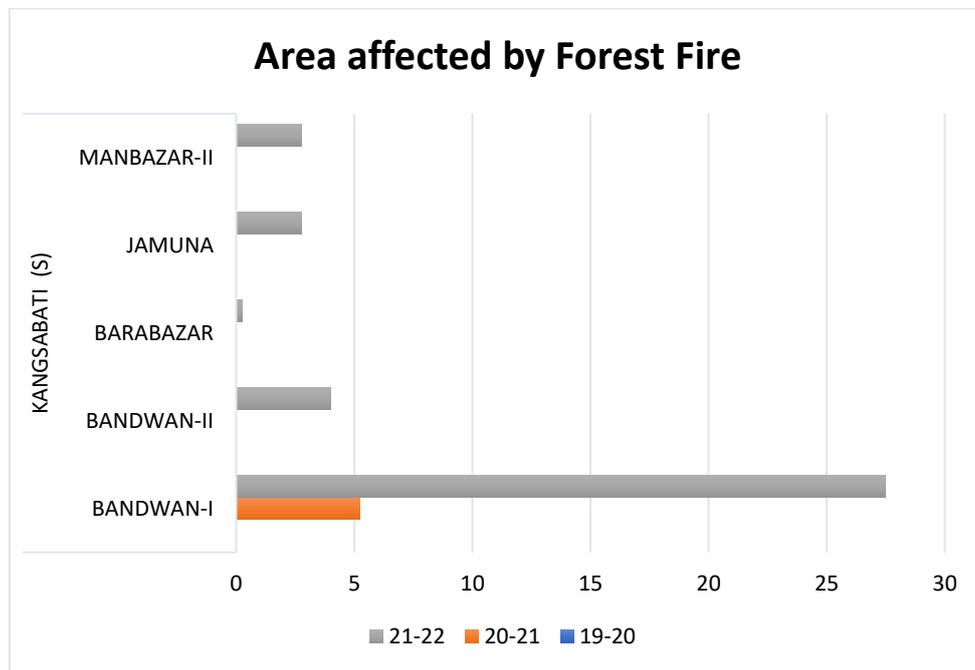


Figure 6: Area affected by Forest Fire in Kangsabati South Division

From the archive data a vulnerability map has been created where the most vulnerable ranges are being shown with different colour codes.

In the vulnerability map 3 years fire affected area has been accumulated range wise and classified in 5 distinct classes as per the severity of the affected area viz. less fire-prone forest area (0-10 ha affected area), Moderately fire-prone forest area (10.1-20 ha affected area), Highly fire-prone forest area (20.1- 50 ha affected area), Very highly fire-prone forest area (50.1- 100 ha affected area) and Extremely fire-prone forest area (100.1- to 250 ha affected area)

From the vulnerability map (Figure 7 and 8) it is clear that the most vulnerable area in these two Divisions which are extremely prone to the forest fires is Bankadhaha Range under Panchet Division (Figure 7) shows a massive total affected area for three consecutive years of 100.87 ha while Taldangra (25.25 ha) and Joypur (24 ha) under Panchet Division and Bandwan-I (32.75 ha) under Kangsabati South Division shows high proximity to forest-fire. Rest of the ranges shows either moderate or less proximity to the forest-fire as the total affected area for these ranges are less than 20 ha in three consecutive years.

Panchet Forest Division Fire Vulnerable Ranges

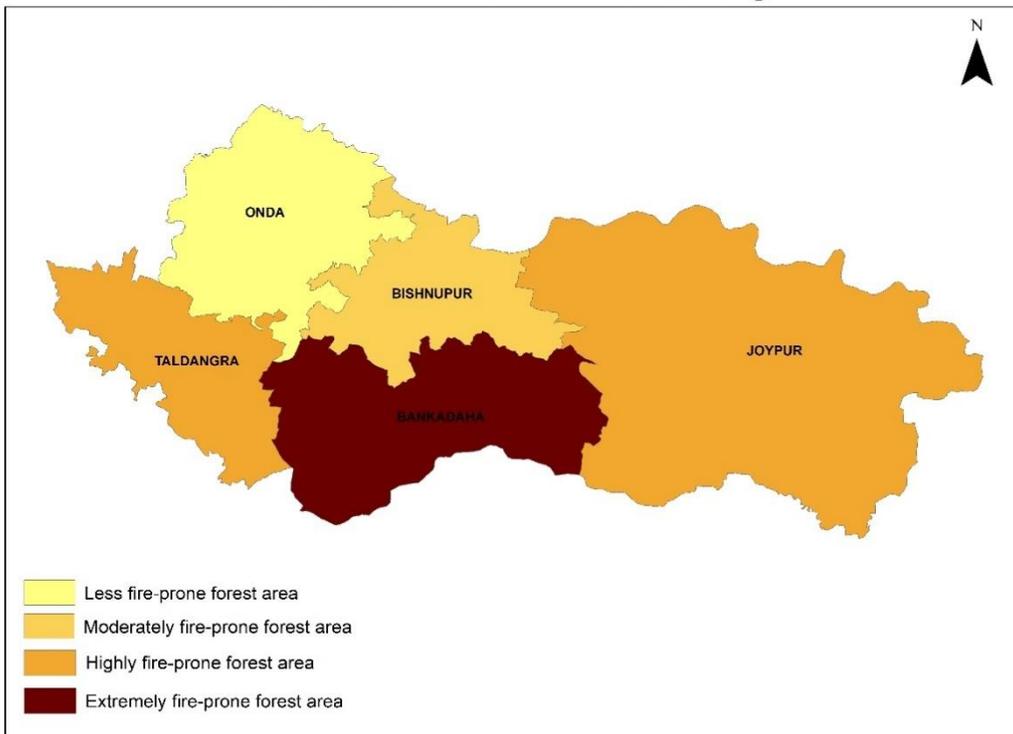


Figure 7: Most Fire vulnerable Ranges of Panchet Division

Kangsabati South Division Fire Vulnerable Ranges

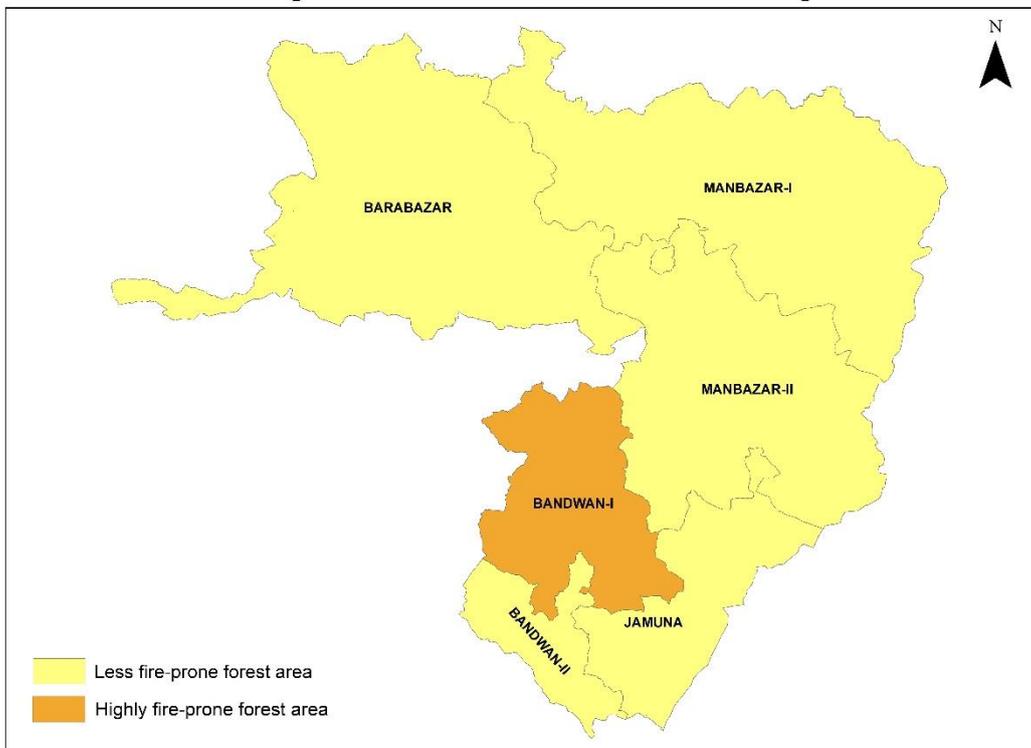


Figure 8: Most Fire vulnerable Ranges of Kangsabati South Division

4.2. Evaluation of role of JFMC's in forest fire management:

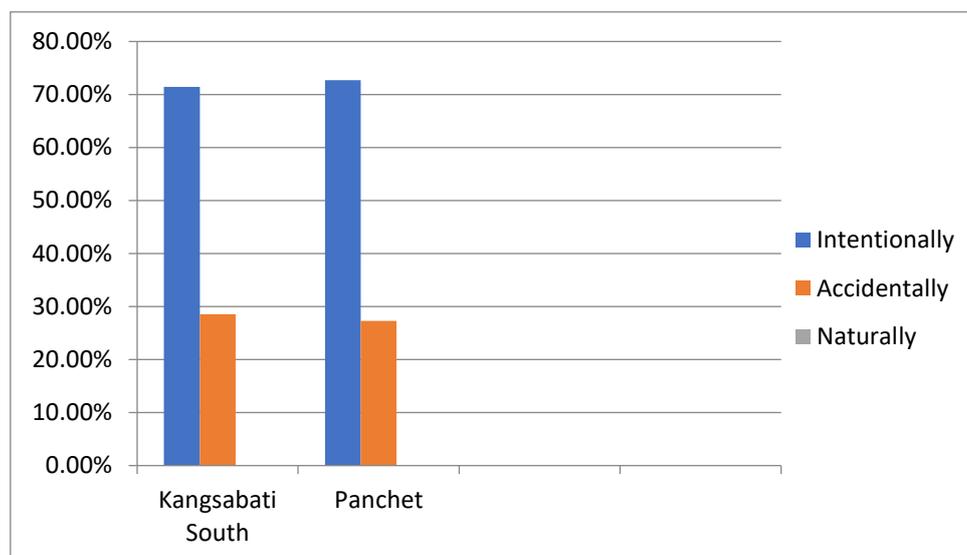


Figure 9: Cause of Forest Fire in Kangsabati South and Panchet Division

Total seven beats viz. Bandwan, Pargora, Kunchia, Latapara, Amdahara, Uporsole and Joypur under Bandwan I, Bandwan II, Bankadaha and Joypur Ranges of Kangsabati South and Panchet Division has been visited and conducted interview (Annexure IV) to evaluate the role of JFMC's role on forest fire management. 37 JFMC member from 21 JFMC, along with 14 Forest Officials have been interviewed (Annexure II for the Forest Officials and Annexure III for JFMC members). Almost all of them informed that most of the forest fire occurs due to accidental or intentional cause and none of them mentioned the occurrence of forest fire due to natural cause.

- **Sensitization of local community:** As most of the forest fires are caused by the activities of the rural population living inside and on the fringes of Forest and by forest dependent communities, the main role of JFMC begins at the very initial-stage. Before the forest fire season, the joint collaboration of Forest Department and JFMC takes part in sensitization of community through leaflet distribution among the villagers, street drama on the negative impact of forest fire and its-preparedness, public announcements, meetings on awareness, poster and flex display (Annexure V). Also, the department had planned sensitize activities and monitoring at the check posts for tourists and visitors throughout the fire season in most fire-prone areas along with the JFMC members.
- **Forest Fire Prevention:** Almost everywhere the Forest Department Officials and the JFMC members have a common platform for communication like WhatsApp group or SMS group. When the forest fire occurs, the respective Range or Beat officer communicates with the nearby JMFC teams via WhatsApp, SMS or phone call to prevent the fire. The JFMC members mostly carry sand and soil dust and make fire lines to control the fire until the Forest staff come with the leaf blower machine (Annexure VI).

- **Conduct regular patrol:** JFMCs in these areas even conduct regular patrols of forest areas to detect any potential fire hazards. This helps the Forest Department in identifying and addressing issues such as unattended campfires, unauthorized burning of waste, or any other activities that could lead to a fire.

5. Discussion

5.1. Assessment of most vulnerable area

From the vulnerability map generated it is observed that the most Fire-prone ranges are from Panchet Division. The total area affected by the Forest Fire for three consecutive years in Panchet Division was 178.35 ha while the Kangsabati South Division has the minimal area of 42.55 ha, that has been affected in three consecutive years.

5.2. Evaluation of role of JFMC's in Forest Fire Management

The Joint Forest Management Committee (JFMC) is a community-based initiative that aims to involve local people in the management and conservation of forests in India. It is a collaborative effort between forest officials and local communities to jointly manage forest resources.

The role of the local community is extremely important in managing forest fires. All the officers of the respective range and beats had clear views to the effectiveness of the department's current engagement with the local community and mostly rated it as excellent. One step ahead they all agreed that JFMC members played most important role as in many cases they first informed the Department of the fire and usually before the departmental help comes, they bring the fire under control.

JFM committees play a crucial role in preventing forest fires in the following ways:

1. **Early warning systems:** The JFM committees act as an early warning system for forest fires. They identify the vulnerable areas and inform the Forest Department about them. This helps the Forest Department to take preventive measures in a timely manner.
2. **Awareness campaigns:** JFM committees run awareness campaigns to educate people about the importance of preventing forest fires. They educate people about the dos and don'ts during the dry season and the dangers of uncontrolled fires along with the Forest Department.
3. **Firefighting:** JFM committees are sometimes trained in firefighting techniques and equipment handling. They assist the Forest Department in containing the fire before it spreads.

4. **Patrolling:** JFM committees patrol the forest regularly to detect any fire incidents. They also keep watch on any activities that can lead to forest fires, such as smoking or leaving behind lit cigarettes.
5. **Restoration:** JFM committees play a critical role in restoring the forest after a fire. They work with the Forest Department to plant new trees and restore the ecological balance of the forest.

For the better management of Forest Fire Prevention:

Joint Forest Management (JFM) is a concept where the forest department and the local community work together to manage the forest resources. To reduce the risk of the forest fire, active participation of JFMCs is always needed. And for better management, JFMC members need to be strengthened with proper training on Forest Fire prevention, and they should always be equipped with safety gears and more effective communication tools such as walkie-talkie. They should conduct more community awareness campaigns to educate people about the importance of preventing Forest Fires. They should educate more people about the dos and don'ts during the dry season and the dangers of uncontrolled fires.

To increase the effectiveness of the forest management, JFMC members should also be given some incentives by the Department. These incentives may take a variety of forms, like wage labour, small cash rewards, and public recognition for outstanding performance.

The role of JFMC is not only crucial for Forest Fire incidents, but also for promoting sustainable forest management practices. Without the help of the JFMC, not only the prevention of Forest Fire but also better management of the forest resources is nearly impossible task alone for the Forest Department Officials.

6. References:

- Anonymous. 2021. Indian State Forest Report 2021. Forest survey of India, Ministry of Environment Forest and Climate Change, Dehra Dun.
- Cha, S., Kim, C.B., Kim, J., Lee, A.L., Park, K.H., Koo, N., Kim, Y.S. (2020). Landuse changes and practical application of the land degradation neutrality (LDN) indicators: a case study in the subalpine forest ecosystems, Republic of Korea. *Forest Science and Technology*. 16(1): 8-17.
- Janzen, D.H. 1988. Tropical dry forests. *Biodiversitas*, 15: 538.
- Jhariya, M.K. and Raj, A. 2014. Effects of wildfires on flora, fauna and physicochemical properties of soil-An overview. *Journal of Applied and Natural Science* 6 (2): 887 – 897.
- Kauffman, J.B., Steele, M.D., Cummings, D.L. and Jaramillo, V.J. 2003. Biomass dynamics associated with deforestation, fire, and conversions to cattle pasture in a Mexican tropical dry forest. *Forest Ecology and Management*, 176: 1-12.
- Lal, R. 2004. Soil carbon sequestration to mitigate climate change. *Geoderma*, 123: 1-22.
- Murphy, P.G. and Lugo, A.E. 1986. Ecology of tropical dry forest. *Annual Review of Ecology and Systematic*, 17: 67-68.
- Priyadarshini, A. and Mohapatra, A.K., 2022. A review of India scale analysis of forest fire and toxic emission. *EcoEvoRxiv*, DOI: <https://doi.org/10.32942/osf.io/bfuw9>
- Reddy, C.S., Bird, N.G., Sreelakshmi, S., Manikandan, T.M., Asra, M., Krishna, P.H., Jha, C.S., Rao, P.V.N. and Diwakar, P.G. 2020b. Identification and Characterization of Spatio-Temporal Hotspots of Forest Fires in South Asia. *Environmental Monitoring and Assessment*, 191: 791.
- Srivastava, P. and Garg, A. 2013. Emissions from Forest Fires in India-as assessment based on MODIS Fire and Global land cover products. *Clim Cha and Enviro Sust*, 1(2):138–144.

ANNEXURE I

Questionnaire format for the Forest officials and JFMC Members

Name of Forest Officer/JFMC Member:

Rank of Forest Officer:

Name of Division:

Name of Range:

Name of Beat:

Name of JFMC:

Date:

1. What is the frequency of Forest Fires?
সাধারণত কত ঘন ঘন দাবানল লাগে?
2. Is there a seasonality when Forest Fires occur?
আগুন লাগার কোনো নির্দিষ্ট সময় আছে কি?
3. Do these Forest Fires occur at the same sites?
আগুন কি বার বার একই জায়গায় লাগে?
4. Is there a nodal point where the Forest Fire initiates every time?
আগুন লাগার কি কোনো মূল উৎস আছে যেখান থেকে প্রতিবার আগুন ছড়ায়?
5. What is the area of spread of the Forest Fires once started?
একবার দাবানল শুরু হলে আগুনের ছড়িয়ে পড়ার ক্ষেত্র কতটা?
6. What are the reasons for the Forest Fires not spreading beyond a certain area?
কোনো নির্দিষ্ট এলাকার বাইরে দাবানল না ছড়াবার কারণ কি?
7. What is the time taken for a Forest Fire to spread in each area?
দাবানল ছড়াতে কত সময় লাগে?
8. What is the time taken for the Forest Fire to extinguish totally, by itself and/ or manually?
এই আগুন নেভাতে কত সময় লাগে এবং তা কিভাবে নেভানো হয়?
9. Do Forest Fires occur only in selected patches?
কিছু নির্দিষ্ট জায়গাতেই কি আগুন লাগে?
10. If not what the major causes of Forest Fires?
যদি তা না হয়, তাহলে আগুন লাগার কারণ কি?
11. What is the approximate distance from human habitation that these Forest Fires occur?
লোকালয় আর দাবানল এর দূরত্ব কতখানি?
12. Are there instances of local communities responsible for initiating Forest Fires?
দাবানল শুরু করার জন্য দায়ী স্থানীয় সম্প্রদায়, এই ধরনের উদাহরণ আছে কি?
13. Historically when was the first Forest Fire recorded in your area?
এই জঙ্গলে কবে প্রথম আগুন লেগেছিল?
14. When did the last Forest Fire occur?

ANNEXURE I

Questionnaire format for the Forest officials and JFMC Members

শেষ কবে আগুন লেগেছিল?

15. Would you be able to list the major damages due to Forest Fires with special reference to plant density?
আগুন লাগার ফলে গাছের ঘনত্ব পরিবর্তিত হয়েছে কি? তার কি কোনো নথি আছে?
16. Are there records of wildlife mortality due to these Forest Fires?
আগুন লাগার ফলে কোনো বন্যপ্রাণীর মৃত্যু হয়েছে কি?
17. Are there records of human mortality due to these Forest Fires?
আগুন লাগার ফলে কোনো মানুষের মৃত্যু হয়েছে কি?
18. If so, do you have details of compensation paid to the next of kin of the victims affected?
যদি হয়ে থাকে, তাদের কোনো ক্ষতিপূরণের ব্যবস্থা করা হয়েছে কি?
19. How many litigation cases due to Forest Fires are settled till date and how many are on-going?
এই দাবানল ঘটিত কতগুলি মামলা আদালতে দায়ের করা হয়েছে?
20. Are there records of natural floral regeneration (both grasses and trees) and the time for their original restoration?
আগুন লাগার পর আবার গাছ বা ঘাস গজিয়ে উঠতে কতদিন সময় লাগে আর সেই গাছ বা ঘাস পূর্ণতা পেতে কতদিন সময় লাগে?
21. Has the Forest Department undertaken restoration activities after Forest Fires?
দাবানল লাগার পর, বনদফতর কি আবার বনভূমি পুনরায় সংরক্ষণ করেছে?
22. Are there records of time taken by Forest Department for complete restoration of the affected areas by Forest Fires?
আগুন নিভে যাওয়ার পর বনদফতর পুনঃ সংরক্ষণ করতে কতদিন সময় নিয়েছে?
23. Has Forest Fires been only destructive?
এই আগুন কি শুধুই ক্ষতি করেছে?
24. Are there instances of any advantages due to Forest Fires?
এই আগুন লাগার কোনো উপকারিতে আছে কি?

ANNEXURE II

Sample filled up questionnaire sheet of Forest Official



Questionnaire for the Forest officials and JFMC Members

Name of Forest Officer/JFMC Member: BUBAI BAURI

Rank of Forest Officer: B S

Name of Division: KANGSABATI SOUTH DIVISION

Name of Range: BANDWAN 4 RANGE

Name of Beat: BANDWAN BEAT

Name of JFMC:

Date: 18/01/2023

1. What is the frequency of Forest Fires?

সাধারণত কত ঘন ঘন দাবানল লাগে ?

Ans → প্রতি বছরে একবার ।

2. Is there a seasonality when Forest Fires occur?

আগুন লাগার কোনো নির্দিষ্ট সময় আছে কি ?

Ans → শেহরয়ারি থেকে চার্চের চণ্ডি ।

3. Do these Forest Fires occur at the same sites?

আগুন কি বার বার একই জায়গায় লাগে ?

Ans → না, বিভিন্ন জায়গায় থেকে লাগে ।

4. Is there a nodal point where the Forest Fire initiates every time?

আগুন লাগার কি কোনো মূল উৎস আছে যেখান থেকে প্রতিবার আগুন ছড়ায় ?

Ans → না ।

5. What is the area of spread of the Forest Fires once started?

একবার দাবানল শুরু হলে আগুনের ছড়িয়ে পড়ার ক্ষেত্র কতটা ?

Ans → 2 km - থেকে 10 km পর্যন্ত ।

ANNEXURE II

Sample filled up questionnaire sheet of Forest Official



6. What are the reasons for the Forest Fires not spreading beyond a certain area?

কোনো নির্দিষ্ট এলাকার বাইরে দাবানল না ছড়াবার কারণ কি?

Ans → এই এলাকার জমিদার এক বনকর্মী দ্বারা গড়তপাতি জঙ্গল
নেভানো হয়।

7. What is the time taken for a Forest Fire to spread in each area?

দাবানল ছড়াতে কত সময় লাগে?

Ans → 1 ঘণ্টা থেকে 4 ঘণ্টা।

8. What is the time taken for the Forest Fire to extinguish totally, by itself and/or manually?

এই আগুন নেভাতে কত সময় লাগে এবং তা কিভাবে নেভানো হয়?

Ans → বন জমিদার স্বয়ং গড়তপাতি নেভানো হয়। বর্তমানে
শেফালিরা সাহায়ে আগুন নেভানো হয়। গড়াড়া-সাহেব
ডালসান্না দিয়ে আগুন নেভানো হয়।

9. Do Forest Fires occur only in selected patches?

কিছু নির্দিষ্ট জায়গাতেই কি আগুন লাগে?

Ans → আগুন মজার কোনো নির্দিষ্ট জায়গা নেই।

10. If not what the major causes of Forest Fires?

যদি তা না হয়, তাহলে আগুন লাগার কারণ কি?

Ans → বিড়ি-সিগারেটের আগুন থেকে জেগে উঠে
আগুন লাগে।

11. What is the approximate distance from human habitation that these Forest Fires occur?

লোকালয় আর দাবানল এর দূরত্ব কতখানি?

Ans → 1 km - 5 km ।

ANNEXURE II

Sample filled up questionnaire sheet of Forest Official



12. Are there instances of local communities responsible for initiating Forest Fires?

দাবানল শুরু করার জন্য দায়ী স্থানীয় সম্প্রদায়, এই ধরনের উদাহরণ আছে কি?

Ans → হ্যাঁ,

13. Historically when was the first Forest Fire recorded in your area?

এই জঙ্গলে কবে প্রথম আগুন লেগেছিল?

Ans → ২০২২ সালে,
জানুয়ারী মাসে।

14. When did the last Forest Fire occur?

শেষ কবে আগুন লেগেছিল?

Ans → ২০২২ সালে।

15. Would you be able to list the major damages due to Forest Fires with special reference to plant density?

আগুন লাগার ফলে গাছের ঘনত্ব পরিবর্তিত হয়েছে কি? তার কি কোনো নথি আছে?

Ans → হ্যাঁ নেই।

16. Are there records of wildlife mortality due to these Forest Fires?

আগুন লাগার ফলে কোনো বন্যপ্রাণীর মৃত্যু হয়েছে কি?

Ans → হ্যাঁ নেই।

17. Are there records of human mortality due to these Forest Fires?

আগুন লাগার ফলে কোনো মানুষের মৃত্যু হয়েছে কি?

Ans → না।

ANNEXURE II

Sample filled up questionnaire sheet of Forest Official



18. If so, do you have details of compensation paid to the next of kin of the victims affected?

যদি হয়ে থাকে, তাদের কোনো ক্ষতিপূরণের ব্যবস্থা করা হয়েছে কি?

Ans- প্রায়শই নয়।

19. How many litigation cases due to Forest Fires are settled till date and how many are on-going?

এই দাবানল ঘটিত কতগুলি মামলা আদালতে দায়ের করা হয়েছে?

Ans- ০।

20. Are there records of natural floral regeneration (both grasses and trees) and the time for their original restoration?

আগুন লাগার পর আবার গাছ বা ঘাস গজিয়ে উঠতে কতদিন সময় লাগে আর সেই গাছ বা ঘাস পূর্ণতা পেতে কতদিন সময় লাগে?

Ans- ~~কোনও~~ কোনওর বসবসনে।

21. Has the Forest Department undertaken restoration activities after Forest Fires?

দাবানল লাগার পর, বনদফতর কি আবার বনভূমি পুনরায় সংরক্ষণ করেছে?

Ans- হ্যাঁ বসবসনে।

22. Are there records of time taken by Forest Department for complete restoration of the affected areas by Forest Fires?

আগুন নিভে যাওয়ার পর বনদফতর পুনঃ সংরক্ষণ করতে কতদিন সময় নিয়েছে?

Ans- 1 জনস্ট্র হোবস 6 জনস্ট্র।

ANNEXURE II

Sample filled up questionnaire sheet of Forest Official



23. Has Forest Fires been only destructive?

এই আগুন কি শুধুই ক্ষতি করেছে?

Ans- না, আগুন লাগার মতল দীর্ঘদিন ধরে এটা অক্ষয় বন্য-
মাতা পুড়ে গিয়ে জেট অক্ষয় পরিষ্কার হয়ে যায়, অতঃপর
সাধের বর্ষে পড়ে জেট অক্ষয় গাছ-জায়ের স্থান হয়।

24. Are there instances of any advantages due to Forest Fires?

এই আগুন লাগার কোনো উপকারিতা আছে কি?

Ans- পুড়ে যাওয়া অক্ষয় পরিষ্কার হওয়ার মতল, অতঃপর
বর্ষে পড়ে অক্ষয় জায়ের বেশি স্থান হয়।

Bubai Bawri

Bardwan Beat (B.S)

18/01/2023

ANNEXURE III

Sample filled up questionnaire sheet of JFMC member



Questionnaire for the Forest officials and JFMC Members

Name of Forest Officer/JFMC Member: স্বপ্নকান্ত হাঙ্গা
Rank of Forest Officer: -
Name of Division: Kancharibati South
Name of Range: Bardwan I
Name of Beat: Bardwan
Name of JFMC: উদ্যান
Date: ১৪-১-২১

1. What is the frequency of Forest Fires?
সাধারণত কত ঘন ঘন দাবানল লাগে?

⇒ প্রত্যেক বছর ঘনঘন লাগে।

2. Is there a seasonality when Forest Fires occur?
আগুন লাগার কোনো নির্দিষ্ট সময় আছে কি?

⇒ গ্রীষ্ম মাস থেকে - ফেব্রুয়ারি মাস পর্যন্ত।

3. Do these Forest Fires occur at the same sites?
আগুন কি বার বার একই জায়গায় লাগে?

⇒ আগুন বার বার একই জায়গায় লাগে না।

4. Is there a nodal point where the Forest Fire initiates every time?
আগুন লাগার কি কোনো মূল উৎস আছে যেখান থেকে প্রতিবার আগুন ছড়ায়?

⇒ কোন নির্দিষ্ট উৎস নেই।

5. What is the area of spread of the Forest Fires once started?
একবার দাবানল শুরু হলে আগুনের ছড়িয়ে পড়ার ক্ষেত্র কতটা?

⇒ ২ থেকে ৩ কিলোমিটার।

ANNEXURE III

Sample filled up questionnaire sheet of JFMC member



6. What are the reasons for the Forest Fires not spreading beyond a certain area?
কোনো নির্দিষ্ট এলাকার বাইরে দাবানল না ছড়াবার কারণ কি?

⇒ জ্বলে যাওয়া আগুন নিজেই ছেড়ে যায় ইত্যাদি।

7. What is the time taken for a Forest Fire to spread in each area?
দাবানল ছড়াতে কত সময় লাগে?

⇒ দুই থেকে তিন ঘণ্টার সময় লাগে।

8. What is the time taken for the Forest Fire to extinguish totally, by itself and/or manually?
এই আগুন নেভাতে কত সময় লাগে এবং তা কিভাবে নেভানো হয়?

⇒ ৫ থেকে ৬ ঘণ্টার সময় লাগে এবং জ্বলন্ত পদার্থ দিয়ে ঢেকে দেওয়া হয়।

9. Do Forest Fires occur only in selected patches?
কিছু নির্দিষ্ট জায়গাতেই কি আগুন লাগে?

⇒ নির্দিষ্ট জায়গাতে আগুন লাগে।

10. If not what the major causes of Forest Fires?
যদি তা না হয়, তাহলে আগুন লাগার কারণ কি?

⇒ কোন মানুষ বিড়ি জ্বালায় না নিজেই অসাবধানতাবশত আগুন ছেড়ে দেয়।

11. What is the approximate distance from human habitation that these Forest Fires occur?
লোকালয় আর দাবানল এর দূরত্ব কতখানি?

⇒ দুই মিলিমিটার।

ANNEXURE III

Sample filled up questionnaire sheet of JFMC member



12. Are there instances of local communities responsible for initiating Forest Fires?

দাবানল শুরু করার জন্য দায়ী স্থানীয় সম্প্রদায়, এই ধরনের উদাহরণ আছে কি?

না

13. Historically when was the first Forest Fire recorded in your area?

এই জঙ্গলে কবে প্রথম আগুন লেগেছিল?

না

14. When did the last Forest Fire occur?

শেষ কবে আগুন লেগেছিল?

না

15. Would you be able to list the major damages due to Forest Fires with special reference to plant density?

আগুন লাগার ফলে গাছের ঘনত্ব পরিবর্তিত হয়েছে কি? তার কি কোনো নথি আছে?

না

16. Are there records of wildlife mortality due to these Forest Fires?

আগুন লাগার ফলে কোনো বন্যপ্রাণীর মৃত্যু হয়েছে কি?

না

17. Are there records of human mortality due to these Forest Fires?

আগুন লাগার ফলে কোনো মানুষের মৃত্যু হয়েছে কি?

না

ANNEXURE III

Sample filled up questionnaire sheet of JFMC member



18. If so, do you have details of compensation paid to the next of kin of the victims affected?

যদি হয়ে থাকে, তাদের কোনো ক্ষতিপূরণের ব্যবস্থা করা হয়েছে কি?

না ১

19. How many litigation cases due to Forest Fires are settled till date and how many are on-going?

এই দাবানল ঘটিত কতগুলি মামলা আদালতে দায়ের করা হয়েছে?

না ১

20. Are there records of natural floral regeneration (both grasses and trees) and the time for their original restoration?

আগুন লাগার পর আবার গাছ বা ঘাস গজিয়ে উঠতে কতদিন সময় লাগে আর সেই গাছ বা ঘাস পূর্ণতা পেতে কতদিন সময় লাগে?

না ১

21. Has the Forest Department undertaken restoration activities after Forest Fires?

দাবানল লাগার পর, বনদফতর কি আবার বনভূমি পুনরায় সংরক্ষণ করেছে?

না ১

22. Are there records of time taken by Forest Department for complete restoration of the affected areas by Forest Fires?

আগুন নিভে যাওয়ার পর বনদফতর পুনঃ সংরক্ষণ করতে কতদিন সময় নিয়েছে?

না ১

ANNEXURE III

Sample filled up questionnaire sheet of JFMC member



23. Has Forest Fires been only destructive?

এই আগুন কি শুধুই ক্ষতি করেছে?

⇒ শুধুই ক্ষতি করেছে।

24. Are there instances of any advantages due to Forest Fires?

এই আগুন লাগার কোনো উপকারিতা আছে কি?

কোনো উপকারিতা নেই।
শুধুই ক্ষতি করেছে।

Ramkrishna Hamsola

vill. - Dalbani

ANNEXURE IV



NEWS team discussing with the Forest Officials and JFMC members about the problems and mitigation of Forest Fire through semi structure questionnaire at Kangsabati South Division and Panchet Division

ANNEXURE VI



Prevention of Forest Fire by the JFMC members with Air Blower or Leaf Blower Machine