



Forest Fire Dynamics in Nepal: Emerging Challenges and Responses Strategies

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Global Institute
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Context

The increasing forest fire incidents have been one of the important issues in current days in Nepal. Forest fire pose threats to the ecosystem and human lives every year. The problem is exacerbated with rising temperature, changing precipitation, and prolonged droughts. Despite efforts from multiple agencies, forest fire remains a threat. This calls for effective forest fire management strategies with a combination of prevention, preparedness, response, and recovery measures. In this backdrop, [ForestAction Nepal](#) in collaboration with [Nepal Forester's Association \(NFA\)](#), [Global Institute of Interdisciplinary Studies \(GIIS\)](#), and [Institute for Study and Development Worldwide \(IFSD\)](#) organized a half day dialogue to identify key gaps and challenges pertinent to forest fire management in Nepal.

Dr. Kiran Paudyal, president of NFA, chaired the event, followed by the welcome speech from Ms. Gayatri Karki, vice-president, NFA. It was followed by Dr. Krishna Bahadur Bhujel's presentation on "Forest Fire Dynamics in Nepal: Emerging Challenges and Responses Strategy."

Forest Fire Dynamics in Nepal: Emerging Challenges and Responses Strategy

Dr. Krishna Bahadur Bhujel shared on the forest fire dynamics in Nepal based on data from the Moderate Resolution Imaging Spectroradiometer (MODIS). He shared causes, consequences and response strategies at different levels and possible way outs for forest fire management. The last two decades trend of forest fire shows that about 2.65 million hectare (ha) per year is burning in average with the recorded 2896 incidents per year. In average, around 4.3% of forests have burned during the year having low fire records to 13% in the high number of recorded fire incidents. On average around 5.02 ha of forest ge per sq. km per year has burned. Of total forest fire incidents, 25% of the incidents have occurred in protected areas.

Chure appeared more vulnerable to fire followed by Terai and Siwalik. Although the number of forest fire incidents are lower than in high altitude, the burned areas is high there. Among the provinces, Lumbini has been recorded with high fire incidents (27%). Fires have occurred more in tropical mixed hardwood forest followed by Sal forest and then lower mixed hardwood forest, affecting growing poles, seedlings and saplings the most.



The records from 2007 to 2023 shows that 79 people have lost their lives with high record in mid-hills. Such devastating forest fires were often found to have anthropogenic causes. Proximity to road, increasing fuel deposition, invasion of abandoned land, effect of climate change, difficult geographical terrain and lack of technology and capacity among local people were the prime drivers of forest fire. In response, there have been some initiatives at government level and community level, however are insufficient in comparison to the forest fire distribution and trend. The Department of Forest and Soil Conservation (DoFSC) have formed Detection and Monitoring Unit which has active fire alert system to provide information on fire incidents. Similarly, Division Forest Offices (DFOs) have continued the awareness generation activities and seasonal fire management trainings since long and have also started mobilizing fire-fighting crew and equipment support in recent years. In addition, there are new initiatives of using technologies, such as helicopters, drones, etc, in managing fires, especially in geographically difficult terrain. At community level, activities like fireline construction, fireline cleaning and maintenance, awareness generation are also promoted. However these efforts are not enough to confront the scale of risk. In this context, forest fire can be managed through capacity building, management of fuel deposition, construction of conservation ponds, technological advancement to understand the fire behavior with their accessibility at local level and collaborative efforts among local police, army, forest officials and local communities for community based fire management practices, and researches. Dr. Bhujel emphasized that the upcoming researches should focus on modeling of fire behavior, effect of fire in forest ecology (biodiversity hotspots, forest biomass and carbon loss), effect of fire on high value crops, air pollution, soil property and microorganism loss due, climate change -forest fire link, etc.

Remarks from the Panelists

The session was moderated by Dr. Naya Sharma Paudel. Dr. Sundar Sharma, Undersecretary, National Disaster Risk Reduction and Management Authority (NDRRMA), Dr. Uttam Babu Shrestha from GIIS, and Mr. Nabaraj Pudasaini from DoFSC were the panelists of the event. They were asked to provide their remarks on the understanding on current distribution, trend, drivers and consequences of forest fire as well as response measures (government, non-government, technological, community led approaches, etc) and capacity of relevant agencies and local communities.

Dr. Sundar Sharma clarified on the difference between risk and hazard before understanding what forest fire actually is. Risk incorporates hazard, exposure and vulnerability. In this context, forest fire map developed by ICIMOD is more a hazard map than a risk map. Dr. Sharma mentioned that it is crucial to study on the economic risk of the forest fire which is lacking in the context of Nepal. "*The loss in number is not just sufficient. Unless we find the economic loss incurred by forest fire, neither can we convince finance ministry nor donor agencies to invest on forest fire management.*"- He said. According to him, the weak structural and policy aspect in forest fire management is a challenge thus requires a dedicated structure with institutional arrangements at local level to respond to the forest fire.

Acknowledging the budget speech of 2023 which has spelled out forest fire for the first time in the history of Nepal, he focused on the need of a mega scale of program for forest fire management. According to him, compensating casualties and glorifying the individuals who lost their lives in fire control may encourage the participation. He also provided some potential research areas such as trans-boundary fire and haze production, REDD mechanism and wildfire, carbon emission, etc.

Dr. Uttam Babu Shrestha shared on the contribution made by GIIS in data access on vulnerability of multi-hazard exposures (fire, landslide, flood, air pollution, etc). GIIS has conducted the assessment at palika level using 246 indicators, a step ahead to the assessment of ministry where the district has been considered as a unit. Complementing to the presentation of Dr. Bhujel, Dr. Shrestha shared additional finding of their assessment that forest fire incidences are expanding in new palikas as well, for example Manang and Rasuwa which were never burned before. He spelled on the importance of study to be conducted on the history of forest fire before the 2000, since when MODIS data are available. Providing the example of Canada, where Canadians after the wildfire of 2023 discovered the fire history until 1989 using Landsat imagery (30m spatial resolution) over MODIS (1km spatial resolution), he said that the advancement in the study is required in the context of Nepal as well. "*The research arenas should also focus on the relationship between climate change impact and forest fire trend for preparedness planning.*"- He added.

Mr. Nabaraj Pudasaini opined that fire is a prime factor of evolution, and we should not keep pre-conceived notion that forest fires are always destructive. Indeed, if they become risky, they should be minimized. Acknowledging the forest regulation which has clearly spelled out the provisions for controlled forest fire, he explained on the institutional improvement in forest fire management sector. He shared that the national committee formed after the endorsement of forest fire management strategy 2067 will have its first meeting this year (2023) which has been mentioned in the program of DoFSC. Regarding access to information, the alert system that was accessible till DFOs is in the process of expansion to reach the dedicated disaster management team in every districts. Sharing on challenges, he said that government is facing challenge to prepare the layers of fire distribution due to the lack of research based data on the fire entry point, fire prone areas and their vulnerability mapping which could be a research area. He requested research organizations to study on the exposure of forest dependent communities like in Chure so connecting forest fire and livelihood. He also supported that slash deposition in the forest has increased the risk of forest fires in Nepal. "*The post-harvest cultural operation (management of post-harvest residues) should be monitored by forest officials.*"- He recommended. In the context of changing consumption behavior of users, the alternatives to manage the fuel in the forest should also be identified and implemented by the stakeholders. Similarly, collaborative initiatives from local government is crucial to reduce fire hazards.

Plenary discussion

After the remarks from the panelists, the floor was shared with the participants for their ideas, experiences and suggestions. Dr. Dil Khatri from Southasia Institute of Advanced Studies (SIAS) emphasized on the underlying causes of forest fire. Sharing the case from Dolakha where he observed the struggle of a 60 years old women to get approval from DFO to harvest 50 cft timber from her CF and the frustration it created in her, Dr. Khatri said that the increasing severity of forest fires in mid-hills have been the consequence of lack in community responses resulted by users' alienation from forest services. "*Migration is not only the cause, motivation is also the one. Seizing the communities' rights on forest product utilization is demotivating them in forest fire management*"- he said. He also highlighted that shift from general awareness to awareness and capacity building in technologies is more crucial in recent years.

Mr. Ram Babu Paudel, a forest official emphasized to promote prior management activities such as early burning since fires in fire prone seasons are difficult to manage due to the geographic and demographic factors in Nepal. Similarly, Mr. Raju Chhetri, a forest official from Dang shared on his experience on reality verses expectation despite of several attempts in forest fire management. He said-"*We initiated some efforts starting from the formation of GIS based hazard management plan, formation of fire management team to dissemination of awareness messages and incentives for slash deposition (as demo) and expected that the risk of fire would lower this year. But we*

hardly could sleep for around two months as we faced even high risk this year." He mentioned that accumulation of dry fuels and the lack of human resource in DFOs in comparison to the geographical coverage have been challenging for them to respond.

Mr. Jograj Giri from Association of Family Forest Owners, Nepal (AFFON) said that the handover of forest ownership to local government and capacitating them would be one of the major strategy for forest fire management. He also supported that the alternatives for the management of fuel accumulated in the forest should be identified.

From the academia, Dr. Bir Bahadur Khanal Chhetri, Dean- Institute of Forestry (IOF) emphasized that site specific and incident specific response strategy is necessary for forest fire management as fire events are contested and uneven. Grounded strategy and upgraded awareness is necessary and linking them in the curriculum would be effective. He also suggested experts to find out the tangible and intangible loss and damage caused by forest fire to assist in planning.

Meanwhile, Dr. Naya Sharma Paudel also emphasized that the response attempts made are not sufficient for the scale of problem that Nepal is facing on forest fire. In such context, it is necessary to radically think on three aspects: a. Do the forest conserved with restriction in biomass consumption need to increase biomass consumption in current stage? b. Are we that capable to afford costly technology (helicopters) and handover the responsibility to organized institution and technology? If so what would be the role and response of local communities? And c. What are the long term repercussion of alienation of local communities from their own forest?



Similarly, Dr. Upama A. Koju, GIS expert at ForestAction Nepal questioned on the response of technical advancement achieved so far (fire alert system). Mr. Gauri Shankar Timila, a forest official, requested experts to verify on control burning in national parks and other accidental fires since fire incidents in number are too high of which some may be preventive burning as well.

Ms. Usha Chaudhary, a student, mentioned on the need of synchronization among the shifting forestry goals such as biodiversity conservation and forest utilization, and also their cohesion with forest fire. She also added that invasion of species should be considered in management plans as they are also adding fuel in the forest. Adding voice from fresher, Mr. Sajjan Regmi suggested on the possibility of forest fire management through the early prediction in reference to the trend of climate change impacts, particularly, drought.

From the perspective of researcher, Dr. Govinda Paudel added four particular arenas that need to be studied for forest fire management- Why people burn forest? Why people don't participate in forest fire control? Why fire is problem for forest technicians and officials but not to the communities? And how inclusive have been the dialogues and discussions on fire management regarding the participation of local government?



Remarks by Guest

Emphasizing forest fire as serious issue in current context, Dr. Sindhu Dhungana, Director General of Department of National Parks and Wildlife Conservation (DNPWC) mentioned that forest fire management is possible through the forest management. While saying management, it should not always be considered as technical arena by forest officials. He also committed his readiness to support forest officials from policy level if they want to pilot some actual decentralization approach in forest management and see the consequence on fire.

Closing by Chair


Dr. Kiran Paudyal, chair of the event summarized the program and added a missed aspect in discussion. "*The immediate and long term impacts of forest fire to the community need to be studied as they are the ultimate bearer.*"- He said. Thanking all the participants and supporting organizations (FAN, GLIS and IFSD), he wrapped up the program.

Key Takeaways from the dialogue

With changing patterns and intensity, it is important to understand the forest fire dynamics to reduce the hazards.

- In recent years, local communities are losing interest and motivation in getting involved in extinguishing forest fire in community forests. Though several reasons can be attributed to this, the primary factor has been increasing regulatory requirements for the user groups to acquire timber and other benefits from the forest.
- Declining interest and involvement of user groups in forest management activities has resulted in high deposition of burning materials/biomass in the forests, thus triggering the risk of fire. This demands for a radical rethinking on the use of forest biomass.
- While technological innovations have proven to be effective in some cases, policies and strategies should largely focus on engaging community institutions and their participation in management of forest fire in Nepal. In addition, adequate focus should be laid on reducing risks of communities who get involved in forest fire management.
- While problems and issues pertinent to forest fire in Nepal are largely understood, prioritizing research and piloting will provide a solid ground for scaling out strategies and options for forest fire management.

Workshop on
Forest fire management in Nepal: Status, emerging challenges and response strategies



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