

Institutional fragmentation and forest fire management in federal Nepal: Bridging the governance gap through incident management systems

Alan Hill¹, Manish Shrestha^{2*}

¹*Institute of Forestry, Hetauda Campus, Tribhuvan University, Kirtipur, Nepal*

²*ForestAction Nepal, Ashram Road, Bagdol, Lalitpur, Bagmati, Nepal*

*Corresponding author: manish.shrestha1979@gmail.com

Abstract

Nepal is facing an increasing forest fire crisis, with more than 34,725 incidents recorded from 2008 to 2021, leading to approximately 800 deaths and NPR 22 billion in economic losses. Although forests cover 46 per cent of the country, management efforts are greatly hindered by institutional fragmentation following Nepal's 2015 shift to federalism. This paper explores how constitutional ambiguities, especially overlapping mandates in Schedules 5, 6, 7, and 9, along with conflicting laws such as the Local Government Operation Act (2017) and the Forest Act (2019), create diagonal accountability and jurisdictional disputes. We contend that these structural gaps lead to at least six layers of administration between policy formulation and operational response, causing ad hoc coordination during critical fire periods. By examining successful Incident Management System (IMS) models from the United States and Australia, this study proposes a step-by-step approach to incorporate Nepal's Community Forest User Groups (CFUGs) into a standardised, expertise-based command structure. Launching pilot programs at the municipal level can help Nepal move ahead of top-down legislative delays and foster "ground-level" operational unity. This analysis presents a scalable model for disaster governance in emerging federal states facing challenges related to decentralised resource management.

Keywords: Forest Fire, Emergency response, Legislative conflict, Coordination mechanism, Forest governance

INTRODUCTION

Forest fires are a key driver of forest degradation in Nepal, with approximately 75 per cent of incidents attributed to human negligence (Bajracharya, 2002; Pandey and Bhattarai, 2025). More than 78 per cent of forest fires occur between March and May, coinciding with the dry season (FAO, 2000; Matin *et al.*, 2017; Mishra *et al.*, 2023), when farmers commonly burn crop residues and prevailing environmental conditions significantly increase fire risk. Despite forests

covering around 46 per cent of Nepal's total land area (FRTC, 2024), the country lacks adequate training, equipment, and most importantly, a coordinated approach to forest fire management. These challenges are compounded by severe resource constraints and institutional gaps.

Nepal's transition to federalism in 2015 has neither sufficiently resolved pre-existing issues nor simplified the administrative complexities that continue to hinder emergency response capabilities across the

three levels of government. This situation reflects the problem of "accepting too many different systems and responsibilities at any one level, which can lead to unanticipated complexity that overpowers performance" (Somlai *et al.*, 2018). The complexity is further intensified by constitutional ambiguity. Although the national government has made several attempts through periodic plans to enhance decentralisation, "the Constitution does not provide an elaboration of the organisational structure for local government decentralisation," leaving essential coordination mechanisms underdeveloped (Bahl *et al.*, 2020).

The relationship between institutional fragmentation and the effectiveness of disaster response is well-documented. Research consistently shows that unclear jurisdictional boundaries, overlapping mandates, and insufficient inter-agency coordination significantly hinder emergency response capabilities (Comfort and Kapucu, 2006; Kapucu, 2009; Shrestha *et al.*, 2025). Forest fires pose particular coordination challenges, as they often cross administrative boundaries, may require resources from multiple agencies, and necessitate rapid decision-making under conditions of uncertainty. Unlike floods or earthquakes, which typically trigger immediate centralised emergency responses, forest fires often start small and escalate gradually. They can occur at multiple locations simultaneously, each characterised by different levels of escalation. This situation creates ambiguity regarding response priorities and resource mobilisation (McLennan and Handmer, 2012). The gradual escalation means that institutional gaps such as unclear command structures, inadequate information-sharing arrangements, and fragmented resource allocation systems can have increasingly severe consequences as fires

intensify. In Nepal, these universal challenges are exacerbated by the relatively new federal arrangements and the lack of clearly defined coordination mechanisms specifically designed for forest fire management across all levels of government.

Effective federal systems address the fragmentation of disaster response by establishing institutional mechanisms that clarify roles, define command structures, and facilitate coordination across jurisdictions. Successful federal disaster management systems typically incorporate clearly defined yet flexible jurisdictional authority, enabling rapid scaling of response levels. This often includes standardised communication procedures, interoperable systems that facilitate information sharing among key agencies, and unified command structures that integrate diverse participant organisations while preserving their specific expertise and resources (Waugh and Streib, 2006). Examples of such frameworks are the United States' National Incident Management System and Australia's Australasian Inter-Service Incident Management System. These systems provide standardised approaches that accommodate the complexities of federal governance while maintaining operational unity during emergencies (Buck *et al.*, 2006). Their effectiveness does not stem from the elimination of jurisdictional boundaries, but rather from the establishment of bridging mechanisms such as unified command, liaison officers, and mutual assistance agreements, that enable multiple agencies to coordinate their actions while operating within their respective authorities. In contrast, Nepal's current institutional landscape lacks these bridging mechanisms, resulting in a situation in which different levels of government tend to operate largely independently during forest fire events.



NEPAL'S FOREST FIRE CRISIS

Scale and impact

Recent data indicate significant annual fluctuations in the number of fire incidents. The 2024 fire season was particularly severe, with more than 6,712 incidents, compared to 1,909 in 2022 (NASA FIRMS, 2025). Between 2008 and 2024, forest fires resulted in approximately 800 fatalities and injured around 2,600 people (Dahal, 2024). However, casualty figures can vary widely due to inconsistent reporting systems across different administrative levels. Between 2008 and 2021, approximately 34,725 forest fire incidents were recorded nationwide (Bhujel *et al.*, 2022), resulting in economic losses estimated at NPR 22 billion (Dahal, 2024).

Seasonal patterns

Human activities are the primary cause of forest fire ignitions. Approximately 89 per cent of these fires occur during the dry season, which lasts from March to May (Matin *et al.*, 2017). More broadly, between 78 per cent and 89 per cent of all forest fires are recorded from March through mid to late May each year (Matin *et al.*, 2017; FAO, 2000; Mishra *et al.*, 2023). This pattern may be further exacerbated by climate change, as evidenced by Nepal's average annual temperature increase of approximately 0.056°C (DHM, 2017), which is closely aligned with the global average increase of about 0.06°C (Lindsey and Dahlman, 2025).

ADMINISTRATIVE COMPLEXITY AND GOVERNANCE CHALLENGES

Pre-federal administrative framework

Before 2015, Nepal operated under a centralised system consisting of 75 districts

organised into 14 zones, a structure established in 1962 under King Mahendra (Bahl *et al.*, 2020). Chief District Officers (CDOs) held significant power as the administrative heads of these districts, often referred to as "kings of the district" during the Panchayat era (1962-1990). They wielded extensive authority over district-level governance, including forest management (Bahl *et al.*, 2020).

While this centralised approach may have provided clearer administrative structures compared to the current federal system, forest management already faced institutional tensions at that time. The Panchayat Forest Rules of 1978 introduced a dual system in which the central Department of Forests maintained technical oversight, whereas village Panchayats held management authority over designated forests. This arrangement led to conflicts between political and technical authority, foreshadowing the current complexities related to jurisdiction (Ojha *et al.*, 2014).

Federal transition and new complexities

Nepal's 2015 Constitution fundamentally restructured governance by establishing three tiers of government, each with overlapping responsibilities for forest management (Bahl *et al.*, 2020). The Constitution allocated 22 exclusive powers to local governments and assigned 15 concurrent powers among federal, provincial, and local levels. This arrangement has created coordination challenges that directly affect the effectiveness of forest fire management.

The administrative reorganisation expanded the original 75 districts to 77, with the districts of Nawalparasi and Rukum each being divided in 2017 (Bahl *et al.*, 2020).

More importantly, the constitutional framework established overlapping jurisdictions, which have likely complicated the coordination of forest fire management efforts. Part 17 of the Constitution established District Assemblies in all 77 administrative districts, comprising leaders from municipal and rural municipalities. Although these assemblies are recognised in the Constitution, they serve as an additional administrative layer rather than a fourth tier of government (Bahl *et al.*, 2020).

The constitutional framework creates significant jurisdictional ambiguities for forest management through overlapping power distributions (Bahl *et al.*, 2020):

- **Schedule 5** assigns the Federal Government authority over national forest policies, national parks, wildlife reserves, and wetlands
- **Schedule 6** places forest management under provincial authority
- **Schedule 7** designates inter-provincial forest resources as shared federal-provincial responsibility
- **Schedule 9** establishes forests as a three-tier concurrent responsibility

These constitutional ambiguities are further complicated by conflicting legislative frameworks that obscure the scope of management authority during forest fire emergencies. The Local Government Operation Act of 2017 empowers rural municipalities to "protect, use, manage, monitor, regulate, as well as formulate and implement laws" for forest resources within their jurisdictions (Dahal *et al.*, 2021). However, these provisions conflict with national forest legislation, as the Forest Act retains oversight with Divisional Forest Officers (DFOs). This creates uncertainty

regarding management authority during fire emergencies and limits local involvement in coordinating pre-season preparation and prevention measures.

The constitutional requirement for provincial and local governments to develop their own forest legislation has introduced additional implementation challenges. Several provincial governments have enacted forest regulations consistent with their constitutional mandates, including Koshi Province's Forest Regulation 2023 (Dahal, 2024) and Bagmati Province's Sustainable Forest Management Procedure 2023 (MOFE Bagmati, 2023). However, due to the overlapping jurisdictional structures mentioned above, these regulations often lack clear operational guidelines for exercising their powers (Charmakar *et al.*, 2024). The ambiguity in constitutional schedules means that provincially developed forest legislation frequently conflicts with or duplicates federal frameworks, leading to legal uncertainty about which tier holds ultimate authority during emergency responses.

Moreover, severe capacity constraints and inadequate financial resources at the provincial and local levels mean that, even where forest legislation exists, these bodies may lack the technical expertise, trained personnel, and budgetary allocations necessary to implement their forest management responsibilities effectively (Acharya and Zafarullah, 2020). This combination of legislative ambiguity and resource scarcity results in forest management authority being theoretically devolved but practically unexercised at sub-national levels.

Disaster management institutional fragmentation

The Disaster Risk Reduction and Management Act of 2017 establishes a complex, multi-tiered structure for disaster



management, which complicates coordination in the context of forest fire response. The Act creates disaster management bodies at the national, provincial, district, and local levels, each assigned specific yet partially overlapping responsibilities (GoN, 2017).

- The **National Council** provides policy guidance to provincial and local levels
- The **Executive Committee** approves disaster response policies and coordinates across federal, provincial, district, and local levels
- The **National Disaster Risk Reduction and Management Authority (NDRRMA)** functions as the central resource agency and coordinates search, rescue, and relief operations
- **Provincial Disaster Management Executive Committees** coordinate between the federal and local levels while implementing disaster response at the provincial level
- **District Disaster Management Committees**, chaired by CDOs, implement disaster response at the district level and coordinate with local levels
- **Local Disaster Management Committees**, chaired by village/municipal leaders, implement local disaster plans
- **Security Agencies** mobilise for disaster response under CDO orders

This institutional arrangement results in at least six administrative layers between policy formulation and operational response during forest fire emergencies. Coordination mechanisms between the disaster management hierarchy and the fragmented forest governance structure remain unclear. District Disaster Management Committees, chaired by CDOs, are supposed to coordinate emergency responses across

administrative boundaries. However, these committees face the challenge of navigating the distinct jurisdictional authorities of forestry departments, provincial governments, local municipalities, and protected area management agencies. Each of these entities operates under various constitutional schedules and legislative frameworks governing forest management, complicating coordination.

Departmental fragmentation

The government of Nepal has established 84 Division Forest Offices that operate under provincial governments rather than the federal Department of Forests and Soil Conservation (Pokharel *et al.*, 2020). In addition, the Department of National Parks and Wildlife Conservation (DNPWC) manages 21 protected areas, which include 13 national parks, 6 conservation areas, 1 wildlife reserve, and 1 hunting reserve. This department operates under the federal government and is independent of district and division office boundaries (Adhikari *et al.*, 2014).

The CDOs, appointed by the federal government, coordinate disaster responses through District Administration Offices. These offices are accountable to the federal government rather than provincial or local authorities (DRCN, 2020). At the same time, DFOs operate under provincial direction but must inform CDOs about forest-related disasters, such as forest fires. This creates a situation of "diagonal accountability," in which Division Forest Offices are required to respond to multiple authorities across different levels of government.

This structural contradiction is highlighted by the fact that, although the Constitution allocates authority over community forests to local governments, the reorganised forest

administration permits DFOs (under provincial governments) to approve local government recommendations. This arrangement effectively undermines the constitutional intent and diminishes local autonomy (Pokharel *et al.*, 2020). Moreover, the presence of critical departments with misaligned administrative boundaries creates jurisdictional ambiguity, complicating emergency coordination efforts during forest fire emergencies. This situation reflects broader trends of re-centralisation within Nepal's supposedly federal forest governance structure (Basnyat *et al.*, 2020). The fragmentation in governance forces forest officers to navigate competing directives from federal disaster management authorities, provincial forest directorates, and local governments, each claiming legitimate authority under different constitutional schedules. As a result, governance during the initial phase of federal implementation becomes ambiguous (Bhusal and Breen, 2024).

Community forest management complexity

Nepal's community forestry program comprises more than 23,026 Community Forest User Groups (CFUGs) that manage more than 2.4 million hectares (CFSC, 2024). Since the implementation of federalism, all three levels of government impose taxes on CFUGs (Dahal *et al.*, 2021), resulting in financial burdens and administrative confusion. This undermines the autonomy of CFUGs and increases the risk posed by forest fires due to fragmented forest management.

The Local Government Operation Act (2017) assigns responsibilities for environmental conservation and forest resource management to local governments, thereby creating an expectation that community forestry will be

overseen by these local authorities (Dahal *et al.*, 2021). However, the Forest Act (2019) maintains operational control with DFOs, who are responsible for approving the operational plans of community forests and monitoring CFUGs (Dahal *et al.*, 2021). This creates dual and often conflicting accountability structures, requiring CFUGs to navigate both the authority of local governments (empowered by constitutional concurrent powers under Schedule 9) and the oversight of provincial forestry departments exercised through the DFOs. Such complexity can hinder effective coordination during forest fire emergencies when quick and unified command structures are crucial.

Currently, nearly all individuals involved in forest fire management, including CFUG members, lack adequate training, knowledge, and experience in fire suppression techniques. Insufficient understanding of suppression methods, limited access to firefighting equipment and personal protective equipment (PPE), and poor communication systems contribute to coordination failures during emergencies (Pandey and Bhattarai, 2025). These capacity gaps at the community level exacerbate the broader challenges of intergovernmental coordination.

POLICY FRAMEWORK GAPS AND LEGISLATIVE CONTRADICTIONS

Dispersed policy framework

Nepal lacks a clear, unified policy framework for forest fire management, as relevant legal provisions are scattered across at least seven major pieces of legislation and lack coherent coordination mechanisms. The National Forest Fire Management Strategy (2010) is the only document that explicitly addresses forest fire management. However, despite their importance, the implementation of preventive



measures has seen limited progress and has not been integrated into the post-2015 federal structure (Matin *et al.*, 2017).

The NDRRMA, established in 2017, was intended to coordinate disaster responses but has struggled to establish clear hierarchies during fire emergencies (GoN, 2017). Currently, the coordination role seems to be maintained by the Ministry of Home Affairs. Additionally, the NDRRMA is severely under-resourced and lacks staff with critical experience in forest fire management.

In 2024, a draft Forest Fire Risk Reduction and Management National Strategy and Action Plan (2079–2087 BS) was developed to align with the National Disaster Risk Reduction and Management Action Plan (2018–2030). However, changes in staff at the end of 2024 resulted in the replacement of key positions, including the Executive Head and Under Secretary of the Forest Fire, Fire, and Environment Branch at the NDRRMA. On July 1, 2025, a meeting was held to review and revise Nepal's Forest Fire Strategy 2010. For this review, the original comprehensive document available in 2024 appears to have been replaced by a version that is significantly reduced in scope and detail.

Legislative implementation gaps

More than 30 local-level acts and regulations have been enacted; however, their effective implementation is hindered by technical issues, coordination gaps among central ministries, and ongoing intervention by central agencies (Acharya and Zafarullah, 2020). The political changes and transition to federalism have led to new forest legislation at both the federal and provincial levels. These changes resulted in adjustments to governance and benefit-sharing models, which evoked uncertainty during emergencies (Charmakar *et al.*, 2024).

Even five years after Nepal's constitutional transition, essential framework legislation remains incomplete. The enabling laws for provincial public service commissions have been delayed, and the civil service legislation is stalled (Bahl *et al.*, 2020). These legislative gaps create operational obscurities that impede coordination during forest fire emergencies, where clear chains of command and responsibility are crucial.

OPERATIONAL CHALLENGES AND COORDINATION FAILURES

Resource constraints and command structure deficiencies

For the two main agencies involved in forest fire management, resources are severely limited. For the fiscal year 2022/23, the NDRRMA received only NPR 5 million (approximately USD \$36,000), while the Ministry of Forests allocated a mere NPR 22 million (around USD \$160,000) for forest fire management throughout all of Nepal (Dahal, 2024; Prasad and Khanal, 2023; Shrestha, 2023). This indicates a significant lack of prioritisation for fire management by the national government.

Current emergency protocols highlight the absence of a coordinated incident management system. When local capacity is exceeded, CDOs request assistance from the armed forces through the Ministry of Home Affairs. However, once the armed forces are deployed, they take command of the situation, despite often having limited experience, training, or equipment for forest fire management. This can lead to problems in the command structure during critical response periods, particularly given the documented inadequacies of existing coordination mechanisms.

Intergovernmental coordination failures

Despite constitutional mechanisms mandating cooperation, coexistence, and coordination between levels of government, Nepal's three tiers of government struggle to collaborate effectively through intergovernmental structures (Acharya and Zafarullah, 2020). Since 2015, the Inter-Provincial Council has convened only three times, with the most recent meeting held in 2019 (Bahl *et al.*, 2020).

Poor intergovernmental relations and conflicts between the three tiers of government have become major obstacles to the successful implementation of federalism in Nepal (Subedi, 2023). This lack of coordination is also evident in other sectors, where federal, provincial, and local authorities struggle to establish unified approaches to shared responsibilities (Bahl *et al.*, 2020).

Despite various efforts, the vastness of forest areas, coupled with resource constraints, and inadequate coordination have resulted in little to no reduction in forest fire incidents and the damage they cause. These incidents highlight the urgent need for effective policies, legal frameworks, and institutional measures to prevent and control forest fires. Achieving this requires concerted efforts by governments at all levels, as well as the active involvement of local communities.

INTERNATIONAL EXPERIENCE: FEDERAL FOREST FIRE COORDINATION

United States: Incident command system development

The United States developed its Incident Command System (ICS) in response to catastrophic forest fires in Southern

California during the 1970s. Coordination failures among multiple agencies resulted in ineffective responses to these disasters (GFMC, 2009). The ICS addresses the complexities of jurisdiction by implementing unified command structures, standardised resource procedures, and scalable organisational frameworks that operate beyond typical administrative boundaries during emergencies (FAO, 2010).

The federal structure of the United States distributes responsibilities among federal agencies, such as the Forest Service and the Bureau of Land Management, as well as state agencies and local fire departments. This setup created coordination challenges similar to those faced in Nepal. The implementation of ICS successfully bridged these jurisdictional gaps by establishing predetermined roles and responsibilities that activate during emergencies, enabling a cohesive response that transcends ordinary administrative limitations.

Australia: Multi-jurisdictional coordination - example NSW

The Australian government comprises the national government, state and territory governments, as well as local governments across all states and territories. Fire management typically operates within two main frameworks in each state: urban fire services and rural fire services (RFS), which often work together during incidents. Rural fire services frequently rely on a substantial number of volunteers.

In New South Wales (NSW), which experiences summer wildfires almost every year, the RFS maintains a central administration in Sydney that oversees and coordinates efforts, particularly during simultaneous fire incidents (NSW RFS,



2024). The state is divided into 44 RFS districts, which are grouped into seven Area Commands, with approximately 124 local control centres managing brigade responses. This organisational structure prioritises local responses, escalating to higher levels only when additional resources are needed. Timely situation reports keep all levels informed and prepared to respond to escalating incidents.

Under the Rural Fire Act 1997, the Rural Fire Service, the NSW National Parks and Wildlife Service (NPWS) and the Forestry Corporation of NSW are designated as fire authorities (Australian Emergency Law, 2020; NSW Government, 1997). They respond to fires within the areas they manage and collaborate as incidents develop further. NSW operates three response levels:

- **Level 1** - Resolved using local resources only, with a Fire Captain or Crew Leader in charge (typically the first arriving Officer).
- **Level 2** - More complex incidents requiring resources beyond the initial response, or the establishment of sectorisation or functional sections due to size, risk, or potential consequences. An appropriately qualified Incident Controller (IC) leads these operations, with management potentially shared between multiple fire authorities.
- **Level 3** - Highly complex incidents requiring significant resources and structure, with the IC typically appointed by the Commissioner (NSW RFS, 2025).

Once declared, all personnel work as a unified team regardless of their employing organisation. The IC and Incident Management Team (IMT) operate within the Australasian Inter-Service Incident Management System (AIIMS), the Incident

Management System (IMS) utilised by the RFS (NSW RFS, 2025). AIIMS is an integral component of emergency management doctrine for the fire and emergency services sector in Australia, enabling agencies to coordinate an integrated and effective response to incidents (AFAC, 2017). The response structure's size and complexity directly match the incident's requirements.

KEY LESSONS FOR NEPAL

International experience highlights several critical success factors, including clearly defined roles that cross administrative boundaries, standardised training and procedures, personnel assignments within an IMS based on knowledge and experience rather than rank, position, or organisation. Additionally, effective mutual aid and resource-sharing mechanisms, along with unified command structures that preserve authority while accommodating multiple stakeholders, are essential for success.

Toward an incident management system for Nepal

Addressing critical coordination issues

Nepal's 2022 draft strategy review identified five critical incident management issues that IMS implementation could systematically address (GoN/MoHA, 2022):

1. **Inter-agency coordination:** IMS would establish predetermined protocols that activate during emergencies, creating formal collaboration mechanisms between all government spheres
2. **Integration into disaster management:** IMS provides the structural frameworks needed to integrate forest fire management into NDRRMA coordination systems

3. **Proactive management:** Pre-incident planning would identify high-risk areas and establish response protocols before fires occur
4. **Incident command systems:** Clear command hierarchies with qualified incident commanders based on expertise rather than institutional hierarchy
5. **Structured command systems:** Standardised organisational structures ensuring consistent coordination regardless of incident location

An IMS would create predefined coordination protocols that activate during forest fires and potentially other emergencies. This system would establish formal mechanisms for collaboration among all levels of government, including specific units such as the Armed Forces. Instead of relying on ad hoc coordination efforts during emergencies, the IMS would provide standardised procedures for information sharing, resource allocation, and joint decision-making among agencies operating across different administrative boundaries.

The system would establish liaison positions and communication protocols to facilitate real-time coordination among federal, provincial, and local agencies while preserving each agency's existing authorities within a unified command structure. CFUGs could be formally integrated as first-response teams, with clear reporting lines to DFOs and local emergency coordinators.

Implementation pathway

Recognising Nepal's political and administrative realities (Acharya and Zaffarullah, 2020; Bahl *et al.*, 2020; Subedi, 2023), IMS implementation should follow a phased approach:

Phase 1: Policy framework development-

Create a cohesive national policy that clearly defines the roles of various government levels while addressing any constitutional jurisdictional ambiguities regarding responsibilities. The development of this policy should involve all relevant stakeholders, including federal ministries, provincial governments, local authorities, and representatives from CFUGs. This approach will ensure that IMS implementation fosters consensus rather than imposing external frameworks on existing institutions.

Phase 2: Pilot implementation

- Test procedures should be conducted in selected districts that represent various jurisdictional arrangements, including areas with significant community forests, protected areas, and the need for multi-provincial coordination. The pilot districts should represent diverse jurisdictional configurations and include these essential features.

Phase 3: Training and capacity development

- Develop standardised training programs to enhance IMS skills across various agencies, while incorporating CFUGs as primary first-response teams. It would be beneficial to seek IMS training from experienced international providers specialising in forest fire management. Special emphasis should be placed on training CFUGs, given their vital role in community-level forest management and early response capabilities.

Phase 4: Resource and technology integration

- Implement coordinated resource management systems to enable effective resource sharing during emergencies. This includes standardised equipment specifications, communication systems, and procedures for tracking resources.

Phase 5: Evaluation and refinement-

Systematic evaluation should focus on



measurable improvements in coordination effectiveness, response times, and incident outcomes compared to historical performance.

CONCLUSION

Nepal's transition to federalism has complicated forest fire management due to overlapping jurisdictions, fragmented structures, and poor coordination. The complexity of the constitutional framework, along with resource constraints and unclear accountability, hinder effective fire prevention and response. Nevertheless, international examples demonstrate that federal systems can manage emergencies effectively by implementing an IMS. Introducing an IMS in Nepal could provide a standardised command structure that is currently lacking in its administrative framework.

To address these coordination issues, Nepal should focus on developing a "system of systems" approach in a few key municipalities and provinces. This method would preserve successful community-based forest management while integrating it into a coordinated emergency response framework. Ultimately, effective fire management in Nepal requires clarifying roles and responsibilities, harmonising legislation, and establishing coordination mechanisms among various government levels. Without policy reforms that define clear communication and a unified command, Nepal's forests will remain vulnerable, despite ongoing investments in conservation programs.

REFERENCES

Acharya, K. K., & Zafarullah, H. (2020). Institutionalising federalism in Nepal: Operationalising obstacles, procrastinated progress. *Public Administration and Policy*, 23(2), 125–139. <https://doi.org/10.1108/PAP-03-2020-0013>

- Adhikari, S., Kingi, T., & Ganesh, S. (2014). Incentives for community participation in the governance and management of common property resources: The case of community forest management in Nepal. *Forest Policy and Economics*, 44, 1–9. <https://doi.org/10.1016/j.forpol.2014.04.003>
- Australian Emergency Law. (2020, February 29). Coordinating firefighting with NSW RFS, FC and NPWS. <https://australianemergencylaw.com/2020/02/29/coordinating-firefighting-with-nsw-rfs-fc-and-npws/>
- Australian Fire and Emergency Service Authorities Council. (2017). *AIIMS 2017 manual*. Australian Fire and Emergency Service Authorities Council. <https://www.afac.com.au/marketplace/9be97a80-5025-4ab7-b4ce-4fe7e68ec573>
- Bahl, R. W., Timofeev, A., & Yilmaz, S. (2020). *Implementing federalism: The case of Nepal* (ICePP Working Paper No. 20-10). International Center for Public Policy, Andrew Young School of Policy Studies, Georgia State University. <https://icepp.gsu.edu/files/2020/06/paper2010.pdf>
- Bajracharya, D. (2002). Forest fire situation in Nepal. *International Forest Fire News*, 26, 84–86. <https://dpnet.org.np/uploads/files/Forest%20Fire%202022-03-20%2010-33-22.pdf>
- Basnyat, B., Treue, T., Pokharel, R. K., Baral, S., & Rumba, Y. B. (2020). Re-centralisation through fake scientificness: The case of community forestry in Nepal. *Forest Policy and Economics*, 115, Article 102147. <https://doi.org/10.1016/j.forpol.2020.102147>
- Bhujel, K. B., Sapkota, R. P., & Khadka, U. R. (2022). Temporal and spatial distribution of forest fires and their environmental and socio-economic implications in Nepal. *Journal of Forest and Livelihood*, 21(1), 1–13. <https://doi.org/10.3126/jfl.v21i1.56575>
- Bhusal, T., & Breen, M. G. (2024). A study of the first five-year tenure (2017–2022) of provincial governments in Nepal. *Asian Politics and Policy*, 16(4), 524–547. <https://doi.org/10.1111/aspp.12767>

- Buck, D. A., Trainor, J. E., & Aguirre, B. E. (2006). A critical evaluation of the incident command system and NIMS. *Journal of Homeland Security and Emergency Management*, 3(3), Article 1. <https://doi.org/10.2202/1547-7355.1252>
- Community Forest Study Center. (2024). *Community forest bulletin* (Vol. 20). Community Forest Study Center.
- Charmakar, S., Kimengsi, J. N., & Giessen, L. (2024). Linking institutional change mechanisms with forest management outcomes: Evidence from community forestry in Nepal. *Ecology and Society*, 29(3), 1–35. <https://doi.org/10.5751/ES-15085-290301>
- Comfort, L. K., & Kapucu, N. (2006). Inter-organizational coordination in extreme events: The World Trade Center attacks, September 11, 2001. *Natural Hazards*, 39(2), 309–327. <https://doi.org/10.1007/s11069-006-0030-x>
- Dahal, B. (2024, April 15). Prepare to fight forest fires. *Rising Nepal Daily*. <https://risingnepaldaily.com/news/41587>
- Dahal, B., Joshi, R., Poudel, B., & Panta, M. (2021). Community forestry governance in federal system of Nepal. *Journal of Policy and Governance*, 1(1), 30–45. <https://doi.org/10.33002/jpg010103>
- Democracy Resource Center Nepal. (2020). *The interrelationship between three levels of governments in Nepal's federal structure: A study report* (DRCN Periodic Report No. 9). https://www.democracyresource.org/wp-content/uploads/2020/10/Inter-Government-Relation_EngVer_13October2020.pdf
- Department of Hydrology and Meteorology. (2017). *Observed climate trend analysis in the districts and physiographic regions of Nepal (1971–2014)*. Government of Nepal. https://www.dhm.gov.np/uploads/dhm/climateService/Observed_Climate_Trend_Analysis_Report_2017.pdf
- Food and Agriculture Organization of the United Nations. (2000). *Global forest fire assessment 1990–2000* (Forest Resources Assessment Programme Working Paper No. 55). <https://www.fao.org/3/ad653e/ad653e00.htm>
- Food and Agriculture Organization of the United Nations. (2010). *Wildland fire management handbook for trainers*. <https://www.fao.org/4/i1363e/i1363e01.pdf>
- Forest Research and Training Centre. (2024). *National land cover monitoring system of Nepal, 2020–2022*. Government of Nepal. https://frtc.gov.np/uploads/files/NLCMS_Report_Final.pdf
- Global Fire Monitoring Centre. (2009). *Use of incident command systems in fire management* [Symposium proceedings]. International Symposium on Use of Incident Command Systems in Fire Management, 2009 Pan Asia Forest Fire Symposium. https://gfmcc.org/wp-content/uploads/Pan-Asia-proceeding_ICSFfinal.pdf
- Government of Nepal. (2017). *Disaster risk reduction and management act, 2074 (2017)*. Ministry of Home Affairs. <https://www.dpnet.org.np/public/resource-detail/1119>
- Government of Nepal. (2022). *Forest fire risk reduction and management national strategy and action plan (2079–2087 BS) [2022–2030 CE]*. National Disaster Risk Reduction and Management Authority, Ministry of Home Affairs.
- Kapucu, N. (2009). Interorganizational coordination in complex environments of disasters: The evolution of intergovernmental disaster response systems. *Journal of Homeland Security and Emergency Management*, 6(1), Article 47. <https://doi.org/10.2202/1547-7355.1498>
- Lindsey, R., & Dahlman, L. (2025). *Climate change: Global temperature*. NOAA Climate.gov. <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>
- Matin, M. A., Chitale, V. S., Murthy, M. S. R., Uddin, K., Bajracharya, B., & Pradhan, S. (2017). Understanding forest fire patterns and risk in Nepal using remote sensing, geographic information systems and historical fire data. *International Journal of Wildland Fire*, 26(4), 276–286. <https://doi.org/10.1071/WF16056>



- McLennan, B., & Handmer, J. (2012). Reframing responsibility-sharing for bushfire risk management in Australia after Black Saturday. *Environmental Hazards*, 11(1), 1–15. <https://doi.org/10.1080/17477891.2011.608835>
- Ministry of Forest and Environment, Bagmati Province. (2023). *Sustainable forest management procedure 2079 (2023)*. Government of Nepal. <https://mofe.bagmati.gov.np/content/192/sustainable-forest-management-procedure-2079>
- Mishra, B., Panthi, S., Poudel, S., & Ghimire, B. R. (2023). Forest fire pattern and vulnerability mapping using deep learning in Nepal. *Fire Ecology*, 19, Article 3. <https://doi.org/10.1186/s42408-022-00162-3>
- NASA Fire Information for Resource Management System (FIRMS). (2025). MODIS Collection 6.1 active fire detections [Data set]. NASA EOSDIS. <https://firms.modaps.eosdis.nasa.gov>
- NSW Government. (1997). *Rural Fires Act 1997* (NSW). https://classic.austlii.edu.au/au/legis/nsw/consol_act/rfa1997138/
- NSW Rural Fire Service. (2024). *Structure*. <https://admin.rfs.nsw.gov.au/about-us/structure>
- NSW Rural Fire Service. (2025). *Incident management: General*. <https://www.rfs.nsw.gov.au/resources/publications/operational-procedures-and-guidelines/foundational/incident-management-general>
- Ojha, H. R., Banjade, M. R., Sunam, R. K., Bhattarai, B., Jana, S., Goutam, K. R., & Dhungana, S. (2014). Can authority change through deliberative politics? Lessons from four decades of participatory forest policy reform in Nepal. *Forest Policy and Economics*, 46, 1–9. <https://doi.org/10.1016/j.forpol.2014.04.005>
- Pandey, P. R., & Bhattarai, K. (2025, June 9). Rethinking forest fire management in Nepal: Lessons from Bagmati Province. *Spotlight Nepal*. <https://www.spotlightnepal.com/2025/06/09/rethinking-forest-fire-management-nepal-lessons-bagmati-province/>
- Pokharel, K., Karki, R., Ojha, H. R., Gentle, P., Acharya, D., Banjade, M., & Paudel, D. (2020). State-community relations and deliberative politics within federal forest governance in Nepal. *International Forestry Review*, 22(3), 370–381. <https://doi.org/10.1505/146554820830405609>
- Prasad, R. J., & Khanal, S. (2023, May 13). More pre-monsoon forest fires in Nepal. *Nepali Times*. <https://nepalitimes.com/here-now/more-pre-monsoon-forest-fires-in-nepal>
- Shrestha, M., Karki, R., Bohara, M., & Karna, B. (2025). *The awareness-action gap in community forest fire management: Insights from high-altitude Nepal* [Preprint]. SSRN. <https://doi.org/10.2139/ssrn.5390637>
- Shrestha, S. (2023, May 16). What is flaring Nepal's issue of forest fires? *Nepal Economic Forum*. <https://nepaleconomicforum.org/what-is-flaring-nepals-issue-of-forest-fires/>
- Somlai, I. G., Karakatsoulis, J., Gardner, W., Gautam, A. P., Sharma, S. P., & Adhikari, B. (2018). Forest governance in Nepal: Rationale for centralised forest and wildfire management. *Journal of Management and Development Studies*, 28, 16–35. <https://doi.org/10.3126/jmds.v28i0.24956>
- Subedi, G. (2023). Intergovernmental interaction in federal Nepal and challenges in the transitional period. *Journal of Multidisciplinary Research*, 2(1), 49–60. <https://nepjol.info/index.php/ijmr/article/download/53620/40121>
- Wagh, W. L., & Streib, G. (2006). Collaboration and leadership for effective emergency management. *Public Administration Review*, 66(S1), 131–140. <https://doi.org/10.1111/j.1540-6210.2006.00673.x>