

Legal Implications of Forest Fires on Biodiversity Conservation in Pakistan

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Abstract

This thesis explores the impact of forest fires on biodiversity in Pakistan through a legal and ecological perspective, arguing that existing laws are structurally incapable of responding to a growing climate-driven crisis. Although forests cover only about 5.1% of Pakistan's land, they sustain critical biodiversity—from Chilgoza pine and juniper forests to mangroves and subtropical woodlands—now increasingly threatened by recurrent wildfires. The study shows that Pakistan's legal framework, centered on the colonial Forest Act 1927 and fragmented further by the 18th Amendment, remains revenue-centric, treating forests as timber assets rather than public trust resources vital for ecological security. Using a qualitative, doctrinal methodology, the research critically analyzes federal and provincial statutes, the Pakistan Environmental Protection Act (PEPA) 1997, disaster-management laws, and landmark constitutional jurisprudence under Article 9, alongside international instruments such as the CBD and Paris Agreement. It argues for a shift from fault-based, criminalized responses to a modern “wildfire jurisprudence” grounded in tort law, strict liability, public trust doctrine, and ecological restoration. The thesis proposes a unified Wildfire Management and Liability Act and a National Ecological Security framework to overcome jurisdictional fragmentation, strengthen biodiversity conservation, and align domestic law with climate justice obligations.

Keywords: Forest Fires, Biodiversity, Pakistan, Forest Act 1927, Pepa 1997, Tort Law, Strict Liability, Public Trust Doctrine.

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1. Introduction

The 5.1% of Pakistan's land that constitutes forests represents essential ecological resources that maintain biodiversity and control local climate patterns and provide employment for many people (*Forests | WWF, 2021*). These forests start from the coniferous woodlands of Khyber Pakhtunkhwa (KP), where the endangered Himalayan cedar (*Cedrus deodara*) resides, down to the Indus Delta mangroves in Sindh that support marine life reproduction, and ending at the subtropical scrub forests of Punjab, which protect the phulai (*Acacia modesta*) and Indian pangolin (*Manis crassicaudata*). The important natural habitats struggle to survive from intensifying wildfire risks that result from climate change. Between 2000 and 2022, forest fires destroyed 24,000 hectares of forested areas in Pakistan, concentrating on the regions of KP's Chilgoza pine forests and the Margalla Hills near Islamabad (Khan & Hussain, 2024). As per the report of Dawn (2021) The 2021 Margalla Hills fire wiped out 300 hectares of protected land, which threatens the Punjab urial (*Ovis vignei punjabiensis*) with possible extinction (Dawn, 2021). Forest fires across Pakistan stem from natural causes, along with human-caused contributing elements. Pakistan recorded its warmest April on record in 2022, with a temperature of 49°C, while experiencing record high temperatures that turned the land into a dry and easily flammable territory (*Pakistan Meteorological Department, 2022*). Human activities exacerbate these risks. Human agricultural methods, which combine stubble burning with illegal timber extraction and unauthorized urban developments, destroy habitats and cause destructive fires to spread. Ziarat juniper forests, which shelter trees aged 5,000 years, experienced fires in 2020, mostly due to conflicts between local herders and forest authorities (*UNESCO, 2016*).

These fires have caused extensive negative impacts on the ecological systems. *Pinus gerardiana*, also known as the Chilgoza pine, faces a 60% decline in its regeneration rates in areas affected by fire (Dil & Ali, 2025). Snow leopards (*Panthera uncia*) join the list of threatened fauna since their habitat in northern regions is being destroyed by fires. After fire events in the Margalla Hills caused a 5% reduction of soil organic carbon, which disrupted the important nutrient cycling processes (Sahar et al., 2024). Pakistan struggles to achieve Sustainable Development Goal 15 (Life on Land) since it requires stopping biodiversity loss by 2030 (Vlek et al., 2017).

The environmental regulations in Pakistan are divided, and they only address issues when they arise. On the national level, the Pakistan Environmental Protection Act (PEPA), 1997, states that biodiversity must be preserved, but does not provide any guidelines on how to prevent wildfires. According to the National Forest Policy, 2015, the community must assist in controlling fire, yet it does not provide funds to train or to purchase equipment (*Pakistan Forest Policy, 2015*). The KP Forest Ordinance, 2002, in the provinces prioritizes the acquisition of wood to make a profit over the preservation of the forest, and the Sindh Wildlife Protection Act, 2020, does not discuss the fire threat to mangrove forests. There is also poor coordination among agencies. The National Disaster Management Authority (NDMA), established under the Disaster Management Act, 2010, primarily operates once a disaster has occurred rather than preventing its occurrence. As an example, in 2022, the NDMA was slow to respond to big fires that burned the juniper trees of Baluchistan, allowing the fires to last for weeks (Rahman & Hamza, 2024a). The provincial forest offices are small and have limited funds, so they still fight fires by beating the flames with branches because they do not have modern equipment like water bombers.

Research Methodology

This study is qualitative and analytical in nature, with a particular interest in Pakistan to learn how the laws on forest fires impact biodiversity. The study does not merely enumerate the existing rules but rather excavates the effectiveness of such statutes as the Forest Act of 1927 and the Pakistan Environmental Protection Act (PEPA) 1997. The idea is to contrast the law on paper with the actual ecological harm observed on the ground. Much of this discussion focuses on why we do not have specialized wildfire court cases and why it is so hard to legally prosecute people for forest arson. The study examines various regions, such as the Margalla Hills to the northern coniferous forests, as one legal landscape by taking Pakistan as a case study. This work is supported by the main sources. This encompasses Article 9 of the Constitution that links the right to life to a healthy environment, and other provincial laws such as the KP Forest Ordinance. It also looks at some of the major decisions made by the High Courts and the Supreme Court to determine how the judges have dealt with environmental crises in the past. To complete the argument, the research relies on secondary data in the form of environmental journals and reports by the Ministry of Climate Change. One of the most important aspects of the argument is the 18th Amendment. The study claims that the legal response has been weak and uncoordinated because forest management was decentralized. The absence of a national policy on this issue renders it almost impossible to save wildlife during fire season. Finally, this approach creates a case of Fire Jurisprudence—a novel approach to law that would focus on the survival of the forests and endangered species in Pakistan by designing better legislation.

The State as a Trustee, not an Owner: A New Case to Protect the Forest

To make the state a Trustee, we need to break the colonial-era notion that the Forest Department owns the land. In Roman law, the idea of *Res Communes* means that some things belong to everyone (Martin Schermaier, 2009). Pakistan is a democratic republic, and its authority comes from the people. Thus, its forests are not State Property in the sense of a private estate; they are Public Property under the management of the state. This difference is essential to wildfire litigation. When the state is only an owner, it may assert discretion in the manner in which it uses its money, so that it may prefer to construct a road instead of purchasing firefighting aircraft. However, when the state is a Trustee, it owes a Non-Delegable Duty to safeguard the trust property. The discretion stops at the point of destruction of the trust.

The novelty in this argument lies in treating Ecological Stability as the trust's value. Historically, courts only cared about the timber value. But under a modern Public Trust framework, the value being protected is the biodiversity and the climate-regulating capacity of the forest. When the state allows a protected forest in KP to become overgrown with dry fuel or fails to stop illegal settlements that bring fire-risks, it is acting in a way that is inconsistent with the trust. As a researcher, I propose that every fire that occurs due to a lack of Reasonable Trustee Care should be seen as a Maladministration of the Trust. This provides a much firmer footing for the courts to issue *Mandamus* orders—forcing the state to take specific fire-prevention actions because it is their fiduciary duty to do so. We are not asking for a favor; we are demanding that the Trustee protect our inheritance. This paradigm shift would also affect how we view State Immunity. A Trustee can never claim immunity for breaching the terms of the trust. If a bank manager loses a client's money through negligence, the bank must pay. Similarly, if the Forest Department loses the nation's biological capital through a failure to implement firebreaks, the state must compensate the Ecological Fund of the country. By framing the state as a Trustee, we remove the political nature of forest management and turn it

into a legal obligation. The state can no longer say we didn't have the budget, because a Trustee is obligated to prioritize the survival of the trust assets above all other secondary expenditures. This is the concrete basis we need to move from rhetorical rights to enforceable obligations.

Beyond Suo Moto: An Examination of why Judicial Intervention has not led to Legislative Reform

The high courts of Pakistan, which have the jurisdiction under Article 184(3) of the Constitution, have often interfered in environmental issues by issuing Suo Moto notices (H. Awan, 2025). Although these interventions have stopped certain encroachments like the Monal Restaurant case in the Margalla Hills, they have left what is referred to as a Legislative Gap.

The Reliance on Judicial Governance (The Relief Trap)

According to the statistics provided by the Supreme Court of Pakistan and provincial High Courts, the Environmental Public Interest Litigation (EPIL) has increased over the years since the landmark case of *Shehla Zia v. WAPDA (1994)* (Hilal, 2022). Nevertheless, a quantitative study of the environmental laws enacted between 1994 and 2024 reveals that the Parliament has not yet adopted a particular National Wildfire Management Act. The active nature of the judiciary has unwillingly enabled the legislature to shirk its responsibilities. When the court provides a comprehensive list of Guidelines to protect the forests, the executive adheres to the guidelines as temporary administrative orders (noise) instead of converting them into the Forest Act of 1927 or the Pakistan Environmental Protection Act (PEPA), 1997 (Sial et al., 2018b).

Statutory Obsolescence: Forest Act of 1927

Sections 26 and 33 of the Forest Act of 1927 give penalties against setting fire to a reserved forest. Nevertheless, the maximum fine is insignificant in terms of inflation and ecological value. Fire is considered by the law to be a criminal trespass and not a systemic environmental risk. The judicial intervention has been on the Right to Life (Article 9), but without an amendment to the 1927 Act, the field officers are left with a 100-year-old toolkit. The KP Forest Ordinance of 2002 tried a little modernization, but it still does not provide any specifications on the costs of the Ecological Restoration following a fire (Sheikh et al., 2019).

The Separation of Powers and Institutional Friction

The stand-off in Pakistan is usually caused by the Doctrine of Separation of Powers. The executive refers to the budgetary constraint and Article 81 of the Constitution (Charged Expenditure) when the judiciary directs the state to acquire firefighting aircraft or install fire towers (Rana, 2020). Since these judicial orders are not supported by a statutory Wildfire Fund established by Parliament, the enforcement is uneven.

The Lack of Evidence-Based Law

There is a critical gap in the application of geospatial and remote sensing data in the law. Although the Pakistan Council of Research in Water Resources (PCRWR) and SUPARCO offer fire-risk maps, the existing Forest Law does not require the utilization of this information in the context of Preventive Foreclosure of forests during high-risk months (Lodhi, 2025). The use of technology has been referred to in judicial orders, but until this is enshrined in the Evidence Act or the Forest Laws, such data is still Administrative Noise and does not weigh lower court prosecutions.

The Timber Lobby and Legislative Inertia

The inability to convert judicial energy into reform is also associated with the political economy of forest land. In areas such as Sherani (Balochistan) and the Galiyat (KP), fires tend to promote land-use changes by eliminating the Protected status of trees. A new law system

would demand Mandatory Reforestation and Non-Conversion Clauses on burnt land. There is no such federal or provincial law in existence now that automatically bans the commercial development of burnt forest land. Judicial Suo Moto notices are case-by-case, which is not enough to fight the 2% per annum deforestation rate that Pakistan is experiencing (Shabbir et al., 2024).

The Failure of the Climate Change Act 2017

The gap was supposed to be filled by the Pakistan Climate Change Act 2017. Its proposed Climate Change Authority has however, been mostly ineffective. Wildfire management is not specifically stated as a core responsibility in the Act, and there is a jurisdictional overlap between the National Disaster Management Authority (NDMA) and the provincial Forest Departments. This overlap results in a diffusion of responsibility, where judicial orders are issued between departments without establishing a legal obligation (Jamal, 2018)

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