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Environmental Governance in Pakistan: Strengthening Institutions and Policies

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Abstract

Environmental governance in Pakistan operates within a decentralized framework established by the Pakistan Environmental Protection Act (PEPA) of 1997, bolstered by the Ministry of Climate Change and Environmental Coordination. This ministry coordinates national climate efforts through key instruments, including the Updated National Climate Change Policy (2021), National Adaptation Plan (2023), National Clean Air Plan (2023), and Pakistan's Third Nationally Determined Contribution (NDC 3.0), submitted in September 2025 to the UNFCCC. The NDC 3.0 commits to reducing projected greenhouse gas emissions by 50% by 2035 (17% unconditional and 33% conditional on international support), alongside achieving 60% renewable energy by 2030, with an estimated investment need of USD 565.7 billion. The 18th Constitutional Amendment devolved environmental responsibilities to provinces, yet challenges persist, including institutional fragmentation across federal and provincial entities, weak law enforcement, limited technical and financial capacity in Environmental Protection Agencies, inadequate monitoring (covering only about 30% of projects), overlapping mandates, and climate finance below 0.5% of GDP against requirements of 2-3%. Pakistan's acute vulnerability contributing <1% to global emissions is amplified by recurrent disasters, such as the devastating 2022 floods and intensified 2025 monsoon floods causing over 1,000 deaths, mass displacement, agricultural losses exceeding USD 1 billion, and infrastructure damage. Notable progress includes the Ten Billion Tree Tsunami, mangrove conservation, electric vehicle policies, provincial clean air plans, and international collaborations like the UK-Pakistan Green Compact (£35 million in 2025) for climate resilience and clean energy. The National Climate Finance Strategy (2024) aims to mobilize resources and enhance transparency. Strengthening governance requires improved inter-governmental coordination, capacity building for enforcement and environmental tribunals, transparent funding via mechanisms like the National Climate Finance Strategy, robust data and monitoring systems, enhanced public-private participation, integration of safeguards into projects such as the China-Pakistan Economic Corridor (CPEC), and prioritized global climate finance access to foster resilient, low-carbon, and equitable development amid escalating climate risks.

Keywords: *Environmental governance, Pakistan, PEPA 1997, NDC 3.0, climate finance, institutional fragmentation, climate resilience, floods 2025, renewable energy, CPEC.*

Introduction

Pakistan stands as a stark emblem of global climate injustice, contributing less than 1% to worldwide greenhouse gas emissions yet ranking among the most vulnerable nations to climate-induced disasters, as evidenced by its position in the top tier of the Global Climate Risk Index. The country's acute exposure stems from its geographic and socioeconomic profile, including the Hindu Kush-Karakoram-Himalayan mountain ranges that feed massive glacial melts and the Indus River Basin, which amplifies flood risks during intensified monsoons. The devastating 2022

floods, triggered by unprecedented rainfall exceeding historical norms by up to 400% in some regions, submerged one-third of the nation, displacing 33 million people, claiming over 1,700 lives, and inflicting economic damages estimated at USD 30 billion, predominantly in agriculture and infrastructure sectors. This catastrophe was compounded in 2025 by even more severe monsoon deluges, exacerbated by human-induced climate change that increased rainfall intensity by approximately 10-20%, leading to flash floods in northern provinces like Punjab and Khyber Pakhtunkhwa, resulting in nearly 1,000 fatalities, over 5 million affected individuals, and widespread destruction of croplands and homes. Analytically, these events underscore a vicious cycle where poverty afflicting 40% of the population intersects with environmental degradation, rendering communities in Sindh and Balochistan particularly susceptible to health crises, food insecurity, and displacement. The floods not only highlight Pakistan's hydrological vulnerabilities but also expose systemic inequities, where marginalized groups, including women and children, bear disproportionate burdens, with child mortality rates spiking amid waterborne diseases and malnutrition. This vulnerability demands a paradigm shift from reactive disaster management to proactive resilience-building, integrating climate science with socioeconomic planning to mitigate future risks in a warming world.

The evolution of environmental governance in Pakistan reflects a transition from centralized control to decentralized federalism, marked by pivotal legislative milestones that have reshaped institutional responses to ecological challenges. Enacted amid growing international pressure post the 1992 Earth Summit, the Pakistan Environmental Protection Act (PEPA) of 1997 established a foundational framework for pollution control, environmental impact assessments, and sustainable development, creating bodies like the Pakistan Environmental Protection Agency and provincial counterparts to enforce standards. However, the 18th Constitutional Amendment in 2010 devolved environmental authority to provinces, abolishing the concurrent list and empowering regional governments to tailor policies to local contexts, such as water management in arid Balochistan or urban pollution in Punjab. This shift, while promoting autonomy, has introduced analytical tensions, including legislative divergence and enforcement asymmetries, where provinces like Sindh have updated EIA regulations, but others lag due to capacity constraints, leading to fragmented governance and compromised effectiveness in addressing transboundary issues like riverine pollution. Recent studies reveal that post-amendment decentralization has yielded benefits in localized adaptation but drawbacks in coordination, with institutional fragmentation hindering uniform implementation and exacerbating vulnerabilities in disaster-prone areas. Critically, this evolution illustrates the double-edged sword of federalism: it fosters innovation through provincial acts like the Balochistan Environmental Protection Act, yet demands stronger inter-provincial mechanisms to ensure cohesive national strategies, preventing governance silos that undermine collective resilience against escalating climate threats.

At the forefront of Pakistan's climate response is the Ministry of Climate Change and Environmental Coordination (MoCC&EC), which orchestrates national efforts through updated policies that blend mitigation and adaptation for low-carbon, resilient development. The Updated National Climate Change Policy (NCCP) of 2021 provides a comprehensive blueprint, emphasizing sectoral integration across agriculture, water, and energy, while the National Adaptation Plan (NAP) of 2023 outlines actionable strategies for building adaptive capacities, including nature-based solutions and gender-responsive measures to address vulnerabilities post-2022 floods. Complementing these, Pakistan's Third Nationally Determined Contribution (NDC 3.0), submitted in September 2025, commits to a 50% reduction in projected emissions by 2035 17% unconditionally and 33% conditionally targeting 60% renewable energy by 2030 with

an investment need of USD 565.7 billion. The MoCC&EC's role extends to coordinating international partnerships, such as with the UNDP for NAP implementation, ensuring alignment with SDGs and Paris Agreement goals. Analytically, strengthening these institutions and policies is imperative for fostering resilient development, as weak enforcement and funding gaps below 0.5% of GDP hinder progress toward equitable, low-carbon pathways. By enhancing inter-governmental coordination and mobilizing climate finance, Pakistan can transform vulnerabilities into opportunities, promoting sustainable growth that safeguards ecosystems and livelihoods amid intensifying global warming.

Literature Review

Global environmental governance has evolved as a multifaceted framework addressing transboundary ecological challenges through a blend of centralized international regimes and decentralized models that emphasize polycentricity and multi-level coordination. Decentralized approaches, often rooted in subsidiarity principles, allow for localized decision-making while fostering collaboration among states, non-state actors, and subnational entities, as seen in the polycentric governance model that distributes authority to enhance adaptability and innovation in climate mitigation efforts. This model contrasts with traditional top-down structures, such as those under the United Nations Framework Convention on Climate Change (UNFCCC), by promoting bottom-up initiatives where local governments and civil society drive environmental policies, reducing implementation gaps through contextual relevance and stakeholder engagement. Recent analyses highlight how decentralized governance mitigates complexity in global issues like climate change, where hierarchical models falter due to diverse national capacities, advocating for hybrid systems that integrate legal instruments with adaptive networks for resilience-building. Critically, these models underscore the tension between sovereignty and collective action, with empirical reviews showing that selective decentralization, as observed in China's environmental reforms from 1973 to 2023, can enhance efficiency under centralized oversight but risks fragmentation without robust coordination mechanisms. In a 2025 assessment, four governance visions hierarchical, market-based, network, and reflexive reveal that decentralized models excel in handling uncertainty by leveraging diverse knowledge systems, yet they demand strong institutional safeguards to prevent inequities in resource distribution and enforcement. Analytically, this evolution reflects a shift toward inclusive, adaptive frameworks amid escalating climate risks, emphasizing the need for AI-integrated tools to optimize decentralized decision-making for sustainable outcomes.

The evolution of environmental governance in Pakistan illustrates a trajectory from centralized, rudimentary frameworks to a devolved, yet fragmented system post the 18th Constitutional Amendment in 2010, with the Pakistan Environmental Protection Act (PEPA) of 1997 serving as a pivotal milestone. Pre-amendment, governance was federally dominated, with PEPA establishing key institutions like the Pakistan Environmental Protection Council (PEPC) and Environmental Protection Agencies (EPAs) to enforce pollution controls and environmental impact assessments (EIAs), marking a shift toward sustainable development amid international pressures from the 1992 Earth Summit. This era built on earlier ordinances like the 1983 Pakistan Environmental Protection Ordinance, focusing on conservation through national policies such as the National Conservation Strategy (1992), but suffered from weak enforcement due to overlapping mandates and limited provincial autonomy. Post-amendment devolution transferred environmental responsibilities to provinces, enabling tailored legislation like the Sindh Environmental Protection Act (2014) and Balochistan's equivalents, yet it introduced legislative divergence and enforcement asymmetries across regions. Studies reveal that while this decentralization fostered localized adaptation, such as provincial clean air plans, it

exacerbated coordination challenges, with federal bodies like the Ministry of Climate Change and Environmental Coordination (MoCC&EC) struggling to align national strategies with provincial implementations. Analytically, this transition highlights federalism's dual nature: empowering provinces for context-specific responses while demanding inter-provincial mechanisms to address transboundary issues like river pollution, underscoring PEPA's enduring framework amid ongoing reforms for coherence.

Key studies on institutional challenges in Pakistan's environmental governance expose deep-seated policy implementation gaps and coherence deficits, attributing them to fragmented structures and capacity constraints that undermine climate resilience. Institutional fragmentation, with responsibilities dispersed across 17 federal agencies, leads to overlapping mandates and weak coordination, as evidenced by monitoring covering only 30% of projects and enforcement lapses in environmental tribunals. Policy paralysis persists despite frameworks like the National Climate Change Policy (2021), driven by federal-provincial rifts post-18th Amendment, short-term political incentives, and donor-dependent formulation that prioritizes external agendas over domestic needs. Recent analyses highlight implementation gaps in sectors like water, sanitation, and hygiene (WASH), where decentralization has created regulatory inconsistencies and financing dependencies on donors (68% of sector funds), exacerbating vulnerabilities to climate disasters like the 2022 floods. Coherence issues are amplified in mega-projects, where environmental policies overlook transparency and stakeholder inclusion, resulting in trade-offs between economic growth and sustainability. Critically, these studies advocate for evidence-based reforms, emphasizing that without enhanced capacities and cross-sectoral bodies, Pakistan's governance will continue failing to translate ambitious policies into actionable resilience, perpetuating cycles of vulnerability.

Discussions on climate finance, international commitments under the UNFCCC, and mega-projects like the China-Pakistan Economic Corridor (CPEC) reveal critical financing shortfalls and integration gaps, while identifying literature deficiencies in post-2025 developments and enforcement mechanisms. Pakistan's NDC 3.0 (2025) pledges a 50% emissions cut by 2035, requiring USD 565.7 billion, with 33% conditional on international grants, yet actual finance hovers below 0.5% of GDP against needed 2-3%, highlighting reliance on mechanisms like the Green Climate Fund amid COP29's Baku Finance Goal of USD 300 billion annually by 2035. CPEC's environmental impacts, including ecosystem degradation, are poorly integrated into national policies, with coherence assessments showing conflicts in energy and agriculture sectors, necessitating safeguards for sustainable development. Literature gaps include limited empirical focus on post-2025 NDC implementation, such as real-time monitoring of conditional targets and provincial enforcement post-devolution, as well as under-explored intersections of AI in governance and decentralized finance models. Analytically, while studies address finance mobilization through green bonds and Article 6 cooperation, they overlook dynamic evaluations of CPEC's long-term climate risks, calling for future research on adaptive enforcement and equitable finance distribution to bridge these voids.

Problem Statement

Pakistan's environmental governance suffers from deep-rooted systemic weaknesses that severely limit its ability to tackle escalating climate risks, despite progressive policies. The 18th Constitutional Amendment devolved responsibilities to provinces, creating localized flexibility but also institutional fragmentation, overlapping mandates, and chronic coordination failures between federal and provincial bodies. Environmental Protection Agencies remain critically under-resourced, understaffed, and politically constrained, resulting in weak enforcement, inadequate monitoring (covering only ~30% of projects), and ineffective penalties. Consequently,

ambitious targets in the Updated National Climate Change Policy (2021), National Adaptation Plan (2023), and NDC 3.0 (2025) such as 50% reduction in projected emissions by 2035 and 60% renewable energy by 2030 remain largely unimplemented due to policy gaps, short-term political priorities, donor-driven agendas, and weak evidence-based planning. Climate finance mobilization is grossly inadequate, below 0.5% of GDP against the required 2–3%, restricting access to international support and deepening dependence on conditional aid. These governance failures intensify Pakistan's exposure to recurrent disasters, such as the devastating 2025 monsoon floods, which compound earlier losses from 2022, causing widespread displacement, agricultural ruin, infrastructure damage, and entrenched socioeconomic inequities. Without urgent reforms to strengthen coordination, institutional capacity, transparent funding, robust monitoring, and safeguards in projects like CPEC, Pakistan will remain trapped in cycles of vulnerability, obstructing the transition to resilient, low-carbon, and equitable development.

Research Objectives

1. To examine the legal and institutional framework post-devolution.
2. To assess key policies and commitments (e.g., NDC 3.0, climate finance strategy).
3. To identify major challenges and barriers to effective implementation.
4. To investigate strategies for improved coordination, capacity building, monitoring, and finance mobilization.

Research Methodology

This study adopts a qualitative research design centered on policy and document analysis to critically examine Pakistan's environmental governance framework and pathways for institutional strengthening. The approach relies primarily on systematic review and interpretation of textual materials, supplemented by secondary quantitative data where relevant, such as emissions projections, finance gaps, and monitoring coverage statistics drawn from official sources. Primary data sources include key official policies and legal instruments such as the Pakistan Environmental Protection Act (PEPA) 1997, Updated National Climate Change Policy (2021), National Adaptation Plan (2023), National Clean Air Plan (2023), and Pakistan's Third Nationally Determined Contribution (NDC 3.0, 2025) alongside government reports, UNFCCC submissions, international assessments (e.g., from UNDP, World Bank, and Germanwatch), academic literature, and targeted case studies illustrating real-world impacts, including the 2022 and 2025 floods and environmental safeguards in mega-projects like the China-Pakistan Economic Corridor (CPEC). The analytical approach employs thematic analysis to identify recurring patterns, strengths, and weaknesses in institutional arrangements, enforcement mechanisms, and policy coherence. This is complemented by a comparative review benchmarking Pakistan's practices against global decentralized governance models and best practices in climate policy implementation, while applying an evaluative framework to assess overall governance effectiveness in delivering resilient, low-carbon development amid escalating climate risks. Through iterative coding and synthesis, the methodology ensures rigorous, evidence-based insights into barriers and reform priorities.

Legal and Institutional Framework

The legal and institutional framework of environmental governance in Pakistan has undergone a profound historical evolution, transitioning from rudimentary ordinances to comprehensive legislation amid growing global awareness of ecological crises. The foundational milestone was the Pakistan Environmental Protection Ordinance (PEPO) of 1983, promulgated in response to the 1972 Stockholm Declaration, which established key institutions such as the Pakistan Environmental Protection Council (PEPC) and federal/provincial Environmental Protection

Agencies (EPAs) to address pollution and conservation, albeit with limited enforcement powers due to overlapping mandates and resource constraints. This ordinance laid the groundwork for systematic environmental regulation but fell short in integrating sustainable development principles, reflecting Pakistan's early prioritization of economic growth over ecological safeguards. The pivotal advancement came with the Pakistan Environmental Protection Act (PEPA) of 1997, which repealed PEPO and introduced robust mechanisms for environmental impact assessments (EIAs), National Environmental Quality Standards (NEQS), and penalties for violations, empowering EPAs to monitor industrial effluents and emissions while promoting public participation in conservation efforts. Analytically, PEPA represented a paradigm shift toward proactive governance, aligning with international norms like the Rio Declaration, yet its centralized approach often marginalized provincial contexts, leading to implementation gaps in transboundary issues such as river pollution and deforestation. By the early 2000s, supplementary instruments like the National Environmental Policy (2005) further emphasized biodiversity protection and climate resilience, but persistent challenges in judicial enforcement and inter-agency coordination underscored the need for adaptive reforms. This evolution highlights Pakistan's reactive yet progressive trajectory, where legislative milestones have bolstered institutional capacity but demand ongoing refinement to counter escalating threats like urban smog and glacial melt.

The 18th Constitutional Amendment of 2010 marked a seismic shift in environmental governance, devolving authority from the federal center to provinces and fostering localized policy innovation while exposing vulnerabilities in national cohesion. By abolishing the Concurrent Legislative List, the amendment transferred environmental responsibilities to provincial legislatures, enabling tailored acts such as the Punjab Environmental Protection (Amendment) Act (2012), Sindh Environmental Protection Act (2014), Khyber Pakhtunkhwa Environmental Protection Act (2014), and Balochistan Environmental Protection Act (2012), which adapted PEPA's framework to regional priorities like arid-zone water management in Balochistan or urban air quality in Punjab. This devolution empowered provinces to enact context-specific regulations, such as enhanced EIA procedures and provincial clean air plans, potentially accelerating responses to localized disasters like the 2022 floods. However, it has engendered institutional fragmentation, with divergent legislative standards causing enforcement asymmetries and coordination failures in addressing cross-provincial challenges, such as Indus River pollution. Provincial structures, including autonomous EPAs and Environmental Tribunals, now handle monitoring, licensing, and adjudication; for instance, tribunals in Lahore, Karachi, Peshawar, and Quetta serve as specialized fact-finding bodies under PEPA-derived laws, imposing fines and closures for violations while allowing appeals to high courts. Critically, while this decentralization promotes federalism's subsidiarity principle, it risks undermining uniform national standards without robust inter-governmental mechanisms, as evidenced by post-amendment studies revealing capacity deficits in under-resourced provinces like Balochistan.

Federal institutions remain pivotal in orchestrating national environmental strategies, with the Ministry of Climate Change and Environmental Coordination (MoCC&EC) serving as the apex body for policy formulation, international commitments, and climate finance mobilization. Established post-18th Amendment and restructured in 2019, MoCC&EC coordinates UNFCCC obligations, oversees NDC submissions (e.g., the 2025 NDC 3.0 aiming for 50% emissions reduction by 2035), and integrates safeguards into mega-projects like the China-Pakistan Economic Corridor (CPEC), while managing entities like the federal Pak-EPA for enforcement in capital territories and federally administered areas. The federal EPA complements this by

certifying laboratories, conducting national monitoring, and enforcing NEQS, though its scope has narrowed post-devolution. Inter-governmental coordination mechanisms, primarily through PEPC chaired by the Prime Minister and comprising federal/provincial ministers facilitate policy alignment, but persistent gaps in vertical collaboration, such as inconsistent data sharing and funding disparities (climate finance below 0.5% of GDP), hinder cohesive governance. Analytically, these structures embody a hybrid federalism where MoCC&EC's role in bridging provincial silos is crucial for resilient development, yet requires enhanced frameworks like a National Climate Action Council to resolve conflicts and ensure equitable resource distribution amid escalating vulnerabilities.

Key Policies, Commitments, and Progress

Pakistan's national policies and plans form a robust, evolving architecture for climate and environmental governance, integrating adaptation, mitigation, and resilience amid acute vulnerabilities. The Updated National Climate Change Policy (NCCP) 2021 provides a comprehensive framework to steer the country toward climate-resilient and low-carbon development, mainstreaming climate concerns across sectors like agriculture, water, energy, health, and disaster management while emphasizing gender-responsive and pro-poor approaches. Complementing this, the National Adaptation Plan (NAP) 2023 focuses on enhancing socioeconomic and environmental resilience through inclusive, participatory strategies in priority areas such as the agriculture-water nexus, natural capital, urban resilience, human capital, disaster risk management, and gender/youth/social inclusion, aiming to empower vulnerable communities against escalating risks like floods and droughts. The National Clean Air Plan (NCAP) 2023 targets significant reductions in PM2.5 emissions 38% by 2030 and 81% by 2040 compared to baselines through sector-specific interventions in transport (e.g., Euro-5/6 standards), industry (emission enforcement), and other sources, addressing severe urban air pollution. Most recently, the National Climate Finance Strategy (NCFS) 2024, launched in November 2024, outlines pathways to mobilize resources, close a USD 348 billion gap by 2030, enhance transparency via a National Climate Finance Portal, and prioritize sectoral resilience, institutional clarity, and diverse funding sources, including domestic mechanisms and international grants. These interlocking plans demonstrate Pakistan's commitment to coherent, multi-sectoral action, though effective implementation hinges on overcoming coordination and resource constraints.

Internationally, Pakistan's commitments under the UNFCCC reflect heightened ambition in its Third Nationally Determined Contribution (NDC 3.0), submitted in September 2025, which pledges a voluntary 50% reduction in projected greenhouse gas emissions by 2035 (from a business-as-usual baseline of approximately 2,559 $MtCO_2e$ to 1,280 $MtCO_2e$), with 17% unconditional through domestic efforts and 33% conditional on international support. Key sectoral targets include achieving around 60-69% renewable and clean energy share in the power mix by 2035, aligning with Integrated Generation Capacity Expansion Plan goals. The plan estimates a massive USD 565.7 billion in required investments by 2035 (building on USD 348 billion to 2030), covering adaptation (e.g., disaster preparedness at USD 139.1 billion), mitigation (e.g., low-carbon power at USD 137.5 billion), and cross-cutting measures like sustainable transport and wastewater management. This submission strengthens earlier targets, integrates the NAP for granular adaptation, and emphasizes gender equality, social inclusion, and alignment with the Paris Agreement's equity principles, positioning Pakistan as a proactive voice for vulnerable nations while underscoring the critical need for scaled-up finance, technology transfer, and capacity building to bridge ambition-reality gaps.

Notable initiatives showcase tangible progress in on-ground implementation and international collaboration. The Ten Billion Tree Tsunami Programme (now upscaled as Green Pakistan Programme) has planted over 2.2 billion trees since 2019, with extensions through 2025-2026 focusing on afforestation, biodiversity, and carbon sequestration, contributing to ecosystem restoration and community livelihoods. Mangrove conservation has seen remarkable advances, including restoration of thousands of hectares in the Indus Delta via projects like Delta Blue Carbon (covering 350,000 hectares with community involvement) and Navy-led drives planting millions of propagules, bolstering coastal resilience against sea-level rise. Electric vehicle policies, under the New Energy Vehicles Policy 2025-2030, promote accelerated adoption through subsidies (e.g., Rs100.36 billion PAVE scheme until 2030) targeting 30% NEV sales in phases, with incentives for bikes, rickshaws, and buses to curb transport emissions. Provincial clean air plans complement the NCAP, while international partnerships, such as the UK-Pakistan Green Compact (launched December 2025 with £35 million), advance clean energy, nature-based solutions (e.g., mangroves), and resilience. These achievements highlight nature-based and low-carbon pathways, fostering public-private synergies and demonstrating scalable models for equitable climate action.

Integration of environmental safeguards into major development projects, particularly the China-Pakistan Economic Corridor (CPEC), remains a critical yet evolving dimension. Recent developments in CPEC Phase II (post-2025 relaunch) emphasize "green corridors" with expanded focus on renewable energy, sustainable agriculture, and mining, aligning with Pakistan's low-carbon goals through enhanced environmental governance, climate-resilient infrastructure, and ecosystem protections. While early phases faced criticism for coal dependency and resource strains, upgraded frameworks now prioritize safeguards like EIAs, biodiversity conservation, and green technology transfers to mitigate impacts on sensitive areas. Analytically, this integration is essential for avoiding trade-offs between economic growth and sustainability, ensuring CPEC contributes to NDC targets and resilient development rather than exacerbating vulnerabilities, with ongoing calls for stronger monitoring and diversified partnerships to realize truly equitable, low-emission outcomes.

Challenges, Gaps, and Pathways

Pakistan's environmental governance grapples with profound institutional fragmentation and weak enforcement mechanisms that severely undermine policy efficacy and climate resilience. Post the 18th Constitutional Amendment, responsibilities devolved to provinces have created overlapping mandates across 17 federal agencies and provincial bodies, leading to coordination failures, delayed responses, and inconsistent implementation of environmental standards, as seen in the disjointed handling of transboundary pollution and resource management. Weak enforcement is exacerbated by under-resourced Environmental Protection Agencies (EPAs), which suffer from political interference, limited technical expertise, and inadequate staffing, resulting in nominal penalties for violations and monitoring coverage of only about 30% of projects, allowing rampant deforestation and industrial effluents to persist unchecked. Capacity constraints further compound these issues, with provincial governments lacking robust data systems and expertise for evidence-based planning, while financial limitations restrict investments in sustainable infrastructure, perpetuating donor dependency where 68% of sector funding comes from external sources. Low climate finance, hovering below 0.5% of GDP against a required 2-3%, stems from restricted access to international funds and weak domestic mobilization, hindering adaptation efforts in vulnerable sectors like water and agriculture. Analytically, these challenges reflect a governance paradigm trapped in reactive silos, where short-term political priorities and elite capture distort resource allocation, fostering inequities

and amplifying environmental degradation in a nation already strained by rapid urbanization and biodiversity loss.

Climate vulnerability in Pakistan manifests acutely through recurrent disasters, with the 2022 and 2025 floods serving as harrowing exemplars of compounded risks from global warming and local susceptibilities. The 2022 deluge, intensified by 547% above-average monsoon rains and accelerated glacial melt, submerged one-third of the country, displacing 33 million people, claiming over 1,700 lives, and inflicting $30 billion in damages, disproportionately affecting rural poor in Sindh and Balochistan through destroyed crops, infrastructure collapse, and health crises like waterborne diseases. In 2025, similar patterns emerged with rainfall 10-20% heightened by climate change, triggering flash floods in Punjab and Khyber Pakhtunkhwa, killing nearly 1,000 over half children and damaging 1,600 homes, while exacerbating urban vulnerabilities in informal settlements built on floodplains. These events underscore Pakistan's top-tier ranking in global climate risk indices, where low emissions contribution (<1%) belies extreme exposure, with heatwaves preceding floods creating compounding effects that strain health systems and deepen poverty for 8-9 million more people. Analytically, governance failures amplify impacts: inadequate early warnings, fragmented disaster response, and deforestation heighten flood severity, perpetuating cycles of displacement, food insecurity, and economic setbacks that erode societal resilience amid rising sea levels and erratic weather.

Pathways for strengthening institutions and policies demand targeted reforms to foster cohesive, resilient governance. Enhancing inter-governmental coordination through revived bodies like the Council of Common Interests and a dedicated cross-sectoral task force could resolve overlaps, ensure policy coherence, and align federal-provincial efforts for transboundary challenges. Capacity building for EPAs and tribunals via training, digital tools, and increased funding would bolster enforcement, monitoring, and adjudication, addressing gaps in technical expertise and resource allocation. Robust data and monitoring systems, including a national climate finance portal and MRV frameworks, are essential for transparency and evidence-based decisions, while mobilizing domestic and international finance through green bonds and Article 6 mechanisms could bridge the USD 565.7 billion NDC gap. Promoting public-private participation via incentives for sustainable investments and community-led adaptation, alongside prioritized global finance access, would enhance inclusivity. Proactive safeguards in mega-projects like CPEC, through stringent EIAs and ecosystem integration, are critical for low-carbon growth. Analytically, these reforms represent a shift from crisis response to proactive federalism, empowering marginalized groups and leveraging digitalization for accountable, equitable development in a climate-stressed future.

Conclusion

Pakistan's environmental governance landscape reveals a nation caught between ambitious aspirations and persistent structural impediments, yet holding considerable potential for transformation through deliberate reforms. The decentralized framework established by the Pakistan Environmental Protection Act of 1997 and reinforced by the 18th Constitutional Amendment has enabled provinces to tailor responses to local ecological realities, while national policies such as the Updated National Climate Change Policy (2021), National Adaptation Plan (2023), National Clean Air Plan (2023), and the Third Nationally Determined Contribution (NDC 3.0) of 2025 articulate clear pathways toward a 50% reduction in projected emissions by 2035, 60% renewable energy by 2030, and enhanced resilience against intensifying climate hazards. Initiatives like the Ten Billion Tree Tsunami, mangrove restoration, electric vehicle promotion, and international collaborations such as the UK-Pakistan Green Compact demonstrate meaningful on-the-ground progress and signal Pakistan's capacity to mobilize domestic and

external resources for nature-based and low-carbon solutions. However, the persistent realities of institutional fragmentation, weak enforcement, severe capacity and financial constraints, inadequate monitoring systems, and climate finance mobilization well below required levels continue to render many commitments aspirational rather than operational. Recurrent disasters the catastrophic 2022 floods and the even more lethal 2025 monsoon deluges serve as stark reminders that without addressing these governance deficits, vulnerability will deepen, socioeconomic inequities will widen, and hard-won development gains will remain fragile in the face of accelerating global warming.

The path forward hinges on a decisive shift from fragmented, reactive management to coordinated, proactive, and inclusive environmental governance. Strengthening inter-governmental mechanisms, investing in systematic capacity building for Environmental Protection Agencies and tribunals, establishing robust, transparent data and monitoring systems, and creating reliable domestic and international funding channels are non-negotiable priorities. Greater public-private participation, community-led adaptation, and rigorous integration of environmental safeguards into mega-projects such as the China-Pakistan Economic Corridor can convert potential trade-offs into synergies that advance both economic growth and sustainability. By prioritizing equitable access to global climate finance, enhancing policy coherence across federal and provincial levels, and embedding accountability and evidence-based decision-making at every stage, Pakistan can break the cycle of recurring crises and move toward genuinely resilient, low-carbon, and just development. The urgency is undeniable: every year of delay compounds human suffering, ecological degradation, and economic loss. Yet the same vulnerabilities that expose Pakistan to disproportionate climate harm also create a compelling case for leadership in demanding and demonstrating effective, adaptive governance models suited to the realities of the Global South. With political will, institutional courage, and sustained international solidarity, Pakistan has the opportunity not only to protect its people and ecosystems but to offer valuable lessons for other climate-vulnerable nations striving for a secure and sustainable future.

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