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PAKISTAN'S NATIONAL CLIMATE CHANGE POLICY: EVALUATING ITS EFFECTIVENESS IN ADDRESSING THE COUNTRY'S CLIMATE CHALLENGES AND ACHIEVING ITS COMMITMENTS UNDER THE PARIS AGREEMENT

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ABSTRACT

This research paper focuses on assessing the effectiveness of Pakistan's National Climate Change Policy (NCCP) in addressing its climate-related challenges and fulfilling its commitments under the Paris Agreement. Pakistan is among the world's most climate-vulnerable states due to rising temperatures, glacier melting, water scarcity and an increase in the frequency of natural disasters. Originally established in 2012 and revised in 2021, the NCCP seeks to include mitigation and climate resilience into national planning. The study employs a qualitative research method, drawing on assessment policy papers, reports from government and international organizations, and relevant academic literature. It assesses the NCCP's aims and methods, implementation issues, and commitment to Pakistan's Nationally Determined Contributions (NDCs) stated under the Paris Agreement. This research evaluates the effectiveness of the NCCP in addressing Pakistan's primary climate concerns and assesses its contribution to the country's achievement of its global climate commitments.

Keywords: *Pakistan, National Climate Change Policy (NCCP), Paris Agreement, Climate Change, Mitigation, Adaptation, Reforestation, Renewable Energy, Policy Implementation.*

Introduction

A worldwide challenge, climate change threatens ecosystems, businesses, and communities everywhere. Although its effects are seen beyond national boundaries, underdeveloped nations are particularly at risk because of their poor socioeconomic systems and limited ability to respond. Due to its geographic position, fast population expansion, and reliance on climate-sensitive industries like agriculture and water resources, Pakistan is one of the most climate-vulnerable nations in the world (World Bank, 2023). Climate change has become an important concern for Pakistan due to rising temperatures, unpredictable rainfall patterns, the melting of glaciers in the Himalayas, and a rise in the frequency and severity of extreme weather events like droughts and floods. Over the past 20 years, Pakistan has continuously been in the top ten nations most impacted by climate-related disasters, according to (Germanwatch's Global Climate Risk Index, 2021). Substantial socioeconomic ramifications arise from these environmental pressures, which increase poverty, force population displacement, and jeopardize the security of food and water.

In 2012, Pakistan announced its National Climate Change Policy (NCCP), which was updated in 2021 to come into agreement with the Paris Agreement in response to these problems. By incorporating adaptation and mitigation techniques into national planning, the NCCP aims to advance climate-resilient development. The revised policy emphasizes capacity building, disaster preparation, forest restoration, and renewable energy as crucial areas of priority (Ministry of Climate Change, 2021). The NCCP is complemented by

frameworks like the Updated Nationally Determined Contributions (NDCs), the National Adaptation Plan (NAP), and programs like the Ten Billion Tree Tsunami Program. However, despite the presence of these frameworks, execution remains challenging due to institutional limitations, insufficient climate finance, and a lack of technical expertise (UNDP Pakistan, 2022). This study assesses whether the NCCP has been effective in accomplishing its stated aims and Pakistan's international climate commitments. It assesses policy performance using the perspectives of implementation, effect, and alignment with the Paris Agreement. The study intends to contribute to the expanding body of knowledge on climate governance in poor countries while also making recommendations to enhance policy effectiveness in Pakistan.

In addition to its impact on environmental systems, climate change has significant socioeconomic ramifications, especially for Pakistan's most vulnerable people. A growing number of climate-related pressures, including unpredictable rainfall, changing crop cycles, and soil erosion, are affecting rural populations, who are heavily dependent on agriculture. According to the UNDP (2022), this has resulted in decreased agricultural production and food insecurity. In addition, metropolitan regions struggle with issues including poor air quality, water scarcity, and heat island effects, which increase health risks and reduce overall resilience to climate shocks.

Climate change continues to pose an urgent threat to Pakistan, harming both the ecology and socioeconomic stability. Over the last decade, the number of climate-related disasters in the country has increased significantly. According to the (World Bank Climate Risk Country Profile: Pakistan (2023), the country is becoming more vulnerable to extreme weather events such as destructive floods, heatwaves, and long-term droughts. These catastrophes not only harm infrastructure but also affect livelihoods, especially in agriculturally reliant areas.

The 2022 floods in Pakistan, which affected over 33 million people and cost more than USD 30 billion in damage, highlighted the seriousness of the country's climatic issues. These floods, caused by irregular monsoon patterns intensified by global warming, showed the vulnerability of Pakistan's disaster management infrastructure. The climatic catastrophe was worldwide listed among the deadliest and most expensive disasters of the year, emphasizing the necessity of good climate governance and adaptation planning (World Bank, 2023; Eckstein et al., 2021).

Pakistan's climate vulnerability is additionally worsened by its low ranking in global indices. According to Germanwatch's Global Climate Risk Index (2021), Pakistan has regularly ranked among the top ten nations most affected by extreme weather events during the last two decades. Despite making a little contribution to global greenhouse gas emissions, the country suffers disproportionately due to its susceptibility to glacier melt in the north, coastal risks in the south, and insufficient resilience infrastructure in rural areas.

In response, the government changed its National Climate Change Policy (NCCP) in 2021 to better match changing climate issues, as well as its updated Nationally Determined Contributions. The redesigned NCCP emphasizes nature-based solutions, renewable energy, early warning systems, and climate-resilient infrastructure. However, recent studies by the IUCN Pakistan (2023) and FAO (2022) show that, while the policy framework is good, its execution lacks consistency at the federal and provincial levels, and implementation is still unequal.

In addition, foreign organizations have expressed concerns regarding Pakistan's access to climate money and its capacity to use the money efficiently. The IPCC Sixth Assessment

Report (2022) advises that nations like Pakistan need not just large-scale investments but also enhanced institutional structures to manage such investments openly. The country's dependency on donor-funded initiatives, as well as a lack of specialized climate funding paths, continues to be a significant challenge. Without an organized change toward integrated, evidence-based policy execution, Pakistan risks falling short of its Paris Agreement targets.

In addition, Pakistan's geostrategic location near the Himalayas puts it at the forefront of glacier melt and freshwater scarcity. According to the IPCC (2022), the Indus Basin glaciers, which are critical to the country's agriculture and electricity, are receding at an alarming rate owing to global warming. This process adds to both seasonal water shortages and unpredictable glacial lake outburst floods (GLOFs). The simultaneous challenges of water shortage and violent floods highlight the necessity of integrated climate risk management through consistent national policy.

Internationally, Pakistan shows its commitment to global climate efforts by participating in venues such as the United Nations Framework Convention on Climate Change (UNFCCC) and making Nationally Determined Contributions (NDCs). However, as emphasized by the World Bank (2023), there is a considerable implementation gap between these promises and actual climate results on the ground. This divergence is due in part to fragmented policy implementation and a lack of coordination between federal and regional governments. As a result, assessing the effectiveness and limitations of the NCCP is essential in identifying institutional bottlenecks and suggesting more effective, context-specific climate governance solutions.

Analysis and Discussion

1. **Policy Alignment with International Commitments:**

The new NCCP (2021) aligns with the Paris Agreement and Sustainable Development Goals, focusing on areas such as water, agriculture, and energy. It focuses on both mitigation and adaptation, including cross-cutting topics like institutional capacity and gender equity. However, the lack of enforceable objectives and performance indicators makes monitoring implementation challenging (UNDP Pakistan, 2022).

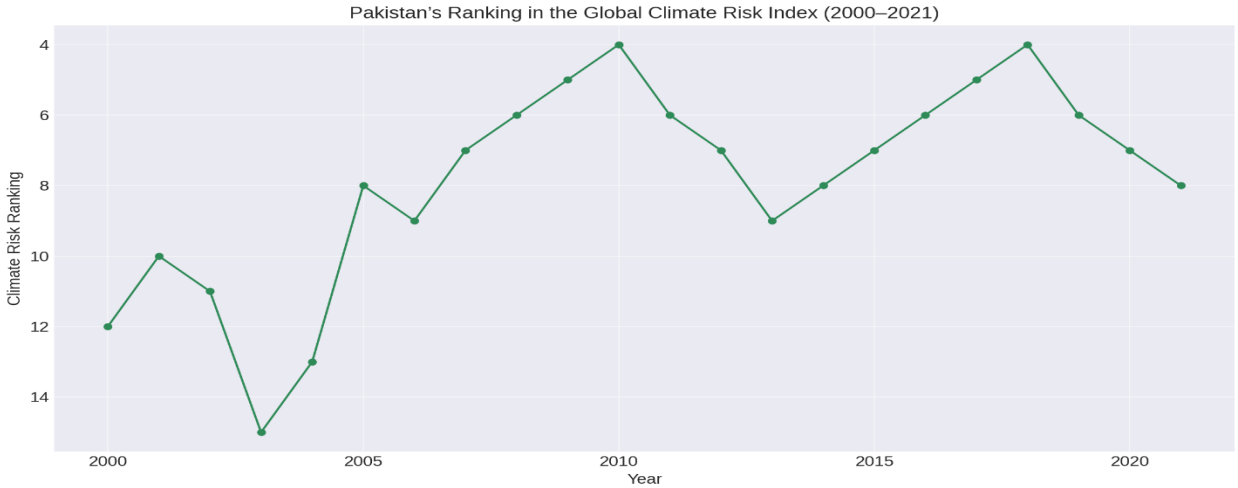
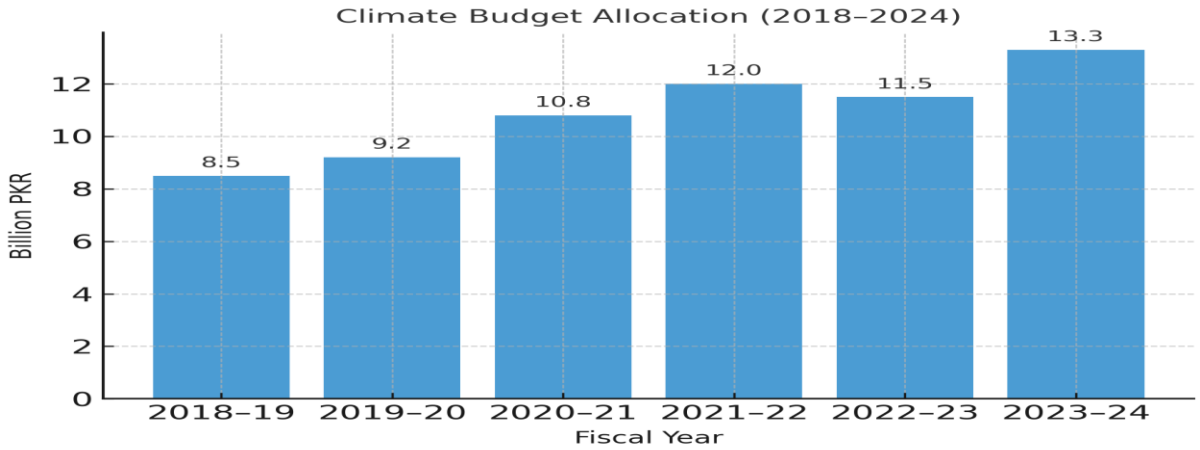


Figure E1: Pakistan's ranking in the Global Climate Risk Index (2000–2021) A line graph illustrating Pakistan's annual vulnerability ranking in the Germanwatch Climate Risk Index

2. **Significant Implementation Gaps:**

Despite robust policy form, implementation is inconsistent. The decentralization of environmental governance following the 18th Amendment resulted in provincial climate action plans that frequently lacked expertise and institutional coherence (IUCN Pakistan, 2023). Poor coordination between federal and provincial authorities, along with ineffective data-sharing systems, impedes progress in implementing climate policy and achieving environmental sustainability targets (UNDP Pakistan, 2022).

3. **Federal Climate Budget Allocation in Pakistan (2018–2024)**



This chart illustrates the increasing trend in federal climate budget allocations over the six-year period. From PKR 8.5 billion in 2018–19, the allocation has risen to PKR 13.3 billion in 2023–24, reflecting greater government attention to climate change. However, despite this rise, the budget remains insufficient compared to the estimated climate financing needs highlighted in the NDCs and other national reports.

4. **Partial Success of Flagship Programs**

The Ten Billion Tree Tsunami Program (TBTTP) reflects the NCCP's commitment to ecosystem restoration and biodiversity conservation. According to official data and FAO (2022), over1.5/ 1.4 billion trees had been planted by the end of 2022. Nevertheless, third-party audits have highlighted concerns over survival rates, the dominance of monocultures, and insufficient engagement with local communities (WWF Pakistan, 2022; IUCN Pakistan, 2023).

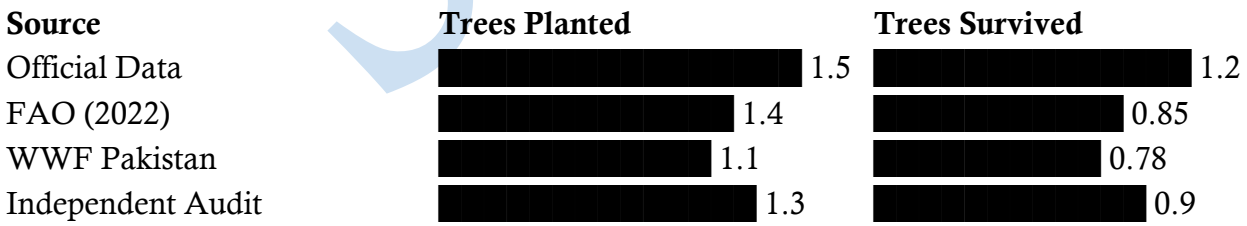
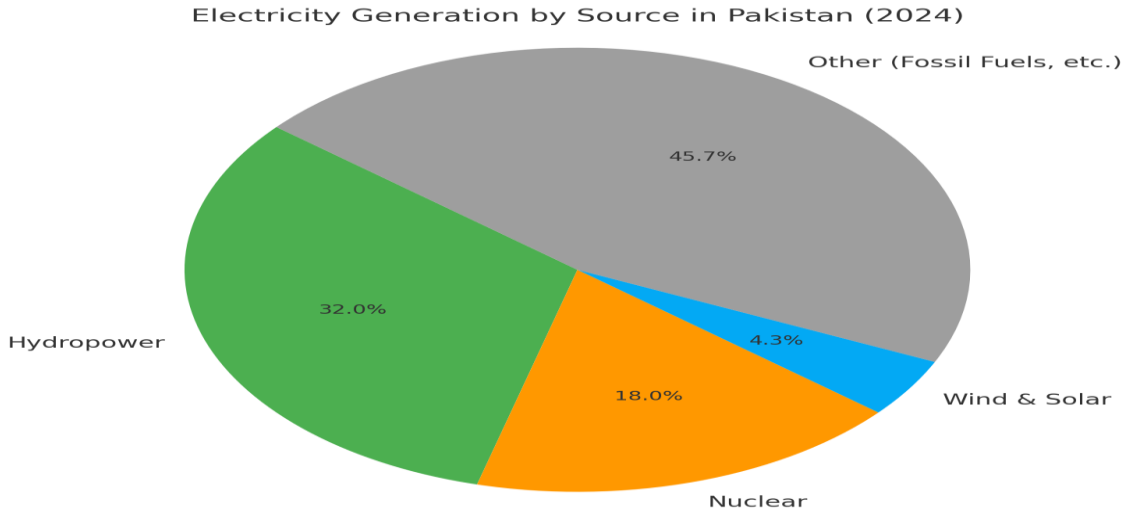


Figure E2: Ten Billion Tree Tsunami – Planted vs. Survived Trees A comparative bar chart based on official and third-party estimates

5. Slow Progress in Renewable Energy Transition

The National Climate Change Policy (NCCP) sets an ambitious target: 60% of Pakistan's electricity to be generated from renewable sources by 2030. However, as of 2024, only around 4.3% of electricity generation—based on utility-scale wind and solar—comes from those sources, while hydropower and nuclear contribute additional shares, bringing total low-

carbon generation to about 47% propakistani.pk. Specifically, hydropower accounts for roughly 32%, nuclear for 18%, and wind plus solar collectively stand at just 4–5%.
Despite a steep climb in renewable capacity—utility-level installations reached ~13,640 MW (31% of installed capacity), rising to ~16,091 MW (35%) when including distributed systems—the share of utility-generated renewables remains modest profit.pakistantoday.com.pk. The uptake of solar through net metering and rooftop systems has been rapid, but utility-scale deployment is lagging. Implementation hurdles include overlapping institutional mandates, weak incentives for private investment, and frequent changes in energy legislation, all of which hinder long-term planning and project rollout weforum.org.



5. **Inadequate Access to Climate Finance:**

Pakistan's Updated NDCs estimate a requirement of over USD 100 billion by 2030 (Government of Pakistan, 2021). However, the country continues to depend on short-term, project-based donor funding. Institutional barriers, such as the absence of a national climate finance framework and limited engagement with global climate funds, have restricted access to consistent and scalable financing (UNDP Pakistan, 2022; Climate Policy Initiative, 2023).

6. **Institutional and Governance Challenges:**

The Ministry of Climate Change lacks the necessary authority, resources, and staff for executing policy objectives across the country (UNDP Pakistan, 2022). Administrative fragmentation and unclear mandates lead to inefficiency. Furthermore, climate issues are still not fully integrated into other sectoral policies (such as agriculture, water, and health) (IUCN Pakistan, 2023).

7. **Lack of Community Engagement and Public Awareness:**

Although the NCCP emphasizes participatory approaches, most implementation efforts are top-down. Community consultation is insufficient, and local administrations sometimes lack the authority or expertise to successfully execute climate programs (UNDP Pakistan, 2022). Evidence from localized projects indicates that community-driven modification methods are more sustainable and cost-effective (IUCN Pakistan, 2023).

8. **Limited Use of Data and Technology:**

Climate planning still neglects digital technology such as satellite monitoring, GIS mapping, and automated early warning systems. Data fragmentation and a lack of real-time access across agencies have limited Pakistan's ability to respond quickly to emerging climate dangers.

The absence of a coordinated climate information system decreases transparency and hinders monitoring of NCCP progress (IPCC,2022).

9. Governance Structure of NCCP:

Pakistan's NCCP is governed by the Ministry of Climate Change (MoCC), which acts as the federal focal institution. The Minister chairs the National Climate Change Policy Implementation Committee, which comprises provincial secretaries, representatives from AJK and GB, former FATA officials, and other stakeholders. Provincial EPAs and Climate Units work with federal line departments (such as Energy and Water) and the National Disaster Management Authority (NDMA). Municipalities and local government entities are in charge of on-the-ground implementation. A number of implementation partners, including NGOs, INGOs, academia, and the commercial sector, contribute to activities through technical competence, finance, and community participation.

The graphic below shows this governance set up.

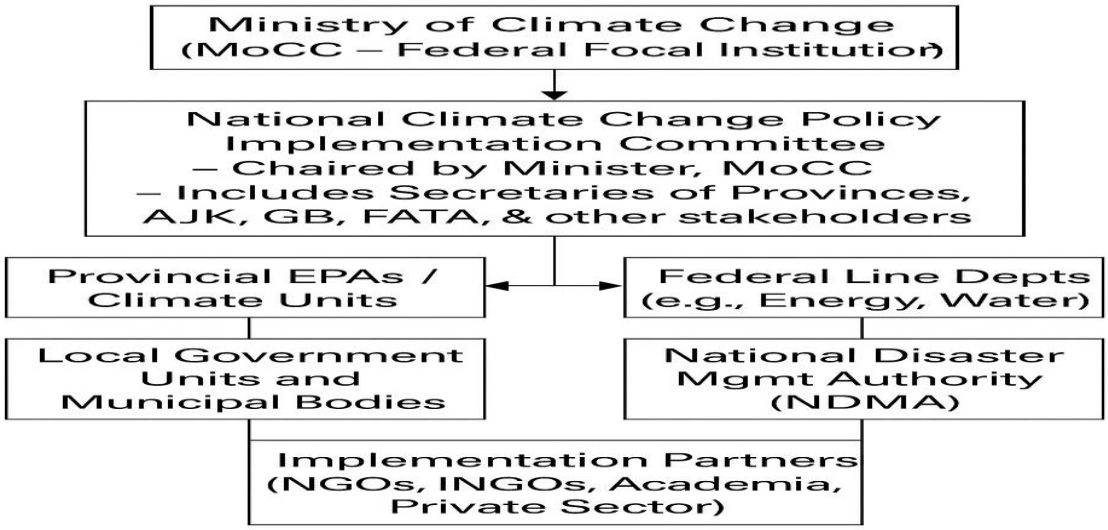


Figure E5: Climate Governance Structure in Pakistan A flowchart showing the federal–provincial coordination mechanism for NCCP implementation.

Recommendations

1. Establish a Comprehensive Monitoring and Evaluation structure:

To strengthen climate policy beyond just commitments, a transparent monitoring and evaluation mechanism should be established. This should include developing performance indicators, perform regular progress audits, and develop public reporting strategies. Embedding M&E at the national and provincial levels can improve accountability, increase learning, and allow for adaptive policy management.

2. Improve Federal-Provincial Climate Coordination Mechanisms:

In Pakistan's decentralized governance system, effective climate action requires coordinated efforts at all levels of government. Creating intergovernmental climate coordination institutions, such as a National-Provincial Climate Council, may assist in combining the federal goal with provincial action. Formalizing such relationships will contribute to less policy fragmentation and more coordinated climate governance.

3. Mobilize and Institutionalize Climate Finance

To overcome the climate funding gap, a dual strategy is required: obtain foreign help while mobilizing local financial resources. Pakistan should implement a National Climate Finance Strategy, backed by a dedicated Climate Fund, to improve access to global institutions like the Green Climate Fund (GCF) and foster public-private partnerships. Green bonds, carbon pricing, and climate risk insurance are all examples of new instruments that should be extensively investigated.

4. Invest in capacity development at all levels

Human capital is essential to the effectiveness of climate initiatives. Strengthening climate institutions' technical, administrative, and operational ability is important, especially at the local level. Tailored training programs, climate leadership seminars, and information exchanges with successful developing countries can all contribute to build a professional cadre of practitioners capable of efficiently implementing NCCP objectives.

5. Establish Community-Based Climate Governance:

Top-down approaches are insufficient to ensure policy sustainability. Pakistan must integrate participatory planning and community-led climate governance approaches that emphasize inclusiveness, local ownership, and indigenous knowledge. Local climate committees, gender-inclusive village adaptation plans, and civil society involvement frameworks should be incorporated into national and provincial policies.

6. Promote Renewable Energy Transition with Strategic Incentives:

To satisfy its climate goals and reduce its dependency on fossil fuels, Pakistan must speed up the transition to sustainable energy through aggressive legislative measures. These should include tax breaks, regulatory simplification, and concessional funding for renewable energy projects. Prioritizing decentralized energy alternatives, such as off-grid solar for distant populations, can also improve fairness and resilience.

Conclusion

Pakistan's National Climate Change Policy (NCCP) is a significant step forward in addressing the country's growing susceptibility to climate change. The policy framework, especially following its 2021 adaptation, shows a noteworthy commitment to including climate resilience and sustainability into national planning. It is consistent with international agreements such as the Paris Agreement and prioritizes key elements such as mitigation, adaptation, capacity building, and public awareness. However, this analysis shows that the NCCP's potential is largely underutilized owing to ongoing implementation problems.

The research findings show a significant gap between policy formulation and real-world implementation. While major projects such as the Ten Billion Tree Tsunami Program have produced evident outcomes and received international acclaim, they do not reflect structural change. Institutional fragmentation, lack of technical ability, insufficient climate money, and poor coordination between the federal and provincial governments continue to inhibit significant progress. Furthermore, a lack of community participation and underutilization of current data and technological tools reduce the policy's intended impact.

Pakistan's climatic vulnerabilities are worsening, as indicated by the devastating floods of 2022 and an increasing frequency of heatwaves, droughts, and glacier melt. In this situation, simply having a climate policy on paper is no longer sufficient. Effective climate governance must be proactive, inclusive, and based on long-term solutions that consider both scientific evidence and local reality. There is an urgent need to transform national promises into local

measures through decentralized planning, capacity development, and greater investment in adaptation infrastructure.

The future success of the NCCP is dependent not just on technological solutions but also on political will, institutional responsibility, and ongoing international collaboration. As Pakistan moves forward in the global climate arena, enhancing the execution of its climate policies will be vital to safeguarding the environment, economy, and future generations. A strong, well-executed NCCP might act as both a national safeguard and a model for other climate-vulnerable developing nations experiencing similar challenges.

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