



Climate Change and Environmental Governance in Pakistan: Historical Trends and Contemporary Responses

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Abstract

Climate change is an environmental issue of the current time and has a greater impact on developing countries with high vulnerability and low adaptive capacity. This research examines historical trajectories of climate change and the development of environmental governance in Pakistan, emphasizing on the relations between environmental change, institutional development and current policy responses. The study adopts the qualitative analytical research design and secondary data is collected from government reports, publications of national/international organizations and bodies, climate policy documents, and academic literature, using historical and policy analysis methods. The results indicate that considerable climatic change has occurred in Pakistan with rise in temperature, shift in precipitation regime, glacier retreat, and an increase in water insecurity through floods, droughts, and heatwaves. All these environmental changes have created significant socio-economic impacts such as on agriculture, food security, public health, water resources, energy systems and human lives. This research also shows that environmental governance in Pakistan has also developed through the creation of environmental institutions, the enactment of environmental laws, climate actions and governance mechanisms for improving resilience and sustainability. The contemporary responses highlight climate adaptation via disaster risk reduction, climate smart agriculture and water management, while mitigation efforts include developing renewable energy, afforestation and ecosystem restoration, and green infrastructure projects. However, considerable institutional fragmentation, implementation deficiencies, financial constraints, technological constraints, and coordination issues among governance actors pose serious challenges. The study highlights the urgent need for strengthening institutional capacities, better policy integration, and increased stakeholder participation and access to climate finance and international cooperation. It points out that good environmental-governance is crucial for enhancing climate-resilience and achieving sustainable development in Pakistan. Incorporating climate into national development plans and governance systems is vital to prepare for future environmental issues and for long-term socio-economic and ecological stability.

Keywords: Climate Change, Environmental Governance, Climate Resilience, Sustainable Development, Pakistan, Climate Adaptation.

Introduction

Climate change is a pressing issue for humanity today, impacting environmental, economic and social conditions all over the world. Scientific evidence shows that the concentration of greenhouse gases in the atmosphere has increased and has been a significant factor in global warming, changes in precipitation, biodiversity loss and an increase in the severity and frequency of extreme weather events. Governments and societies are facing unprecedented pressures as a result of these changes to the environment, especially in the developing world where adaptive

capability is limited. Climate change impacts also go beyond environmental harm and are becoming more apparent in the areas of food security, public health, water access, migration and economic productivity (IPCC, 2023). Therefore, climate change is now being identified as a multidimensional problem, which needs a multidimensional approach in terms of implementing policies and governance systems at local, national and international levels. States have been spurred by the necessity for climate action to incorporate strategies to build environmental sustainability into development planning and disaster risk reduction. International bodies and scientific bodies have highlighted that there is a need for coordinated governance systems that can foster resilience, adaptation and mitigation, as well as sustainable resource management to address climate challenges. As a result, environmental governance has become a focal point in the current climate action agenda, and in the quest for sustainable development goals more broadly, in different geographical and socioeconomic settings (United Nations Environment Programme, 2024).

Pakistan, which accounts for less than one per cent of global GHGs, is among the countries most at risk from the negative effects of climate change. It has been repeatedly hit by floods, droughts, heat waves, melting glaciers and water shortages which have resulted in significant economic losses and social disturbances. The devastating flood in 2022 is a stark reminder of the vulnerability of the country to climate induced disasters, with millions impacted and significant damage to infrastructure, agriculture and livelihoods. Pakistan's exposure is further compounded by the fast rate of population growth, urbanization, poverty, and reliance on climate-sensitive sectors like agriculture and water resources (Adger et al., 2022). Socio-economic and environmental exposure are a powerful mix, and adaptation and resilience building are challenging. Climate related risks are thus a serious threat to national development and human security. There is growing recognition that, in very vulnerable areas, effective environmental governance is necessary to lower vulnerability and improve adaptive capacity. Good governance structures can enable disaster preparedness, resource management, coordination of institutions and policy implementation, which, in turn, can improve societal resilience to climate shocks. To appreciate the climate vulnerability of Pakistan, we need to look back at the environmental change drivers of Pakistan's history as well as the present day governance responses to these growing climatic challenges in the national context (World Bank, 2022).

Pakistan's geographical and climatic conditions play a significant role in determining its climate change and environmental governance dynamics. The country has a wide variety of ecological zones from the glaciers of the Hindu Kush Karakoram Himalayan region to the coastal areas along the Arabian Sea. This geographical diversity provides a diversity of ecosystems and economic activities, but also exposes to multiple climate hazards. Due to the critical nature of the Indus River Basin in agriculture production and water security, temperature and precipitation changes are important for national development. Climatic variability has been experienced over the last few decades, with irregular monsoon precipitation, extended dry spells, rapid glacier recession, and temperature rise (Khan et al., 2024). These changes have increased environmental stresses and made it difficult to manage natural resources sustainably. Environmental governance is an important aspect in balancing ecological sustainability, economic growth and social wellbeing in this context. Good governance is essential to coordinate institutional response, adaptation strategies and incorporate climate into development policies. Sustainable environmental governance also plays a vital role in safeguarding ecosystems, enhancing community resilience and mitigating costs of climate related disasters in the long run. Hence, the environmental

conditions of Pakistan highlight the need for adaptive, inclusive, and responsive governance systems to address the changing environment challenges (Mishra et al., 2020).

This study aims to explore the history of climate change effects in Pakistan and critically review the present environmental governance interventions to meet the challenges of climate change. The study will examine the historical evolution of climate and environmental governance and the changes in policies and institutions to understand how environmental governance has shifted over time due to the rising climate risks. The investigation is especially relevant since climate change remains a significant driver of economic performance, environmental sustainability and human wellbeing, all over the country. This study's results are likely to feed into the policy debate around climate resilience, adaptation planning, and sustainable development. Moreover, the study provides useful information for policy makers who want to enhance governance capacity and institutional efficiency in responding to vulnerabilities in the context of climate change. They can help researchers gain a more in-depth understanding of how environmental change relates to the evolution of environmental governance, and environmental organizations and civil society groups can apply the findings to inform advocacy and community engagement efforts (United Nations Development Programme, 2023). The study highlights the critical challenges and opportunities in Pakistan's climate governance framework, aligning with the broader global initiatives and agendas to foster climate resilience, sustainability, and informed decision-making in the face of growing environmental uncertainties. The implications of the study are thus not confined to academic research only but have also contributed to the efforts of climate governance and sustainable development outcomes in Pakistan (Asian Development Bank, 2024).

Literature Review

Climate change is defined as a change in climate over a longer period, due to the combined effect of natural changes and human intervention. The scientific community today overwhelmingly believes that the recent climate changes are due to human activities, such as the higher release of greenhouse gases from industrial manufacturing, fossil fuel burning and deforestation and the expansion of cities. It is no longer regarded just as an issue of environmental science, but is now being studied from interdisciplinary viewpoints, including political, economic and social aspects. Climate change is not just a physical phenomenon, but rather a governance challenge as the impacts of climate change are realized through institutions, policies and societal capacities. Environmental governance is thus a necessary structure to investigate the response of states and societies to ecological risk. Ostrom (2010) has argued that good environmental governance depends on collective action and institutions that are able to sustainably manage common resources. In a similar vein, Bulkeley and Newell (2015) point to the fact that governance is not just about government and includes a number of actors working at local, national and global levels. The principles of participation, accountability, equity and ecological responsibility, in turn, are central to sustainable environmental governance and help enhance resilience to climate related threats, and to facilitate sustainable development outcomes in various environmental settings.

The connection between climate change and development is of special relevance in developing countries where the environmental vulnerability and socioeconomic limitations are overlapping. The countries of the Global South are more vulnerable to climate risks due to poverty, weak institutions, high reliance on agriculture and lack of infrastructure. Adaptation has thus become a key focus in international climate debates. International governance documents like the Paris Agreement aim to provide support to vulnerable countries in the form of financial support, technology cooperation and capacity building. In this respect, Pakistan is an important study case

as it is highly vulnerable to floods, droughts, heatwaves and water stress. The studies show that climate disasters have resulted in significant economic and social costs across the country. Ahmed et al. (2019) note that an increase in climatic variability poses a threat for agricultural production and food security, and Rasul et al. (2022) point out that glacier retreat and alterations in hydrological trends pose increasing risks in the Indus Basin. These environmental stresses have exacerbated poverty reduction, public health, and sustainable development issues. Thus, the climate change scenario in Pakistan is becoming more and more complex and demands comprehensive governance strategies that can address environmental and developmental challenges.

In Pakistan, institutional and policy reforms have paved the way for the evolution of environmental governance with a focus on enhancing environment protection and climate resilience. The institutional space is growing over the last decades because of legislative initiatives, environmental protection agencies and climate related policies. However, some vulnerable points in the implementation, coordination and enforcement have been detected. Ali and Khan (2023) point out that fragmented institutional responsibilities can lead to the failure of effective policy implementation and limit the capacities of governance institutions to solve complex environmental challenges. Likewise, the United Nations Economic and Social Commission for Asia and the Pacific (2024) documents the challenges of financial constraints, technical limitations, and stakeholder engagement in adaptation processes in many developing nations, including Pakistan. While much research has been conducted on climate impacts and governance frameworks, there are few studies that integrate historical analysis of climatic change and assessments of governance responses in the present. Much of the literature focuses on environmental risks and policy interventions separately and there is a lack of knowledge regarding the evolution of governance systems in response to the evolving climate realities. A response to this gap is needed to create effective solutions that integrate environmental governance and long-term climate adaptation and sustainable development goals.

Problem statement

Climate change has become a key challenge to environmental and developmental issues in Pakistan, where frequent flood events, droughts, heatwaves, glacier melting, and water scarcity are significant threats to the nation's human security, economic development, and ecological sustainability. The country's relatively small greenhouse gas emissions make it less responsible for climate change than other countries, but its vulnerability to climate related risks is increasing because of geographical conditions, growing population, scarcity of resources and socio-economic challenges. In the last few decades, Pakistan has implemented several environmental policies, institutional arrangements, and climate governance mechanisms for adaptation and resilience. However, serious issues of policy implementation, institutional coordination, and resource allocation and governance effectiveness remain. While there is extensive literature concerning the physical effects of climate change, and concerning the development of environmental governance frameworks, there has been limited focus on understanding the relationship between climate change trends historically, and the contemporary governance response. Overall, there is a need to conduct a detailed analysis of the changes in environmental governance in the context of climate change and its effectiveness in enhancing climate resilience and sustainable development in Pakistan.

Research Objectives

1. To examine the historical patterns and impacts of climate change in Pakistan.
2. To evaluate the evolution of environmental governance frameworks in Pakistan.
3. To assess contemporary climate adaptation and mitigation policies.

4. To identify governance challenges affecting climate resilience.
5. To propose policy recommendations for strengthening environmental governance.

Research Questions

1. What have been the major historical trends of climate change in Pakistan?
2. How has environmental governance evolved in response to climate-related challenges?
3. What contemporary policies and institutional mechanisms address climate change in Pakistan?
4. What are the key governance challenges limiting effective climate action?
5. How can environmental governance be strengthened to improve climate resilience and sustainability?

Methodology

The present study uses qualitative analytical research design to explore the linkage of climate change and environmental governance in the context of Pakistan. The qualitative approach is very appropriate as it is helpful to gain insight into historical developments, evolution of policies, institutional responses and the problems of governance in the context of climate change. The study adopts a historical and policy analysis approach in studying how the climate related issues have changed with time and how governmental and institutional frameworks have dealt with the challenges. Secondary sources of data such as government reports, climate policy documents, national climate strategies, adaptation plans, international climate assessments, academic literature and publications of national and international organizations relevant with environmental sustainability and climate governance are used as the only source of data in the study. These sources include detailed details about the climate and environmental policy, institutional arrangements and governance practices in Pakistan. Thematic content analysis is used to identify consistent themes, patterns and governance issues from the literature. Comparative policy analysis is undertaken to assess the effectiveness and changes in environmental policies and governance mechanisms over the different periods and historical trend analysis is used to assess the changes in the impacts of climate and institutional responses over time. The study is limited to the impacts of climate change and environmental governance in Pakistan from the post-independence era to the present, which allows the study to appreciate and assess the evolution, current status as well as future governance issues in the country's environmental space.

Historical Trends of Climate Change in Pakistan

Pakistan's past climate change history indicates a trend of greater environmental instability which include an increase in warming, alterations in precipitation patterns and a faster melt in the cryosphere. Average temperature in Pakistan has increased significantly during the last 100 years and the warming rate has increased in recent decades, as evidenced from climatic observations. This rise has led to changes in seasonal cycles, increased evapotranspiration and increased extreme temperature events in rural and urban areas. At the same time, rainfall has become more irregular with some regions receiving too much while others receive too little. This range of variability has led to disruptions in hydrological systems, and has made agricultural planning difficult in a country where livelihoods are still largely dependent on climate-sensitive sectors. Amongst the most important sign of the environmental change is the retreat of the glaciers in the Hindu Kush Karakoram Himalayan region, where one of the largest concentrations of ice outside the polar areas is found. While some glaciers in the Karakoram region have been relatively stable, the overall trend suggests a reduction in glacier mass and an increase in glacial lakes, leading to potential risks of flooding and future water security challenges (Bolch et al., 2019; Ren et al., 2022). These environmental changes have helped Pakistan's economic and

social fabric to be reshaped due to a series of climate related disasters. The devastating floods of 2010 impacted around twenty million people, destroyed infrastructure, agricultural land and settlements. In the same way, the unprecedented flooding in 2022 washed over vast parts of the country, revealing significant failings in the disaster preparedness and climate adaptation systems (World Weather Attribution, 2022; United Nations Office for the Coordination of Humanitarian Affairs, 2023). In addition to the flooding, frequent droughts in Sindh and Balochistan have impacted water availability and agricultural output and extreme heatwaves have become a regular feature in major cities like Jacobabad, Karachi and Lahore. All these events represent the increasing severity and occurrence of climatic extremes, which have become the hallmark of climatic history of Pakistan. The growing evidence clearly shows that climate change is not an issue for the future, but a current reality, which is impacting ecological processes, disaster risks and sustainability of economic and social development in the country. The socio-economic and environmental impacts of these climate changes have been remarkable on agriculture, water security, energy production, public health and population mobility. Agriculture is especially vulnerable because it is directly affected by changes in temperatures and precipitation patterns, which affect the yield of crops, irrigation needs and the availability of food. Research shows that climatic variations pose a hazard to the productivity of staple crops, which in turn affects food security and increases rural poverty in vulnerable areas (Abid et al., 2019; Sultan et al., 2024). Water resources are also becoming under increasing stress due to glacier retreat, uncertain rainfalls, and the increased competition of water among sectors, as water availability is decreasing. These developments have an important energy security impact since hydro generation is very sensitive to stable river flows and predictable hydrological conditions. The impacts on public health have also been a consequence of climate-related disruptions, such as outbreaks of waterborne diseases, heat-related illnesses, malnutrition, and poor living conditions after a major disaster. Environmental deterioration and the loss of livelihood also have added to internal migration, notably from drought prone and flood affected regions, adding to the social and economic strains in cities. There is significant learning to be gained from past climate emergency experiences in terms of environmental governance and institutional adaptation. The recurrent disasters have encouraged governments and policy makers to reinforce the capacities of disaster management, create adaptation policies for climate change, and to enhance the coordination between national and provincial institutions. But there have been indications that the governance responses have been largely reactive, failing to anticipate long term climate risks, and thereby limiting their effectiveness (Leal Filho et al., 2023; Asian Development Bank, 2024). Institutional learning has led to a slow increase in the understanding of resilience building, risk reduction and climate informed planning, although still significant implementation, resource mobilization and policy integration gaps exist. Thus, from this historical perspective, it is apparent that climate governance needs to be both effective in the sense of having emergency response mechanisms but also have the capacity to adapt to changing climate and provide support for adaptive development pathways in a more uncertain climatic future.

Evolution of Environmental Governance in Pakistan

The concept of environmental governance in Pakistan has been gradually developed to address growing environmental degradation, growing population, industrialization and growing ecological issues. The institutional structures of environmental governance were formally established with the promulgation of the first comprehensive attempt at the legal and administrative level to deal with environmental issues, Pakistan Environmental Protection Ordinance 1983. Regulatory provisions to control pollution and environmental management

were included in the ordinance, but these were minimal due to low institutional capacity and lack of public awareness. The more important development that was made was with the passage of the Pakistan Environmental Protection Act, 1997, which gave a much greater legal backing to the regulation of environment and laid out modalities of conducting EIAs and monitoring compliance. The Act also helped to establish and bolster environmental protection agencies at federal and provincial levels, thus increasing institutional accountability for environmental management and enforcement of environmental policies across the country (Nadeem & Hameed, 2008; Khan, 2021).

In the 21st century, Pakistan, under the rising awareness of the climate change as a national development challenge, started having dedicated climate governance structures. These activities led to the development of the National Climate Change Policy, which offered strategic guidance on adaptation, mitigation, DRR and SD. The policy emphasized sectoral planning with consideration of climate, and the need for institutional coordination among governmental and non-governmental stakeholders, such as the Ministry of Climate Change (Ministry of Climate Change, 2021). The institutional progress continued with the Climate Change Act 2017 that set up a legal framework for climate governance and institutions for policy and action coordination in the field of climate change. The institutional structures were developed to enhance resilience, to promote adaptation activities and to facilitate the implementation of national climate priorities. It is argued that the development of these frameworks is a sign of a progressive shift from traditional approaches to environmental protection to a wider governance paradigm that acknowledges climate change as a multidimensional issue that impacts economic development, social welfare and the environment (Ghaus et al., 2022).

After the Eighteenth Constitutional Amendment (ECA), transferring a considerable responsibility on the environment to the provinces, an important shift in environmental governance took place. This constitutional reorganization changed the governance landscape in favour of more control on environmental management, policy-making and regulatory enforcement by provincial governments. Decentralization opened up possibilities for developing context-specific environmental strategies with a focus on local ecological and economic conditions (Cheema et al., 2023). Provincial institutions were granted with greater flexibility in responding to environmental issues and in supporting sustainable development projects. But there were also challenges to coordination between federal and provincial levels, including in relation to policy harmonization, resource allocation and institutional accountability, as a result of the transfer of responsibilities. Differences in administrative capacity and technical expertise of provinces are another factor affecting the uniformity of the implementation of environmental policies throughout the country. However, the scope of decentralization has made more stakeholders involved and local engagements in environmental decision making, showing a net of opportunities and challenges which are associated with the multilevel governance structure in Pakistan (Bari, 2020).

The relationship of Pakistan with international environmental agreements and global sustainability program also affects environmental governance framework. The country has signed the Paris Agreement and has pledged to enhance the adaptation and mitigation capacities through the contribution of the Nationally Determined Contributions and the implementation of the climate resilience strategies. In addition, the Sustainable Development Goals (SDGs) have helped to establish an essential platform to embed environmental sustainability in development plans and governance. Pakistan has been actively engaged in the international climate negotiations and has been increasingly applying for climate finance, technological cooperation and capacity building assistance from international institutions and development partners

(United Nations Framework Convention on Climate Change, 2024). Is an example of acknowledging that climate change is an issue that must be addressed and will require international cooperation. Meanwhile, global climate diplomacy has led to opportunities for strengthening domestic governance processes and national policies in line with international environmental standards. The developments highlight that environmental governance in Pakistan has come from both domestic institutional reforms and international cooperation for enabling sustainable and climate resilient development (Climate Action Tracker, 2025).

Contemporary Responses and Future Directions

Climate adaptation has become a key part of Pakistan's government response to the rising environmental risks. In response to the frequent occurrence of floods, droughts and heatwaves, DRR has been identified as a priority policy area, with enhanced early warning systems, emergency preparedness mechanisms and DRM institutions. Climate smart agriculture has also become a priority as decision-makers intend to improve food security through the use of drought resistant seeds, irrigation systems and sustainable farming practices. Meanwhile, water resource management has become a crucial space for action as water resources continue to be under increasing pressure from climate variability, glacier receding, and growing demand for water (Food and Agriculture Organization, 2023; International Water Management Institute, 2023). The idea of adaptation strategies today is therefore not only to tackle current climate risks but also make vulnerable sectors of the economy and society more resilient. This indicates a growing understanding that sustainable development and climate adaptation have to go hand in hand to decrease environmental vulnerability and increase the national resilience. (United Nations Development Programme, 2024).

Climate mitigation has come to play a critical role in environmental governance in Pakistan. With the aim of reducing reliance on fossil fuels and enhancing energy security, renewable energy initiatives such as solar, wind, and hydropower have grown in number. In addition, afforestation and ecosystem restoration initiatives have been undertaken to boost carbon sequestration, rehabilitate degraded land, and provide bolstered biodiversity protection (United Nations Environment Programme, 2024). Moreover, there is an increasing focus on green infrastructure for sustainable urban development and climate resilience. However, governance evaluations suggest that implementation issues are still quite high. The lack of coordination between institutions, weak monitoring systems, and regulatory weaknesses remain obstacles in enhancing the effectiveness of policies (International Renewable Energy Agency, 2024). Financial and technological constraints add to the limitations on scale and impact of mitigation efforts. In this regard, although the Government and other stakeholders in Pakistan have shown increased willingness to engage with climate action, there is still a long way to go to realise policy goals in tangible environmental benefits and sustainable long-term change (World Resources Institute, 2023).

Increased institutional capacity and incorporation of climate considerations in national development plans are critical in the effectiveness of environmental governance in Pakistan. Capable institutions, technical expertise, reliable information systems and coordination in policy implementation across the sectors and administrative levels are all essential for effective governance. Climate policies can be made more responsive to local needs and vulnerabilities with greater community participation and stronger local governance structures, which will enhance accountability. Climate finance and enhanced collaboration with international organisations will be key also to support adaptation and mitigation (Green Climate Fund, 2024; Organisation for Economic Cooperation and Development, 2024). Furthermore, climate change needs to be integrated in economic planning, infrastructure development, agriculture policies,

water policies, and urban governance and government. This integration can contribute to the development of sustainable development goals and to resilience. The way forward thus relies on the capacity of Pakistan in integrating institutional reform, financial mobilization, international cooperation and inclusive governance to establish a robust and holistic plan on the challenges of climate change (United Nations Economic and Social Commission for Asia and the Pacific, 2024).

Conclusion

Climate change is now becoming one of the biggest environmental and developmental challenges for Pakistan in 21st century. This study's results indicate that significant climatic changes have occurred in the country, including temperature warming, precipitation variability, an increase in the frequency of extreme climate events, and an increased strain on natural resources. Floods, droughts, heatwaves, glacier retreat, and water scarcity are all recurring natural phenomena in Pakistan's environmental profile, with significant implications for various aspects of Pakistan's socio-economic stability, agriculture, food security, water availability, public health, and energy production, as revealed by historical analysis. Pakistan, though a small emitter of greenhouse gases, is one of the most vulnerable countries to climate change in the world owing to its geographical exposure, ecological diversity, sectoral exposure and developmental challenges. These environmental realities have made climate change no longer just an ecological issue, but a governance issue which has direct implications for sustainable development, reducing poverty, human security and national resilience. The study also reveals that the environmental governance has undergone significant transformation over the years with the creation of environmental institutions, laws, climate policies, and adaptation plans to counter new environmental risks. The establishment of environmental protection agencies, climate governance regimes and national climate policies is a sign of growing awareness of the need for coordinated institutional action in response to climate risks. Moreover, Pakistan's participation in international environmental agreements and global climate initiatives underscores its dedication to tackling climate issues on both national and international fronts. However, the analysis shows that policy frameworks are now much more extensive but implementation deficits, institutional fragmentation, resource limitations, and governance weaknesses remain to hinder the effectiveness of climate action and environmental management.

The study also notes that the current climate change reactions require adaptation, mitigation and resilience construction, as critical components of sustainable development. The number of initiatives in disaster risk reduction, climate smart agriculture, water resource management, renewable energy development, afforestation, and ecosystem restoration are also signs of efforts to tackle the root causes and impacts of climate change. But their success depends on the quality of governance institutions and their ability to effectively enforce policies at various levels and in various sectors. Future environmental governance in Pakistan should thus shift from reactive to integrated, forward looking policies that integrate climate issues with national planning and development. Building institutional capacity, strengthening policy coordination, strengthening regulatory enforcement and increasing technical expertise will be key to ensure long term climate resilience. The engagement of communities and the strengthening of community-based governance structures to enable vulnerable groups to participate and to contribute in decisions making is also vital. To achieve sustainable climate action, more investments are needed in adaptation and mitigation projects, along with innovative investment mechanisms and partnerships with international organizations and development agencies. Incorporating environmental sustainability in economic planning, infrastructure development, agricultural modernization and resource management will be critical to limit vulnerability and ensure resilient growth. In conclusion, the future of climate governance in Pakistan will rely on

the collaborative efforts of various institutions, policymakers, civil society, and international partners to achieve shared goals of environmental sustainability and climate resilience. The adoption of these measures can help to build more resilient and sustainable communities in Pakistan, ensuring that the country is better equipped to face the future environmental challenges that lie ahead.

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