

Bridging the Climate Resilience Gap: Balancing Mitigation and Adaptation in Pakistan's Climate Policy

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Introduction

Pakistan faces a significant challenge from climate change, especially in adapting to its effects. According to the German Watch, Pakistan is ranked as the 8th most affected country due to climate change between 2000 and 2019.¹ This means that the country is highly vulnerable to extreme weather events. Another index, called the ND-Gain Index, rates Pakistan as the 39th most vulnerable country and the 27th least prepared country in the world to deal with the impacts of climate change.² This highlights the urgent need for Pakistan to enhance its ability to cope with and respond to the challenges posed by climate change. Responding to climate change involves two major approaches that are adaptation and mitigation.

Adaptation is like adjusting to a changing climate. The main aim is to reduce the risks from the harmful effects of climate, such as rising sea levels, stronger storms, and food insecurity. It is also about making the most of any good opportunities that might come with climate change. For instance, the weather might become warmer for longer periods, which could make it possible to grow crops for more months in the year and get more food.³ Mitigation means reducing the amount of heat-trapping greenhouse gases that are released into the atmosphere. This can be done by either cutting back on the sources of these gases (such as the burning of fossil fuels for transportation, heat, or electricity) or by improving the 'sinks' for these gases, such as the oceans, forests, and soil.⁴ To effectively address the challenges of climate change, a combination of both the adaptation and mitigation approaches is necessary. While various strategies exist, no single solution is enough on its own. Successful implementation relies on collaborative policies across various levels and even more benefits can be gained through integrated actions that connect adaptation and mitigation with broader societal goals. Given Pakistan's status as a developing nation, the emphasis should be on adaptation-based strategies, this will bolster the country's climate resilience and better equip it to navigate the impacts of climate change.

Pakistan has shown a dedicated commitment to addressing the challenges of climate change through a range of key national policies, strategies, and plans such as its Nationally Determined Contribution (NDC) to the Paris Climate Agreement (2016), Technology Needs Assessment for Climate Change Adaptation (2016), National Disaster Risk Reduction Policy (2013), National Climate Change Policy (2012), and consistent submissions of National Communications to the United Nations Framework Convention on Climate Change (UNFCCC)⁵ (latest in August 2018). The nation's focus on resilience is evident from the ongoing national adaptation policies and plans, highlighting Pakistan's commitment to effective climate action. Besides, Pakistan has also submitted its first Biennial Update Report (BUR-1) in 2022.

Thus, Pakistan's proactive stance on climate change is demonstrated through an array of impactful projects and initiatives. These efforts encompass the Living Indus Initiative, Recharge Pakistan, GOLF-II, Ten Billion Tree Tsunami Project, REDD+ Indus Delta, Delta Blue Carbon, Green Pakistan Upscaling Programme Phase-1, Miyawaki Forests, Pakistan Snow Leopard and Ecosystem Protection Program, and the ongoing pilot project to ban single-use polythene bags in Islamabad.⁶ These endeavours collectively highlight Pakistan's commitment to enhance the adaptive capacity, fostering community resilience, promoting sustainable ecosystems, and adopting progressive environmental practices providing a number of socioeconomic, health, and mitigation co-benefits.

Despite Pakistan's dedicated efforts towards addressing climate change, a significant gap has emerged in the country's approach to climate resilience. This gap becomes evident when we examine the Biennial Update Report submitted to the UNFCCC in April 2022, which primarily emphasizes climate mitigation. In contrast, Pakistan's national climate change policies, strategies, and key stakeholders place a strong emphasis on adaptation measures.

This disparity raises a crucial question: Why does Pakistan prioritize adaptation over mitigation in its climate policies and actions? The answer lies in the country's status

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as a developing nation, where the feasibility of implementing advanced technological and financially intensive mitigation strategies is a significant concern for stakeholders. This contrasting approach to climate change policy forms the central theme of this article, as we delve into the underlying reasons for this divergence and its potential consequences. Moreover, this article will systematically examine the existing gap in adaptation measures across different sectors within Pakistan. In doing so, it also highlights the main challenges and the way forward.

Agriculture and Livestock Sector

Agriculture and livestock hold immense significance for Pakistan's economy and people. Around eight million households rely on livestock, contributing about a third of their total income. Pakistan's economy depends significantly on the agriculture sector, employing 45 per cent of the workforce, contributing 19.3 per cent to the GDP, and constituting over 70 per cent of export earnings, rendering it susceptible to climate-induced transformations.⁷ The sector is notably affected by short-term climate fluctuations and is poised to be significantly impacted by potential long-term climate changes. In the past two decades, Pakistan has experienced severe floods and droughts causing significant harm to livestock, crops, transportation, and communication infrastructure. A World Bank report (October 2022) highlighted losses of \$5.6 billion in agriculture, \$3.7 billion in livestock, and \$3.3 billion in transportation and communication. Sindh province suffered the most, accounting for 70 per cent of losses, followed by Balochistan, Khyber Pakhtunkhwa (KP), and Punjab.⁸ The failure to address climate change adaptation in Pakistan's agriculture and livestock sectors carries dire consequences.

While adaptation strategies in agriculture can help mitigate the adverse impacts of climate change, relying solely on them will not solve the overarching climate change issue. The consequences of failed adaptation strategies are far-reaching. Inadequate access to information, knowledge, extension services and credit facilities, lack of labour force in agriculture and livestock, and lack of technical expertise, equipment and physical infrastructure for genetic manipulation of crops emerge as barriers that hamper effective adaptation. However, Pakistan's agricultural and livestock sectors face significant challenges in implementing climate change adaptation strategies. Limited financial resources, inadequate technological capabilities, and ineffective climate policies hinder support for such efforts.

Water Resource and Management

The water sector plays a critical role in Pakistan's agricultural economy and livelihoods, relying on snowmelt, glacier runoff, and monsoon rains, all of which are sensitive to climate change. As projected climate change trends take hold, Pakistan faces significant challenges. Dr Nausheen Hamid, the Parliamentary Secretary for National Health Services, claimed that Pakistan has seen a 400 per cent decline in the amount of water available per person, from 5,600 cubic metres in 1947 to the current level of about 1,038 cubic metres.⁹ Glacier volume and snow cover reduction lead to shifts in the Indus River system's flow pattern, alternating between increased and decreased inflows.¹⁰ This is compounded by increased glacial lake formation, intensified extreme weather events, irregular monsoon rains causing floods and droughts, and heightened water demand due to elevated temperatures.

The implications of inadequate adaptation efforts in Pakistan's water sector are far-reaching. As glaciers melt and precipitation patterns shift, there is a looming risk of water scarcity. Insufficient water storage capacity in dams, combined with wasteful water practices and a lack of preventive measures further compounds this challenge. These failures could result in food shortages, deforestation, and an impending drought, impacting nearly 1.8 billion citizens as warned by the UN and Pakistan Council Research in Water Resources.

Forestry and Biodiversity

Forests are extremely important for various reasons including land conservation, water regulation, fuel supply, and ecological balance. In Pakistan, forests cover 4.8 per cent of the land area (4.2 million hectares), as per PFI 2005 which is very low as compared to other South Asian countries like Bhutan (68 per cent), Sri Lanka (30 per cent), and India (22.8 per cent) and Bangladesh (6.7 per cent), Nepal (25.4 per cent).¹¹ The low forest cover is due to Pakistan's arid and semi-arid conditions (70 per cent of land) with insufficient rainfall for natural vegetation. With a population of over 170 million (projected to reach 210 million by 2025), the demand for forest goods and services is increasing. Only 80 per cent of defined forest areas in Pakistan have tree cover. Forest cover varies across regions: KP: 16.6 per cent, Punjab: 2.9 per cent, Sindh: 2.8 per cent, Balochistan: 1.7 per cent, Gilgit-Baltistan: 9.5 per cent, and AJK: 20.7 per cent.¹² Due to both an increase in human population and deforestation, there is currently less forest cover per person than the global average of 1.0 ha (0.023 ha). The forestry sector currently accounts for 0.39 per cent of the total national GDP and experienced an

increase of 7.17 per cent in 2018 (compared to -2.37 per cent in 2017) as a result of higher timber production recorded by the KP province. The overall amount of forest land has been estimated to be at 4.79 Mha, which represented 5.45 per cent of the country's area in 2012, according to the findings in Forest Reference Emission Level of Pakistan (2020).¹³

In Asia, Pakistan has the second-highest rate of deforestation.¹⁴ This situation is significant because deforestation and degradation in tropical forests drive carbon emissions, destabilizing the global climate. Extreme drought-induced forest fires are a major threat. Fragmented forests vulnerable to fire and drought degrade rapidly. Himalayan region faces floods, desertification, and deforestation, harming ecosystems and economy. Climate change disrupts species' habitats, reproduction, and events like breeding and flowering, causing ecosystem shifts and disruptions. Combined with deforestation, species become more vulnerable, reducing genetic diversity and causing local extinctions. Climate change's impact on biodiversity extends beyond Himalayas, affecting ecosystems, species interactions, and food chains.

Specific Examples from Pakistan

Marine Turtles

Climate change affects the nesting grounds of marine turtles along the coasts of Pakistan. Rising temperatures and changing ocean conditions can disrupt the timing and success of egg laying. Deforestation near these nesting areas can further limit suitable habitats for these turtles.¹⁵

Avian Biodiversity

Pakistan's wetlands are vital stopovers for migratory birds, but climate change can alter these areas and disrupt bird migration routes. Deforestation reduces the natural habitats birds rely on during their journeys, impacting their survival.¹⁶

In Pakistan, adapting forests and biodiversity to climate change faces challenges. Cutting down forests and damaging habitats weaken ecosystems. Changing water availability affects plants and animals. Invasive species spread due to altered climates. Lack of data about biodiversity limits planning. Adaptation needs money, skilled workers, and good plans. Laws and policies must support adaptation.

Conclusion

In a nutshell, Pakistan's environment is under significant threat from climate change, making adaptation crucial. Ranked among the most affected countries, it faces extreme weather risks due to shifting temperatures and rainfall patterns. This impacts habitats, species, and ecosystems. In response, adapting through strategies like adjusting to new conditions (adaptation) and reducing harmful emissions (mitigation), no single solution is enough on its own. Both adaptation and mitigation are important. Challenges include limited resources, lack of awareness, and inadequate policies. The agriculture, water, and forestry sectors are particularly vulnerable and these sectors require successful adaptation efforts more than mitigation, that will also include sustainable practices, and urgent action to safeguard Pakistan's environment for a sustainable future.

Policy Recommendations

- Agricultural adaptation includes altering production, breeding, regulations, and perceptions, tailored to geography and livestock systems. Climate views are shaped by the environment, while credit aids livestock strategies like heat stress alleviation. Labour is crucial for adaptation, particularly in developing nations where more labourers enhance efforts.
- Develop comprehensive water management strategies that account for climate change impacts on water availability and quality. Invest in resilient water infrastructure and promote efficient water use practices to mitigate the effects of changing precipitation patterns.
- Enforce sustainable forest management policies that focus on reforestation, afforestation, and the prevention of illegal logging. Establish protected areas and wildlife corridors to facilitate species migration and safeguard biodiversity.
- Encourage community involvement in crafting climate adaptation plans that leverage local knowledge and resources. Build community capacity through training, empowering them to manage natural resources and adapt to changing conditions.
- Encourage the protection and restoration of natural ecosystems like wetlands and mangroves to act as buffers against climate impacts. Integrate indigenous knowledge and practices into ecosystem-based adaptation strategies.
- Establish robust climate data collection and monitoring systems to track impacts and evaluate adaptation strategies. Make climate data accessible



- for informed decision-making by policymakers and researchers.
- Create dedicated funding mechanisms to support communities' climate adaptation efforts. Facilitate partnerships with developed countries to access advanced adaptation technologies and promote financial sustainability.

Notes and References

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