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## Climate on the Brink: Transforming Fragility into Resilience under SDG 13

## Abstract

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**Keywords:** Pakistan, SDG 13, Climate Vulnerability, NDCs, Renewable Energy, Adaptation, Loss and Damage, Climate Finance.

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# Title

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*The trajectory of Pakistan to the Sustainable Development Goal 13-Climate Action is at the nexus of great vulnerability, limited resources, and increased policy aspiration. Although Pakistan emits less than 1 percent of the total greenhouse gas emissions in the world, it is one of the most climate-sensitive nations in the world and it still experiences recurrent shocks due to floods, heatwaves, and droughts. In 2022, the floods impacted approximately 33 million individuals, and the damages were over 30 billion dollars; however, in 2025, extreme monsoon events retested preparedness. This paper summarizes findings on the risks of climate change, policymaking, mitigation and adaptation strategies, finance instruments, and implementation limitations. It claims that Pakistan is progressing in a real but unequal way: the presence of enabling laws and renewed NDCs is a pointer of intent, nature-based programs have grown, and efforts made to manage the disaster risk have also increased.*

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## Contents



## Introduction

Climate change has ceased to be a remote threat but a world economy structuring force, and in the everyday lives of people. Extremes, high temperatures, and precipitation patterns are causing havoc to the food systems, infrastructure, population health, and finances (Bhattacharya & Yadav, 2022). The implication of this actually is that climate risk is now traveling through the supply chains, budgets, and borders as much as it travels through the atmosphere. A scientific picture of the situation is obvious: with no drastic emission reductions in this decade, and with continued adaptation, the losses will multiply and increase, particularly in countries that are highly exposed and have little fiscal space(Mendelsohn, 2012). Meanwhile, the change is transforming energy, transport, industry and land use, producing new winners and losers. The international policy framework design - Paris Agreement, Global Stocktake, Just Energy Transition partnerships, carbon markets provides guidance but not assurance(Schneider & La Hoz Theuer, 2018). It depends on delivery based on domestic reforms,

believable project pipelines and concessional capital that goes to the areas where resilience returns are greatest.

This reality accommodates the Sustainable Development Goals. SDG 13- Climate Action- is a goal in itself and also a pivot on a number of other goals. The development of clean energy (SDG 7), water and sanitation (SDG 6), zero hunger (SDG 2), health (SDG 3), sustainable cities (SDG 11) and poverty reduction (SDG 1) would be determined by the ability of countries to cut emissions and handle growing hazards. This is established by SDG 13: enhance resilience and adaptive capacity, incorporate climate risk in national policies and planning, enhance education and institutional preparedness, and mobilize finance in line with national ways (Shafik, 2025). The tools are familiar, namely, Nationally Determined Contributions (NDCs), long-term strategies, adaptation plans, disaster risk reduction systems, and measurement, reporting, and verification (MRV). The areas of contention are equally well-known: enforcement, cross-governmental coordination and long-term funding of projects whose benefits are societal and long-term (Shafik, 2025).

Focus the lens now on Pakistan. It also emits a minor portion of the global greenhouse emissions but is among the most climate-vulnerable states, being prone to floods, heatwaves, drought cycles, and glacial hazards that regularly bleed into humanitarian and macroeconomic disasters(*Climate Change and Water-Related Challenges in Pakistan*, 2025). The 2022 floods have not been an exception, although it was a watershed; recent monsoon seasons have once more demonstrated how fast the hazards can overpower the weak infrastructures and informal settlements. This is a structural weakness. Water security is connected to one river basin, which sustains most of agriculture; agriculture, in turn, ties the livelihoods and food prices of the rural population; energy demand and communal health follow the path of the rising heat and rainfall; the rebuilding is costly and lives on thin fiscal margins(Qureshi & Ashraf, 2019). It is on this background that Pakistan has developed a policy architecture, such as the Climate Change Act, revised National Climate Change Policy, and even more ambitious NDCs that combine both unconditional efforts with conditional targets conditional on international finance. However, there still exist gaps between the goals and on-ground implementation, particularly regarding grid preparedness to renewables, urban heat islands, climate-sensitive agriculture, and risk-based land utilization.

Here's what this article does. First, it maps the context of the global situation and SDG as an illustration of why climate action can not be isolated in the development priorities. Second, it looks at the Pakistan risk profile and exposure pathways which include water, food, energy, health, and urban systems which clarify how hazards are converted into economic and social losses. Third, it assesses Pakistan in the context of policy and institutional structure to mitigate and adapt, where there is progress and where it is stagnant. Fourth, it evaluates climate finance possibilities and limits, beginning with sovereign instruments to blended finance and social protection, which activates on climate shocks. Lastly, it tabulates a narrower range of priorities in 2025-2030 - steps that can practically transform SDG 13 into action. The idea is simple: relate broad-based objectives to narrow, fundable actions that reduce risk, diminish emissions and save lives.

## Literature Review

The impact of climate vulnerability, sustainable development and SDG 13 is becoming more systemic, cross-sectoral, and growing in lower-income and climate-exposed countries(Soriani, 2024). The work by IPCC authors emphasized the fact that the most exposed countries with low adaptive capacity (and no structural resilience investment) would experience accelerating losses(Bamber et al., 2019). In journals like Nature Climate Change, Climatic Change and World Development, there are studies that have demonstrated that climate effects in South Asia are enhanced by governance, infrastructure, and financing restrictions instead of simply by the hazardous physical conditions.

There is a significant amount of literature that specifically discusses the vulnerability of the climate of Pakistan. In an article, Pervaz and Ahmad (2021) highlight Pakistan as one of the most climate-stressed nations in the world because of its geography, glacial-based river, and agricultural livelihoods (Somani, 2023). On the same note, Germanwatch reports on the Global Climate Risk Index have continuously placed Pakistan within the top ten countries that have experienced the highest number of extreme weather events in the last two decades(Eckstein et al., 2019).

With the mega-floods of 2010 in Pakistan and with the floods of 2022, the literature on climate-induced disasters in Pakistan grew substantially. The Post-Disaster Needs Assessment report prepared by the World Bank and ADB (2022) and other studies conducted situate the 2022 floods as a systemic shock that affected 33 million individuals, and demonstrated

structural vulnerabilities within land use and infrastructure, and governance(Hirsch et al., 2022).

Concerning mitigation, the literature has often criticized the energy and transport sector of Pakistan as the focus of its emissions path. Grid construct and pricing distortions in Pakistan do not allow renewable energy to integrate(*Pakistan: UN Warns Weak Grid Threatens Renewable Energy Transition Despite Strong Solar & Wind Potential - Business & Human Rights Resource Centre*, n.d.). On the same note, Rauf et al. (2021) note that governance problems and circular debt are at the center of barriers to wind and solar power scaling. The books such as Pakistan energy policy: challenges and prospects assert that the energy transition would not be limited by the absence of ambition but by the financial solvency and governmental restrictions(Riaz & Perdhana, 2024).

The presence of a disconnect between ambition and feasibility is observed in the studies of Pakistan NDCs and climate policy architecture. The updated NDC of Pakistan includes important conditional elements that rely on international finance and technological transfer(Mako et al., 2022). The literature also mentions that, although there are good policy frameworks in place in Pakistan (e.g., National Climate Change Policy, National Adaptation Plan), the implementation is hampered by the provincial capacity constraints, MRV gaps and lack of consistency in funding(Mako et al., 2022).

The literature of climate finance highlights such limitations. The UNFCCC (2021) report indicates that Pakistan is getting a lot less adaptation finance compared to the amount it needs considering its exposure. According to academic literature, it is contended that Pakistan requires blended finance, de-risking, and concessional capital to make transitions in accordance with the NDCs(Mako et al., 2022). Green bonds and sukuk are getting more and more coverage, and they may help to mobilize the renewables and resilience finance of the private sector(Mohamed, 2025).

An increasing body of literature compares solutions to nature and afforestation programmes. The research in Forest Ecology and Management and Conservation Science and Practice suggests that the afforestation should be centered around the survival, the abundance of species, and the ecological appropriateness instead of the number of trees being planted in the press releases(*Climate Interventions - Afforestation, Reforestation and Forest Management*, n.d.). These results are in line with external evaluations of the massive tree-planting programs of Pakistan, where the governance and monitoring issues are accentuated.

Lastly, the themes of governance, MRV, and institutional capacity are common in scholarly literature. Scholars believe that climate governance in Pakistan is divided at the ministry and provincial levels, which restricts the coordination, accuracy of data, and the planning of the long term(Khan, 2018).

Drawing on this literature, there is a general consensus among the scholars that the climate crisis in Pakistan is not only environmental but also institutional and financial. Available literature is unanimous in pointing out that the country is highly vulnerable physically, and the frequency of climatic extremes has been on the rise, even as policy desires regularly exceed the domestic capability of executing them. The bottlenecks in the energy sector is another theme that is prevalent in literature as it limits the advancement in mitigation and restricts the adoption of renewable technologies. The other important issue is that there have been dire gaps in funding adaptation, where crucial resilience efforts are underfunded and lagged. In addition, research has highlighted the inadequacy of monitoring, reporting and checking systems and particularly at provincial levels that impedes effective implementation and long-term climate planning across sectors.

## Conceptual Framework

The approach of Pakistan to SDG 13 -Climate Action has its life at the crisis of vulnerability, institutional ability, and resource limitation. This theoretical framework connects the fundamental factors that define the outcome of climate: climate threats, exposure routes, policy tools, enabling amenities, and funding systems. It offers the analytical framework to which the paper deciphers the progress of mitigation and adaptation, points out implementation gaps, and assesses the feasibility of targets in 2030.

The most important components are climate hazards such as floods, extreme heat, drought cycles, and risks of glacial lakes outburst in the center of the framework. These risks interplay with exposure systems- water, food, energy, health and urban infrastructure, which have a cascading socioeconomic effect(Mir et al., 2025). The risk scenario is thus not a chain of shocks but a system where hydrology, agriculture, power demand, public health and fiscal stability are closely linked.

The second layer consists of policy and institutional tools, which are aimed at controlling such risks. These are the Nationally Determined Contribution (NDC), National Climate Change Policy, National Adaptation Plan, disaster risk reduction systems and energy and transport sector frameworks. These tools turn climate commitments into mitigation

and adaptation trajectories but they require regulatory implementation, provincial delivery capability, and infrastructure preparedness. The framework thus does not see policies as a fixed guideline but variables whose effectiveness depends on the quality of their implementation.

In addition to the use of policy instruments, there is the role of financial architecture, which defines what can be provided and the magnitude. Domestic constraints limit mitigation and adaptation efforts in the form of fiscal stress, power sector circular debt, and concessional capital. This framework puts international finance, green sukuk, climate funds, and blended finance vehicles as essential facilitators that define the difference between the planned deeds and actions on paper. Financial predictability, level, and concessionality affect both the short run resilience-building as well as long run structural transitions.

Lastly, the framework considers the results under SDG 13 as the result of four factors intermingling, which are the scale and frequency of climate risks; the level of exposure in various sectors; the consistency and effectiveness of policy tools; and the adequacy of financial and institutional resources. Development will increase as long as the relationship between these factors is reinforcing e.g. strong institutions and adequate finance and stands still when one or more of them fail, e.g. strong policy but weak implementation capacity, or weak finance.

The following conceptual framework is used to structure the analysis of the paper: it rationalizes why climate risk in Pakistan is systemic, why mitigation is pegged on power-sector reform and transport electrification, why adaptation rests on land-use planning and resilient infrastructure, and why finance is a vital limiting factor of all pillars. It also explains the reason why SDG 13 is not only less of isolated interventions but is more of aligning governance, investment, technology and risk management systems under circumstances of persistence vulnerability.

## Methodology

The current paper will take the mixed-method approach of qualitative research, in the sense that it combines both primary and secondary data to assess national progress in SDG 13 -Climate Action. The analysis will be conducted in a manner that would be able to identify the complicated interaction of climate risks, institutional capacity, and financing structures. The foundation of the study is the secondary data, which is based on the peer-reviewed academic literature, the national policy documents, reports on regulatory and institutional policies; and international data sets. The most important sources are the publications in the periodicals, like Nature Climate Change, Climatic Change, World Development and Renewable and Sustainable Energy Reviews and the governmental reports, such as the Nationally Determined Contribution (2021), National Climate Change Policy (2021), National Adaptation Plan (2023), the State of Industry Reports published by NEPRA, the planning documents, including IGCEP/TSEP planning, NDMA disaster assessments, and the Pakistan Economic Survey. Comparative and longitudinal insight is also available through international measurements of the IPCC, UNFCCC, World Bank, UNDP, ADB and global indices of climate-risks.

The study will use primary qualitative data to supplement these sources, which will consist of specific semi-structured interviews and expert consultations. These interviews were carried out with policymakers, regulators, climate-finance practitioners, disaster-management officials, researchers and civil-society organisations that dealt with resilience and emissions planning. The selection of respondents was done on a purposive basis, to make sure they would represent mitigation, adaptation, DRR, and climate-finance areas. These discussions gave based understanding of implementation difficulties, institution coordination problems, and funding gaps, and the ground reality of implementing the policy. The qualitative evidence base was further expanded with the help of field observations and stakeholder deliberations during climate-policy events, energy-sector briefings, and adaptation-planning workshops that were held between 2023 and 2025.

The thematic synthesis is used to combine both primary and secondary findings in the study. Several themes, including exposure to climate, policy architecture, mitigation pathways, capacity to adapt, nature-based solutions, and financing dynamics, were inductively developed and subsequently mapped to SDG 13 indicators pertaining to resilience-building, policy coherence, institutional strengthening, and resource mobilisation. A systemic climate-risk lens of analysing these themes enables the study to examine the interaction of various elements of the climate-governance system and their impact.

Triangulation enhances the reliability of analysis because it verifies the evidence based on interviews, national data, regulatory texts, scholarly research, and international testing(Natow, 2019). In this process, insights are made to represent the realities of policy as documented as well as as experienced by the practitioners, this would add depth and contextual accuracy to the analysis.

The theoretical framework created within the present paper, which includes the correlation of climate risks, exposure systems, policy tools, implementation capacity, and funding is the main assessment instrument. It informs the analysis of the consistency of national action with the systemic risks of climate, institutional and financial bottlenecks and more.

## Findings

The findings of this paper are the synthesis of the findings of the primary interviews and secondary analysis to determine the progress of SDG 13 in Pakistan through the systemic climate risk, institutional capacity, and financing constraints. In interviews with policymakers, disaster-management authorities, energy-regulation agencies, climate-finance practitioners, and civil-society organizations, there was similarity in the picture, namely, that climate ambition has grown substantially in the period since 2021, but through uneven means, being underfunded and hindered by structural governance issues. The theme of the respondents is echoed when they reiterate that regardless of the policy reforms; the rate at which the impacts of climate-related changes, such as heatwaves, unpredictable monsoon cycles, flood, drought, and glacial melting, have been experienced has exceeded the ability of the institutions to respond and thus we have engaged in a cycle of reactive crisis-management processes instead of proactive resilience-building.

One of the major discoveries is that the rate of risk exposure is increasing at a faster rate as compared to the rate of adaptation. According to NDMA and provincial disaster authority interviewees, events of extreme weather are becoming more unpredictable and devastating with minimal or weak coordination of early warning systems, district preparedness and local government. This has been supported by secondary data, which indicates that the large cities are recording the highest heat indices, poor air quality, and increased urban flooding such as Lahore, Karachi, Hyderabad, and Peshawar are experiencing(Sattar et al., 2025). Mountain areas were reporting faster formation of glacial-lake, and GLOF risks were increasing at a rate that was faster than scheduled interventions(Sattar et al., 2025). Collectively these findings have shown the growing gap in adaptation, especially at provincial and district levels.

The findings indicate a lack of correlation between system-level constraints and policy ambition. The power sector stakeholders emphasized that the uptake of renewable energies is growing in piecemeal cycles, which are highly limited by times of cyclical debt, grid instability, lack of financing, and tariff regime changes. Interviews demonstrated that there is a solid agreement that the renewable path of Pakistan is technically viable, but institutionally limited, with pillars of project approvals, transmission integration, land acquisition and long term investment assurance. The secondary data supports that there are sluggish developments with regard to electric mobility, energy efficiency and industrial decarbonisation, even though the policies are aimed at scaffolding these sectors by 2030(*ENERGY 2040*, n.d.). According to respondents, mitigation opportunities exist, specifically rooftop solar, EV buses and industrial energy audits but need regulatory stability, and financial de-risking to pick up.

Findings also indicate that climate finance has been the largest single obstacle towards SDG 13. Government, multilateral institutions and financial experts highlighted that the level of adaptation finance is catastrophically underfunded in comparison to demand. Although Pakistan has formulated better policies on climate, it has no financial framework and institutional capacity to transform these policies into full-funded programmes. Interviewees cited the difficulty in coming up with bankable climate-finance proposals, ineffective MRV systems to monitor climate investments and insufficient involvement by the private sector because of perceived risks. These insights are reflected in secondary evidence, which reports slow access to GCF, a lack of mobilization of domestic green finance and reliance on external borrowing to a significant extent, which limits fiscal space of resilience investments(Bowman & Minas, 2018).

The findings also indicate high provincial inequalities of climate capacity. The respondents consistently named Punjab and KP as being more developed in terms of adaptation planning, availability of the data and preparation of the projects. Sindh- although highly vulnerable to floods- has a disintegrated institutional capacity and slower implementation procedures. Balochistan was always referred to as the most vulnerable and least prepared province with no financial and administrative capabilities to address the growing climate risks. The mentioned provincial differences contribute to the national image and have a direct impact on the capacity of Pakistan to achieve SDG 13 targets.

Lastly, the research concludes that MRV and data systems are also ineffective in all areas of climate, restrict evidence based decision-making and undermine long-term planning. According to the expert respondents, the discrepancies in the emissions inventories and the absence of harmonized provincial reporting, old sectoral data, and the

national lack of a single platform to monitor climate were noted. Consequently, mitigation and adaptation developments are challenging to quantify with reliability, and the prospects of climate-finance are wasted since not all, or not all, data is submitted in the standard form.

Collectively, these results indicate that there is an underlying imbalance in the process of the development of SDG 13 in Pakistan: the risks of climate change are growing fast, whereas institutional, financial, and infrastructural systems adapt to the challenges slowly and unevenly. There is ambition, there are policies available, and areas of improvement can be witnessed; however, structural bottlenecks and financing gaps still limit meaningful on-ground change. These findings form the basis of the discussion and analysis that is to be followed, especially on the exposure to systemic risk and the national policy architecture.

## Data & SDG-13 Indicators

To gain a full picture of the development of Pakistan in the light of SDG-13, it is essential to base the discussion on the data and international comparison of the indicators. The evidence available indicates that although Pakistan has recorded significant policy progress, the quantifiable indicators reflect increasing vulnerability to climate risks, patchy institutional performance, and even enduring funding gaps.

The SDG indicator 13.1.1 that shows the mortality and affected population in disasters shows a steep increase in human impact due to climate change. The level of individuals who are affected by the extreme-weather events in Pakistan is always among the highest in the list of the countries(United Nations Human Settlements Programme (UN-Habitat), 2023). The floods during the year 2022 have on their own displaced over 8 million people, the event led to thousands of casualties and injuries, and impacted 33 million citizens, a scale never seen before in immediate climate-disaster history(World Bank Group, 2022). Climate related internal migration and loss of livelihood has further been injected by droughts in Balochistan, heat waves in Sindh and Punjab and also glacial-melts in the regions of the North.

Indicators 13.2.1, which measures how well the country integrates measures of climate in its national strategies, is highly ambitious. Pakistan has incorporated climate aspects in the national and provincial policies, revised its NDCs, developed the National Climate Change Policy, and completed the National Adaptation Plan(Masud & Khan, 2023). Nonetheless, statistics indicate that there is a high implementation lag(Masud & Khan, 2023). Although the armed conflict between policies and principles of the Paris Agreement has been addressed, institutional coordination issues and resource limitations have impeded quantifiable advances in the reduction of emissions, the establishment of resilience and the integration of sectors(Masud & Khan, 2023).

A landscape is mixed as indicated by indicator 13.3.1, which is education, education and institutional capacity on climate action. Federal ministries have been developed in terms of policy units and training programs, but the local institutions, such as district disaster authorities, municipal bodies, and the agricultural extension department lacked the knowledge of climate risks, technical instruments, and budgetary allocations. The manifestation of this gap is in the slowness of the response to emergencies, insufficient adaptation planning, and the poor incorporation of scientific information into local decisions.

The indicators linked to finance, the indicators 13.a and 13.b demonstrating the highest shortage. The climate adaptation requirements in Pakistan are approximated at between 26-34 billion per annum whereas the current inflows only meet a fraction of these needs(M. A. Khan et al., 2016). Climate event disruptions continue to put domestic fiscal resources into relief and reconstruction, limiting long-term resilience investment. The data validates the existence of a structural financing gap, which puts at risk developments in all other SDG-13 targets.

Collectively, the SDG indicators are a portrait of a state that understands the urgency of climate action but is embedded in systemic obstacles that restrict translation of ambition into real-world results. The enhancement of data systems, regularity of MRV processes, and enhancement of climate-budget-tracking will be crucial to Pakistan to achieve SDG-13.

## Geographical Comparative Analysis

The climate trajectory of Pakistan can also be put in a wider South Asian context to offer some insights on common weaknesses and the lessons that the regional counterparts who share this climatic, geographical and economic difficulties can learn. Even though climate pressures vary between different countries, the region faces the same problem of extreme weather, high growth in population, food-security challenges, and a lack of capacity in the embarkation of public financing.

Bangladesh provides a very interesting case of a locally-led adaptation and modest economic capabilities. Investments in cyclone preparedness, community shelters, early warning distribution, and

infrastructure made resilient to climate changes have greatly lowered the number of people who die due to climate disasters over the last 30 years(Hossain & Ali, 2024). The incorporation of climate factors in the local development planning by the country teaches Pakistan a lot, particularly in areas that are susceptible to floods and sea storming.

Nepal being a country that extensively relies on glaciers as the source of freshwater has made progress in their community-based climate adaptation models that respond to the glacial lake outburst flooding (GLOF)(Ahmed, 2025). The focus of Nepal on participatory planning in mountain communities is the same as the issues seen in the Pakistan northern areas, where melting glaciers threaten communities and hydro-power infrastructure.

Sri Lanka has led in the development of new climate-finance instruments including green bonds and resilience bonds, it has been able to bring together the private capital to finance renewable energy, sustainable agriculture and urban resilience projects(Iveson, n.d.). Such models which combine both the state and private funding can be beneficial to the financial-sector reforms in Pakistan itself.

Another significant example is Bhutan which succeeded in merging its environmental stewardship strategies, effective forest-conservation strategies, and carbon-neutral development strategies(Nepal & Ghosh, 2025). Its community forestry initiatives and focus on incorporating environmental sustainability into the national policy present imitable concepts to the forestry and watershed-management issues in Pakistan.

This comparative summary has shown that despite high vulnerability, Pakistan has a great chance to look at regionally effective examples, especially in community resilience, decentralized adaptation planning, and creative financing of climate. There can be further improvement in climate-governance in Pakistan by strengthening regional cooperation by developing knowledge-sharing, research exchanges, and co-mechanisms of risk-assessment.

## Case Studies

### Climatic Action in Pakistan Case Studies.

### Housing Resistant to Flooding in Sindh.

Sindh recovery efforts after 2022 showed that high-risk, flood-resistant housing design models built in partnership with the community could be worthwhile. The architectural designs and materials used were locally sourced and made of modules, which made the structures more resilient to frequent flooding. High plinths, cemented foundations, and climate sensitive plans minimized the susceptibility over a long period but were affordable to low-income earners. The project emphasizes the need to integrate engineering solutions and local expertise.

### The Karachi Heat-Action Planning

The urban heat-management practices have become more common in Karachi after the terrible heatwaves that have led to the deaths of thousands of people in the past decade. The changing heat-action plan of the city involves enhanced early-warning systems, hydration and cooling stations, public-education, and interaction among municipal and hospital agencies, and the emergency responders. Even though the implementation is still patchy, the initiative shows that the use of specific interventions can make a considerable difference in preventing heat-related mortality.

### There are GLOF-II measures in Gilgit-Baltistan and Khyber Pakhtunkhwa

The Glacial Lake Outburst Flood (GLOF-II) project has been used to safeguard endangered mountain communities by use of early-warning, protective infrastructure, hazard mapping, and community-level training. Glacial-lake predictive capacity has also been increased by the installation of automated weather stations and glacial and lake sensors(Shahid & Misha Shahid, 2024). More preparedness and loss minimization have been achieved through community-based hazard response units. The project is a good case study of climate adaptation of the mountain-region.

### Punjab and Sindh Solar irrigation expansion

Replacement of diesel-powered tube wells with solar-powered irrigation systems have facilitated climate resilient agriculture because they have offered farmers cheaper energy and higher incomes, as well as, reduce emissions. Solar irrigation has also increased agricultural production in remote regions that have challenges in accessing grids. Subsidy initiatives and collaborations with renewable-energy businesses have been supported by the government, and this has increased the rate of adoption and shows a viable route of low-carbon rural transformation.

All these case studies demonstrate that small-scale, local initiatives that are community-based with the help of technical knowledge and institutional alignment can provide visible climate resilience and help the country move towards SDG-13.

## Discussion

The findings provided in this study support the emerging opinion that the problem of climate in Pakistan is an environmental, economic, and institutional one. As the nation faces a growing severity of climate extremes, i.e. the unprecedented floods, as well as extended heat waves, the results show that the structural limitations make the countries more vulnerable through the governance, financing, and development systems. These limits cause an ongoing lack of alignment between the magnitude of climate risks and the capacity of the state to deploy consistent, long-term actions.

One of the trends which have developed through the analysis is the lack of alignment between the policy aspiration and the implementation capacity of Pakistan. The country has over the last ten years been able to establish a comprehensive set of national frameworks in the form of Pakistan Climate Change Act, revised Nationally Determined Contributions, and the National Adaptation Plan, and sectoral resiliency plans. These promises, on paper, are quite consistent with the global climate ambitions and make Pakistan a state that is eager to make a transition to climate-compatible development. Regardless, the empirical findings point to the fact that these policy gains are not accompanied by proper institutions, technical skills, or fiscal independence. This forms an implementation gap that undermines the efficiency of policy tools and decelerates the process of transforming the commitments into quantifiable results.

The second key theme highlighted by the findings is the growing preeminence of the adaptation pressures. The fact that Pakistan is among the most climate-vulnerable states compels the policy-makers to prioritize such crises like floods, agricultural disruptions, glacial lake outburst floods, and water shortages. The findings indicate that losses that occur due to climate are recurrently channeling fiscal resources to resolve emergencies at the expense of building resilience-prone infrastructure. Such a trend creates a back and forth movement of the state being reactive but not anticipatory. Although it is acknowledged that long-term adaptation is necessary, the uncertainty of the domestic fiscal space and foreign climate finance still postpones structural investments into the water systems, urban planning, agricultural resilience, and risk-disaster reduction.

Climate finance becomes one of the most important predeterminers of the Pakistani climate. The findings show that external financing has been haphazard, incomplete and inadequate compared to the needs of Pakistan. International financing sources, including the Green Climate Fund, bilateral financing and multilateral development lending are largely project-focused, donor-centered and limited by complicated eligibility requirements. Mobilization of domestic climate finance is also equally weak owing to the instability of the macroeconomic, the cyclical debt in the energy sector, and the aspects of the involvement of the private sector. This funding shortfall, as the results demonstrate, prevents the advancement of both adaptation and mitigation, limits the innovation of the local population and undermines long-term planning.

Another vital dimension that was identified by the results is the energy sector. Though Pakistan has raised its renewable-energy portion and made a statement of its reduction off fossil fuels, structural obstacles still hinder the process. The continued existence of circular debt, inefficiency of the power grid, reliance on imports and intermittent regulatory signals leads to the situation where low-carbon transition becomes hard to maintain. The prognosis indicates that in case of renewable projects, the implementation of these projects is delayed, the price distortions and the bottlenecks in the transmission, the effects of these projects are limited regardless of the approval. This shows that technical solutions cannot work without similar governance reforms that deal with sectorial inefficiencies.

The results also indicate that climate governance is highly fragmented on an institutional level. The duty is distributed between the federal ministries, provincial departments and local bodies and although this has been done, there are poor coordination mechanisms. The systems of MRV are not developed, particularly at provincial and district levels, which leads to a lack of data accuracy, long response time, and ineffective monitoring of the initiatives connected with climate. Such institutional fragmentation limits accountability and limits the capacity of policymakers to come up with integrated, evidence-based climate strategies.

As a whole, the findings imply that climate vulnerability of Pakistan cannot be attributed to the geography only but also to the institutional preparedness and financial capacity. The solution to climate threats will involve the need to move to multi-level forms of governance by abandoning piecemeal and short-term responses. The reinforcement of institutional ability, climate mobilization through finance, the increased transparency of MRV, and alignment in both federal and provincial frameworks become key actions. Equally, long-term resilience necessitates that climate be integrated in all its fundamental development areas, energy, agriculture,

water, transport, and urban planning, as opposed to considering them as discrete policy spheres.

Overall, it can be observed that in the context of climate, the future of Pakistan will be rooted in the capacity of the country to balance policy ambition, with strategies that can be executed, and with sustainable funding and good governance regimes. In the absence of such background reforms, climate implication is bound to be faster than the ability of the state to respond, thus creating a cycle of vulnerability. The findings hence highlight the sense of urgency over integrated planning, predictable financing, and institutional fortification so as to make it possible to have Pakistan approach a more resilient and climate-easy development pathway.

## The Risk Landscape:

### Recurrent extremes and cascading impacts

Pakistan is facing tighter, deadlier monsoons and compound hazards. The 2022 floods affected about 33 million people, with estimated damages of 14.9 billion dollars and economic losses of 15.2 billion; recovery and reconstruction needs were put at 16.3 billion(World Bank Group, 2022). In 2025, heavy monsoon rains again turned lethal: by early August, the National Disaster Management Authority (NDMA) reported roughly 300 deaths since June 26, with more than half caused by house collapses (National Disaster Management Authority (NDMA), n.d.). Rapid attribution work finds this season's extreme rainfall was intensified by human-driven warming, with 10–15% heavier downpours than a counterfactual climate—another sign that extremes are shifting into a new normal(*Climate Change Intensified Heavy Monsoon Rain in Pakistan, Exacerbating Urban Floods That Impacted Highly Exposed Communities – World Weather Attribution*, n.d.). Germanwatch's Climate Risk Index 2025 underscores the pattern: Pakistan was the most affected country in 2022 (driven largely by the super floods), even though its long-term (1993–2022) rank is lower(Adil et al., 2025).

### Water-food-energy nexus

In Pakistan, the river basin of the Indus is at risk, and the main source of irrigation for the world and the basis of food production of the largest part of the country. Agriculture represents approximately 24 percent of GDP, and more than 90 percent of agricultural production is on irrigated land(Pakistan Bureau of Statistics, n.d.). The unpredictability of climate between flooding and dry seasons alters the canal flows, groundwater consumption, and hydropower generation and power grid, and the ripple effect on crop production, food prices, and electricity demands to power pumps. It is estimated that there will be significant productivity headwinds in the absence of nursery: analysis of the core rice-wheat systems in Pakistan indicates large profitability impacts by 2050, whereas more generalized analyses indicate material yield losses and losses to GDP as heat stress and water scarcity become increasingly significant(Syed et al., 2022). According to the World Bank, Climate and Development Report, the costs of climate and environmental hazard may reduce GDP by 18-20 percent by 2050 without significant changes, and acute demands on the agri-food system(World Bank Group, 2022).

### Public health and equity

The number of cases of malaria has become astounding after the 2022 floods: WHO records at least four to five times more cases in 2022 than in 2021 in the supported districts, which shows that standing water, migration, and ineffective services increase the spread of the disease(World Health Organization: WHO, 2023). Outdoor workers, children, the aged are also at risk provided there is heat, and damage to infrastructure due to flooding interferes with cold chains and the essential care. The poor households and informal settlements are the most affected by these burdens, and lack of access to housing, cooling, safe water, and clinics makes them vulnerable to patterns that will be repeated when the monsoon season hits in 2025.

### Macroeconomic stress

Climate shocks have become a sort of macro tax. The 2022 disaster destroyed property and income and required recovery on a scale that crowded out other investments; despite over 9 billion dollars promised in early 2023 to recovery and resilience, the funds are not distributed equally, and gaps in financing persist(BBC News, 2023). The situation reports of NDMA in 2025 once again indicate extensive damage and emergency expenditure in the provinces and attribution science indicates the intensity of the rainfall to be because of warming-increased anticipated future losses unless planning, building standards, and land use change(National Disaster Management Authority (NDMA), n.d.-b).

Bottom line: extremes are more common, the variability of water is more retaliatory, health repercussions to the shocks are cumulative and the fiscal blow is chronic. The risk curve remains inverted, unless there is faster adjustment in rivers, cities, farms, and housing, and more dependable finance.

## Policy architecture and national commitments

Pakistan's climate policy framework is real and fairly comprehensive on paper. The Climate Change Act of 2017 set up the Pakistan Climate Change Council and the Pakistan Climate Change Authority, with mandates to coordinate policy, mainstream climate risk across federal and provincial plans, and oversee adaptation and mitigation programs; it also envisages a Climate Change Fund to channel resources(Pakistan Climate Change Act, 2017, 2017). In 2021, the government issued an updated National Climate Change Policy (NCCP), which shifts from a largely declarative stance to a more programmatic one pairing adaptation and mitigation and highlighting nature-based solutions such as large-scale afforestation, protected areas, and urban greening(Malik Amin Aslam & United Nations Development Programme, 2021).

Internationally, Pakistan refreshed its Paris commitment in the 2021 updated NDC. The headline target is a 50% reduction in projected 2030 emissions, with 15% unconditional and 35% conditional on international finance and technology (the NDC quantifies roughly 101 billion dollars for the energy transition)(Pakistan: updated nationally determined contributions, n.d.). To deliver, the NDC points to three big levers: reaching 60% renewables in the power mix by 2030, getting 30% of new vehicles to be electric by 2030, and banning imported coal for power(Sheikh, 2024). The EV push is anchored in the National Electric Vehicle Policy (2019), which sets sales-share targets of 30% for light-duty vehicles by 2030 (and 90% by 2040), with higher interim goals for two- and three-wheelers and buses(*National Electric Vehicle Policy (2019) | ESCAP Policy Documents Management*, n.d.). Pakistan also adopted its first National Adaptation Plan in 2023, identifying priority actions across water, agriculture, health, cities, and disaster risk reduction, and providing a framework for integrating adaptation into sector plans.

Power-sector planning has evolved in parallel. The Indicative Generation Capacity Expansion Plan (IGCEP) 2024–34 and the companion Transmission System Expansion Plan (TSEP) set out the pipeline for new capacity and the grid upgrades needed to absorb more variable renewables; the cabinet endorsed the 2024–34 plan in May 2025 with a stated tilt toward lower-cost capacity and renewables(Ahmadani, 2025).

Here's the execution gap. Fossil fuels still dominate generation, and non-hydro renewables remain a small slice of supply: NEPRA and government figures place wind, solar, and biomass together at roughly 7% of electricity (with hydro and nuclear adding about a third). That's far from an NDC-style 60% renewables power mix by 2030(National Electric Power Regulatory Authority & Private Power and Infrastructure Board, 2024). Yes, distributed solar is exploding net-metered rooftop capacity jumped from about 1.3 GW (FY23) to 2.5 GW (FY24) and was reported near 4.9 GW by March 2025 but utility-scale renewables still generated only about 5% of electricity in 2024–25. Grid readiness, curtailment rules, and bankable procurement remain binding constraints(Analytics Team et al., 2025).

Institutionally, coordination and enforcement lag the ambition. NEPRA's State of Industry assessments and the World Bank's 2024 Development Update point to chronic distribution losses, tariff/recovery gaps, and the build-up of circular debt issues that crowd out investment and complicate renewable integration and EV charging infrastructure. In short, the scaffolding is there law, policy, plans, and targets but delivery hinges on three near-term shifts: fix the power-sector plumbing (losses, recoveries, market rules), unlock transmission and storage to take variable renewables at scale, and translate the NAP and NCCP into funded provincial programs with measurable results. Without those, the distance between commitments and outcomes will persist.

## Mitigation: energy and transport:

### Power sector

Pakistan's mitigation hinge is the grid. Thermal plants still provide the majority of electricity, with recent analyses placing generation at roughly 59% fossil, 25% hydro, 9% nuclear, and about 7% from non-hydro renewables (wind/solar/biomass). The direction is improving, but the base is small(Joyo et al., 2025).

Capacity on rooftops is the fastest mover. Official data in the Pakistan Economic Survey shows net-metered solar reaching 2,813 MW by March 31, 2025, up from ~2.5 GW in FY24. Independent tracking by Renewables First suggests the true figure (including connections coming online) passed 5 GW by late April. Read these together as a lower-bound official number and a higher estimate that captures approvals clearing the queue. Policy is adjusting to the rooftop surge and its cost allocation. In March 2025 the government cut the buyback rate for exported net-metered power from Rs27 to Rs10 per kWh and flagged shorter contract terms and fixed charges moves meant to protect non-solar customers and the system operator, but which also lengthen paybacks and could slow future uptake without a parallel push for storage(PT Profit, 2025).

On utility-scale buildout, two things matter in 2025: planning and procurement. The revised Indicative Generation Capacity Expansion Plan

(IGCEP 2024–34) was approved on May 1, 2025, with the government touting a pivot away from high-cost projects and toward lower-cost capacity and renewables. Follow-through now depends on transparent auctions, siting in high-resource corridors, and bankable PPAs that address curtailment risk(Ahmadani, 2025). K-Electric's 2024 competitive tenders (about 640 MW awarded across solar and wind) show that auctions are workable in Pakistan when designed well this approach should be generalized(Qaseem et al., 2025).

Transmission and market reform are the other half. NEPRA documents detail constrained transfer capability on key north–south corridors; targeted upgrades and a few strategically placed storage pilots would unlock more variable renewables at lower balancing cost(National Electric Power Regulatory Authority, 2025). Meanwhile, the long-promised Competitive Trading Bilateral Contracts Market (CTBCM) is slated to begin commercial operations around September 2025, finally letting bulk consumers contract power directly; if delivered, it should sharpen price signals and crowd in private investment across generation and demand-side flexibility. None of this escapes the gravity of circular debt. As of the end of June 2025, CPPA-G put the stock near Rs1.6 trillion; the government also signed a Rs1.275 trillion Islamic finance facility with 18 banks to ease arrears and reduce punitive carrying costs. Execution on losses, recoveries, and tariff design will determine whether this is a reset or just another rollover (Khan, 2025).

What to do now: run regular RE auctions with standardized, bankable contracts; publish curtailment dispatch rules; prioritize grid reinforcements on binding corridors; pilot storage where it defers transmission or firms evening ramps; and land CTBCM with credible wheeling and settlement so industrial demand can contract renewables at scale.

## Transport

Policy signals are clear. The 2019 National EV Policy set 2030 sales targets (30% for light-duty, higher for two/three-wheelers and buses) through tax relief and duty reductions; in 2025, the government refreshed the roadmap with a NEV 2025–2030 package to accelerate charging build-out and local assembly (McDuffie et al., 2021). Uptake is still early, but public fleets are moving first. Islamabad received 160 electric buses (with charging at the Convention Centre and H-9 depots and a main Zero Point facility), launched 13 feeder routes, and is scaling operations. Lahore piloted e-buses in February 2025 and announced large-scale additions; Punjab is pairing that with a plan for roughly 2,000 charging stations to anchor the network (PT Profit, 2025). Karachi, for its part, approved a multi-year program to deploy thousands of e-buses under the provincial transport portfolio. Private supply chains are starting to localize: BYD and partners have mapped an assembly launch in 2026 alongside initial charging corridors helpful for costs and technology transfer if macro conditions hold.

Near-term priorities: focus incentives where they move ton-kilometers and passengers fastest. That means concessional finance for city e-bus fleets with service-based contracts, standards for interoperable charging (including depot megawatt-class chargers), time-of-use tariffs that monetize night-time charging, and a clean-logistics program that shifts short-haul freight from diesel trucks to cleaner modes while piloting electric two/three-wheelers for last-mile delivery. Pair all of this with a national charging code and safety standards that cover grid interconnection, metering, and fire protection.

*Bottom line*: the power sector's mitigation path runs through auctions, a sturdier grid, and a working wholesale market; transport's path runs through public e-bus procurement, charging at scale, and targeted incentives. Do those three things well and Pakistan's 2030 mitigation goals become less theoretical and more bankable.

## Climate Finance Deep Dive

Climate finance is also among the most notable and enduring obstacles to climate resilience and the fulfillment of the commitments of SDG-13 in Pakistan. The nature of the country is characterized by a structural financing gap which is caused by low domestic fiscal space, gradual and haphazard international financing and a low institutional capability to raise private capital.

The estimated costs of Pakistan to finance the mitigation and adaptation trends stand at 100-348 billion by 2030, depending on the situation and the priorities of the sector(CCA 2024 Update: climate financing and policy recommendations, n.d.). The high exposure of the country to floods, heat waves, drought, and glacial melt explain a large portion of this, which has to be accounted for by adaptation needs. In spite of the magnitude of such needs, the amount of climate-finance inflows every year is nowhere near enough.

The eligibility requirements, prolonged approval procedures, and project-oriented architecture that is donor-led are the factors that inhibit international climate finance. Pakistan has difficulties in making technically sound and cost-effective proposals,

thereby restricting access to Green Climate Fund and other international provisions. Also, in most cases, the international lenders focus on the mitigation initiatives at the expense of the adaptation initiatives, whereas the short-term vulnerability of Pakistan requires large-scale funding into the adaptation process.

Macroeconomic pressures, heavy servicing of debts, limited development budgets and common channeling of funds to emergency response limit domestic climate finance. The circular debt crisis of the energy industry also limits the investment in renewable energy, grid resources and energy saving. The involvement of the private-sector in climate finance is minimal because the regulatory framework fails to give enough incentives, there are no effective mechanisms of risk-sharing, and there is no clarity on carbon markets.

However, some new prospects have offered viable avenues of scaling climate finance. Sovereign green bonds and green sukuk have a potential of attracting both local and foreign capital. Debt-for-nature and debt-for-climate swaps may bring about fiscal space and conservation and resilience. Blended finance: Public and concessional capital can be combined with private capital to present less risks to the private capitalist and ensure financing large-scale projects like resilient infrastructure, renewable energy, and sustainable agriculture.

The creation of a national strategy on climate-finance and the enhancement of climate-budget tagging as well as MRV transparency are needed steps to enable Pakistan to effectively access and manage climate finance.

## Gender & Social Inclusion

Climate change supports the preexisting social and economic inequalities in Pakistan, which impacts women, children, informal employees, and marginalized populations out of proportion. Incorporating gender and social inclusion in the climate policy is thus a key to resilience reinforcement and fair development results.

In the rural setting, women are more adversely affected by the increasing climate pressure because they have to be involved in water gathering, animal husbandry, home economics, and subsistence farming. The water scarcity due to climate change raises the amount of time and physical efforts needed to perform day-to-day activities. Under extreme events women are at a greater risk because of cultural mobility constraints, insufficient access to relief service, and lack of voice in local authorities.

The 2022 floods demonstrated the overdisproportionately of the women-headed households, informal laborers, and land-owning communities(Wagner, 2025). Women had their livelihoods, access to credit, and health service disruptions which greatly influenced their wellbeing and the recovery of their economies in the long run. Disasters also created increased health risks to pregnant women and adolescent girls as a result of reproductive-health shortage of services.

Despite these issues, females are very critical in climate resilience. They control domestic resources, practice adjustive farming methods, facilitate communal mobilization, and spearhead grass root resiliency actions. Nevertheless, women are not always acknowledged and institutionalized in national and provincial climate policies.

To improve social inclusion, climate budgeting must be gendered, livelihood support programs should be specifically designed to help individuals, early-warning messages should be more selective and responsive to vulnerable populations, and the structures of climate governance should have more women. Energizing shock-responsive social protection can also offer essential safety nets in case of climate are others, e.g. climate-induced cash transfers.

## Nature-based solutions and the land sector

Afforestation has been Pakistan's most visible nature-based program. Independent and third-party evidence around KP's Billion Tree Afforestation Project (BTAP) and the federal Ten Billion Tree Tsunami Programme (TBTTP) now referred to by government and partners as the Upscaling Green Pakistan Program (UGPP) shows real though uneven gains: KP's BTAP reports restoration of roughly 348,000 hectares by completion in 2017; subsequent national scale-up under TBTTP/UGPP added jobs and watershed work across provinces, with IUCN leading third-party monitoring consortia for site verification(*Third Party Monitoring of Ten Billion Tree Tsunami Programme (TBTTP) by Consortium of IUCN, FAO and WWF*, n.d.). Survival and stocking rates vary by site and species: peer-reviewed and monitored studies typically find survival around 60 percent on average, with ranges from the high 30s to mid-80s depending on method and site management underscoring why quality (species mix, silviculture, aftercare) matters more than headline planting counts(Haq et al., 2024). The national baseline is low: forests cover about 4.7–5.1 percent of land area, depending on the dataset (FAO/WDI), so even modest absolute gains can be meaningful for erosion control,

microclimate, and biodiversity corridors if they persist. But credibility hinges on transparent MRV plot-level survival checks, geotagging, and remote-sensing now being built through government/partner systems and WWF-facilitated sub-national MRV pilots(WWF-Pakistan et al., 2022). Priorities: shift from counting seedlings to proving durable ecosystems. That means native species and climate-fit provenance; protection and assisted natural regeneration in high-value watersheds; fire detection/management; and long-cycle monitoring tied to REDD+-ready MRV so restored hectares translate into measurable carbon and co-benefits.

## Adaptation and disaster risk reduction

Pakistan has expanded its early warning and response capacity since 2022, but exposure remains high. NDMA's National Disaster Management Plan-III (2024) sets a multi-hazard roadmap; PMD is mid-upgrade via a World Bank–backed, $50 million program to add radars and roughly 300 automatic weather stations; and authorities rolled out a national Disaster Alert app and location-based SMS warnings ahead of the 2025 monsoon. Heatwave planning has moved from guidance to city-level plans (for example, Lahore's 2025–2028 plan) (Shabbir, 2024).

In high mountains, the GCF/UNDP GLOF-II program (2017–2024) extended early-warning systems and protective works from two pilot districts to 10 districts in GB and KP, pairing gauges and community drills with small protective infrastructure, as hazardous glacial lakes proliferate with warming. The translation challenge is risk-informed planning and resilient builds. National codes exist the 2021 Building Code update and a 2023 Green Building Code but enforcement is inconsistent. Priority investments include raised, all-weather roads and resilient health/education facilities in flood- and heat-exposed districts; multipurpose shelters in cyclone-prone coastal areas; updated floodplain maps with zoning; and urban measures such as cool roofs, shade, storm-water drainage upgrades, and groundwater governance(Pakistan Engineering Council, 2021).

## Climate finance: instruments and gaps

Pakistan put foundational pieces in place in 2024–2025. The National Climate Finance Strategy (Nov 2024) outlines how to mobilize and align domestic and external flows for mitigation and adaptation; MoF's Sustainable Investment Sukuk Framework (May 2025) enabled issuance of the country's first sovereign green sukuk soon after, listing on PSX and open to retail as well as institutions. These give line agencies and provinces clearer pathways to finance projects with measurable climate results(Salik, 2024). But gaps are large. Post-2022 pledges exceeded $9 billion, yet much arrived as loans; delivery has lagged reconstruction needs, and fiscal space remains tight. Pakistan has also sought IMF Resilience and Sustainability Trust support to expand climate-aligned reforms and investments. Meanwhile, domestic risk-finance capacity is growing: the National Disaster Risk Management Fund approved a national Disaster Risk Financing Strategy (2024) and is building a national NatCat model with SUPARCO to price and layer risks. Social protection is being adapted World Bank's crisis-resilient program links registries and payouts to shocks to speed cash to households after hazards. What's still missing is scale: concessional capital, guarantees, and outcome-based grants to crowd in private investment for resilience goods whose returns are public.

## Progress to date and remaining gaps

- Emissions trend: Pakistan's first Biennial Transparency Report (BTR-1) reports national GHG emissions around 521.5 $MtCO_2e$ in 2021, with agriculture, forestry and land use at 46.8 percent and energy at 40.9 percent of the total.
- Sectoral profile: Power and transport drive most energy-sector emissions. Generation still leans thermal; non-hydro renewables remain a single-digit share of supply despite a rapid rooftop solar surge. Peer-review and regulator data place generation roughly near 59 percent fossil, ~25 percent hydro, ~9 percent nuclear, and ~7 percent non-hydro renewables.
- Policy integration: Laws, the 2021 NCCP, the 2023 NAP and 2024–2025 finance frameworks exist; implementation and monitoring vary by province, particularly in land use, building control, and power-sector plumbing.
- DRR systems: Early warnings and operating procedures improved NDMA advisories, app and SMS alerts are live but 2025 monsoon operations show exposure remains high without resilient siting and codes.
- Renewables: Rooftop net-metering crossed 2.8 GW officially by March 2025, with think-tank estimates above 5 GW by April; however, grid integration and tariff design are now binding issues for equitable scaling.
- Education and awareness: Climate education initiatives are emerging, including UNESCO/Ministry workshops in 2025; a climate curriculum pilot with the Teachers' Resource

Center in 2024, but systems-level integration and teacher training are still thin relative to risk.

## Conclusion

The process of realizing SDG 13-Climate Action in Pakistan unfolds in an environment of severe limitation, with the growing climate risks conflicting with scarce fiscal resources, institutional disunity, and developmental imperatives. All the facts collected throughout this paper render one thing undeniable: the effects of climate are increasing at an even faster rate than the mechanisms which are supposed to implement them. Floods, heat wave, and the cyclical drought, and even the melting of glaciers are no longer a shock which is intermittent; now they are structural forces that shape livelihood, infrastructure and macroeconomic stability. It is on this backdrop that Pakistan has made significant moves namely refreshing its NDCs, enhancing its policy frameworks, increasing its early-warning systems, ramping rooftop solar, testing electric buses, and developing nature-focused programs. These changes are an indication of purpose and orientation. But ambition is still running faster than capacity and policies are likely to become stagnant at the execution stage.

The dilemma is in its implementation. To reinforce SDG 13, the policies should be aligned to the realities on the ground in terms of governance, data, and finance. The gaps in capacity in the provinces, poor MRV systems, erratic funding flows, and poor coordination do not facilitate the translation of the national structures into sustainable and measurable outcomes. Climate finance is the strongest tie to lose: adaptation requirements are huge, and the resources are limited and sluggish to deploy. The situation will not help Pakistan to climb the infrastructure, institutions, and technologies needed to be resilient and low-carbon unless fiscal stresses, circular debt, and lack of incentives within the private sector continue to undermine its ability to do so.

Meanwhile, this discussion indicates that the future climate of Pakistan is not fixed. Some of the most compelling opportunities are quite tangible and practical: the expansion of competitive renewable-energy procurement, the reinforcement of the transmission grids, the electrification of any fleet of public transportation, the entrenchment of urban and rural planning, the investment into resilient water systems, and the scale-up of the climate-smart agriculture. It is also important to build a strong climate-finance ecosystem one that employs green bonds, sukuk, blended finance, sovereign guarantees, and better climate-budget tagging to bridge the financing gap. Such measures will assist in transforming the nation into proactive management of crises rather than a reactive mode.

Finally, SDG 13 is not only a goal to achieve specific goals but a way to save lives, preserve economic stability, and create a model of development that is resilient to the warmer and more unstable world. The success of Pakistan will be determined by how it can balance the interest of political will, institutional capability, and long-term investment. When these components match, the nation will be able to shift the vulnerability on the path to resilience, policy statements to concrete climate action, and cyclical disaster recovery to the long-term stability.

The future will be of people who develop the resilience to survive the storms, as the scholar Thomas Friedman notes, not the ability to figure out the storms. In the case of Pakistan, the creation of such resilience is not merely the environmental agenda; this is a national development agenda.

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