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# Mainstreaming Climate Change into Development Planning in Pakistan: Key Barriers and Way Forward

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**Abstract:** *Pakistan, highly vulnerable to escalating climate impacts, faces devastating floods and economic losses that actively reverse development gains and threaten lives and livelihoods. This paper addresses the critical need to integrate climate change into Pakistan's national development planning and budgeting. It investigates why this is vital, how it can be achieved, and the associated challenges and opportunities, employing a qualitative approach with policy and document analysis. Key findings highlight significant barriers to effective mainstreaming, including fragmented institutional coordination across federal and provincial levels, limited financial and technical capacities within government entities, weak enforcement mechanisms, and insufficient political prioritisation alongside challenges in mobilising adequate climate finance. The paper argues that a sustainable future for Pakistan hinges on embedding climate risk assessments and adaptation goals across all stages of development projects and within public financial management systems. The paper argues that effective mainstreaming requires embedding climate risk screening into planning and financial management, fostering robust inter-institutional collaboration, revising sectoral policies, enhancing climate education, and strategically mobilising both domestic and international climate finance, including leveraging public-private partnerships.*

**Key Words:** Climate-Resilient Development Planning, Policy Integration, Sustainable Development, Climate Adaptation, Pakistan

## Introduction

Over periods of decades to thousands of years, the natural process known as climate change affects the climate of our world. The greenhouse effect, which occurs when specific gases in the atmosphere trap heat, is what accelerates this process. The planet's energy balance is upset by changes in the Earth system, whether they are brought on by human activity or natural occurrences. The intricate feedback mechanisms determine how the climate system reacts to these changes (Lebel et al., 2012).

Numerous climate adaptation projects by governments, non-governmental organisations, and community groups have been driven by more funding, better scientific understanding, and increased public awareness. These initiatives seek to improve resource access, lower environmental risks, implement regulations, develop new technology, and change behaviour. Agriculture, coastal regions, ecology, health, water, and urban areas are just a few of the sectors that are affected by adaptation (Owen, 2020).

Perhaps the most critical issue of the twenty-first century has been recognised to be climate change. During the 19th century, human actions, specifically land use changes and greenhouse gas emissions, have raised the Earth's surface temperature by about 0.8°C. Temperatures are predicted to continue rising,

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making recent years among the hottest on record. If major emission reductions are not made, global temperatures may rise by as much as 4°C by the year 2100. There would be detrimental effects on human society and the environment from such an increase. Moving towards low-carbon economies and lifestyles is crucial to preventing the worst effects (Feulner, 2015).

Natural hazards in Pakistan have increased due to climate change, with individuals at risk increasingly being affected by frequent landslides and floods. The entire country saw an average of 512 disaster-related casualties per year between 1998 and 2020.

Parts of Attabad, Gilgit-Baltistan, including the neighbouring village of Sarat, were buried in a landslide that occurred on January 4, 2010. It separated Gojal Tehsil by obstructing the Hunza River, creating a lake that was 30 km long by August 2010, and submerging portions of the Karakoram Highway.

Other significant occurrences include the deadly 2010 floods, the earthquake that happened on October 8, 2005, and the 2015 heatwave in Karachi that claimed over a thousand lives. Pakistan's economy and society are also impacted by cross-border risks. Pakistan desperately needs early warning systems, integrated disaster management plans, and focused planning to lower risks, increase resilience, and promote sustainable development (Hussain et al., 2023).

Adaptation to climate change and sustainable development are now central components of international, European, and national policy agendas. However, when poorly planned, adaptation measures can lead to maladaptation—such as increased greenhouse gas emissions or heightened vulnerability for certain populations—which undermines the principles of sustainable development. Therefore, aligning climate adaptation with sustainability objectives is essential to foster resilient and sustainable futures.

Disasters involving climate change and weather caused US$29.3 billion in inflation-adjusted economic losses in Pakistan between 1992 and 2021, including property, crops, and cattle. This corresponds to 11.1% of the nation's 2020 GDP. Just the 2010 floods caused losses equivalent to 4.5 percent of 2020 GDP. Even while the complete economic effects of the 2022 monsoon floods are still being determined, preliminary estimates indicate that they might exceed the losses incurred in 2010 (Rehmat et al., 2023).

Section 2 explains the literature review on climate change. The methodology is explained in Section 3, along with the data sources. Section 4 looks at the main barriers Pakistan must overcome for climate change adaptation and mitigation. In Section 5, methods for integrating climate change into development planning procedures are examined, including climate financing mechanisms. In Section 6, case studies and best practices from both domestic and foreign settings are presented. The conclusions are presented in Section 7, and policy recommendations are made in Section 8 to improve climate resilience and advance sustainable development.

## Research Problem and Objectives

This paper explores the integration of climate change considerations into Pakistan's development planning, with a particular focus on the rising costs of development and the detrimental effects of climate-related risks on poverty reduction and overall progress. It addresses several central research questions: Why is it essential to incorporate climate change into Pakistan's development agenda? How can climate considerations be practically embedded in planning processes? What are the main obstacles and potential entry points for advancing this integration? By engaging with these questions, the paper aims to support informed policymaking and promote sustainable development pathways that are resilient to climate impacts. In doing so, it contributes not only to national policy discussions but also to the global climate discourse. The findings align with international development priorities and are especially relevant to the implementation of Sustainable Development Goal 13 (Climate Action), offering insights that can inform both domestic strategies and broader global initiatives on climate-resilient development.

## Literature Review and Theoretical Framework

Climate change is a global, long-term, and complex phenomenon that involves intricate interactions between climatic, environmental, economic, political, institutional, and technological factors (Ravindranath et al., 2002).

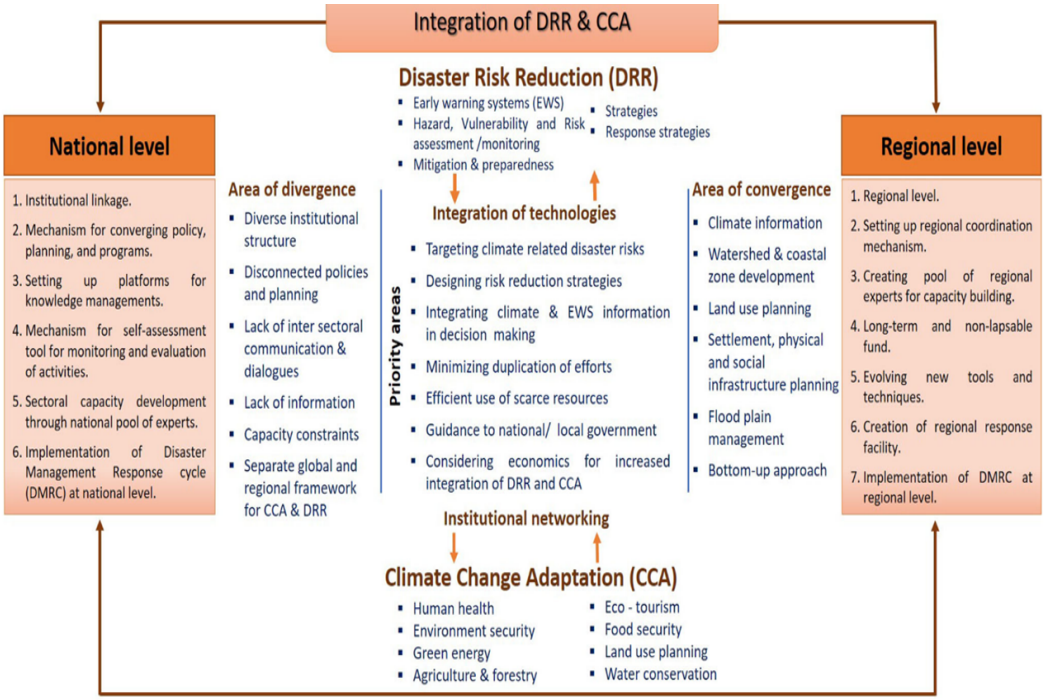
Gupta (2009) highlights the varied interpretations of "mainstreaming" within the discourse of climate change and development. Specifically, the term can denote a general emphasis on integrating climate change considerations into standard development planning. This integration encompasses a dual perspective: first, an analysis of how climate change may influence the achievement of development objectives and the execution of related activities; and second, an assessment of how these development efforts, in turn, may either exacerbate or mitigate vulnerability to the effects of climate (Ravindranath et al., 2002).

Development agencies have actively promoted the concept of mainstreaming. Notably, the World Bank and the Global Environment Facility (GEF) have assumed pivotal roles in administering adaptation-specific funds established under and alongside the United Nations Framework Convention on Climate Change (UNFCCC). The concept of adaptation has been influenced by Sperling (2003) to integrate adaptation into the concept of development in planning and practice for reducing the impact of climate change on vulnerable groups and economic sectors. Similarly, the 2010 World Development Report, 'Development and Climate Change', championed financial transfers from developed to developing nations as a critical component, alongside market-based solutions and rapid economic growth, in addressing climate change, while simultaneously positioning the World Bank as the essential expert organisation for facilitating such transactions (Gasper et al., 2013). Partly due to the inherent ambiguity surrounding the definition of adaptation and its relationship to development, donor states have largely entrusted the responsibility for defining, monitoring, and implementing adaptation initiatives to established development actors, including the World Bank, UNDP, and OECD (Gasper et al., 2013). Concurrently, a substantial early body of academic scholarship has provided support for the concept of mainstreaming. This argument rests on the evidence that climate change will exert a considerable influence on existing development trajectories.

Some research on local narratives on climate change contends that understanding the local and political nature of development and historical development paradigms is also important to understand the current vulnerabilities and corresponding adaptation planning and mainstreaming efforts (Jamali et al., 2023; Jamali, 2015). Conversely, others also argue that mainstreaming climate change can obscure the political and causal nature of people's vulnerabilities and frame their deeply rooted challenges in a climate change lens only, rendering them apolitical and suggesting technical and apolitical solutions (Scoville-Simonds & Jamali, 2019).

**Figure 1**

*Mainstreaming climate change and DRR into development at different scales* (Mall et al., 2019)



## Methodology

### Research Design and Analysis

This research paper uses qualitative research methods for analysis. The data collection methods include literature review, policy and document analysis, and some successful case study examples (Patton, 2002). The literature review and document analysis examined the existing body of research on how effectively climate change impacts development gains and methods for integration in development policies at the international level and lessons for the Pakistani context. Climate change policies were analysed, including the national and sub-national climate change policies, development strategies and other legal instruments. The analysis indicated to what extent climate change is mainstreamed and what the entry points for climate change mainstreaming are at different levels and sectors. Key scientific and international reports, frameworks and development actors include the United Nations Framework Convention on Climate Change, the Intergovernmental Panel on Climate Change (IPCC), development actors and MDBs (Bowen, 2009). Some successful initiatives and case studies were also analysed for lessons learnt at international and regional levels and how these can be implemented in the Pakistani context.

The data gathered through policy and document analysis will be analysed using thematic analysis (Guest et al., 2011). This involves a systematic process of identifying, organising, and interpreting patterns of meaning (themes) within the textual data related to barriers, enabling factors, and proposed solutions for climate change mainstreaming. Additionally, a comparative analysis will be undertaken to juxtapose Pakistan's current approaches with global best practices in climate change mainstreaming within development planning. This comparative lens will help identify potential areas for improvement and inform the development of a robust way forward. The synthesis of findings from these various qualitative methods will contribute to a comprehensive and contextually relevant understanding of the research question (Patton, 2002).

## Climate Change and Development Challenges in Pakistan

### Climate Change Impacts in Pakistan

Pakistan is ranked as one of the most vulnerable countries. According to the 2021 Global Climate Risk Index, Pakistan ranks eighth among countries most vulnerable to long-term climate risks. It falls into both categories: those affected by exceptional natural disasters and those experiencing ongoing extreme climate events. Regional temperatures are rising faster than the global average, causing extreme weather and heat stress. Floods in 2022 evacuated 8 million people and flooded a third of the nation. Glacial lake outburst floods (GLOFs) are a greater risk in the Hindu Kush, Karakoram, and Himalayan regions due to the glaciers' anticipated retreat. The economy is now facing additional pressures due to the accelerating effects of climate change. One such demand is the uncontrolled disruption of catastrophic climate disasters, which in 2022 reduced GDP by 8%.

Pakistan has experienced a mean temperature increase of 0.63°C over the past century. From 1981 to 2005, the decadal rise was 0.39°C—more than double the global average of 0.18°C—indicating a rapid warming trend. While overall mean precipitation increased by 25% between 1901 and 2000, regional variations show a 10–15% decline in rainfall in the arid plains and coastal belt since 1960. Other regions saw slight increases during both monsoon and dry seasons.

Water flow in the Indus River System, Pakistan's main freshwater source, has declined significantly due to climate change and overuse. Per capita water availability dropped from 2,172 cubic meters in 1990 to 1,017 cubic meters by 2017—just above the scarcity threshold of 1,000 cubic meters. The Arabian Sea's average surface temperature rose from 29°C to 31°C within two years, escalating storm formation and sea encroachment. Parts of Karachi are already submerged, with more areas at risk over the next 35 to 45 years. Pakistan is one of South Asia's most flood-prone countries, with major floods occurring almost annually since 2000. The 2022 floods were the most devastating on record, submerging large areas and displacing millions.

### Socioeconomic Impacts

Climate shocks are expected to severely impact all sectors of Pakistan's economy, which is already fiscally constrained and has experienced low growth recently. Environmental degradation and low human capital

are already causing GDP losses, which could be further amplified as climate-related disasters reverse decades of development gains. Limited public funds may increasingly be diverted from growth and climate resilience efforts to immediate relief and recovery.

Weak economic growth highlights the risks of extreme poverty, food insecurity, and malnutrition, making long-term poverty reduction and human development significantly more difficult. These interconnected challenges could also lead to major societal disruptions, including mass displacement and increased pressure on urban areas already struggling to support incoming populations. These projections underscore the urgent need for comprehensive adaptation strategies to reduce the economic and social impacts of climate change across Pakistan.

### Institutional and Policy Challenges

There are numerous challenges for integrating climate change into development policy, planning and budgeting processes, such as weak mechanisms for institutional coordination and accountability at different levels and sectors. A number of institutions and actors often operate in silos, with their own mandate and vertical accountability and reporting systems and duplication of efforts due to poor communication mechanisms. This impedes a coherent integration of climate change into overall development strategies, policies and resource allocations. A weaker coordination between provinces and the deferral entities hinders the design and operationalisation of climate-resilient development planning, directly affecting vulnerable populations and sectors due to a lack of coordinated efforts to mitigate climate change impacts (Hussain & Khan, 2021).

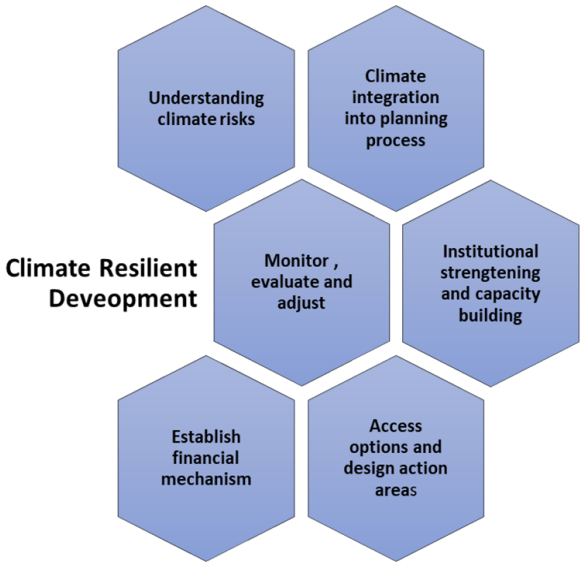
Lack of technical and financial capacities also affected meaningful mainstreaming of climate change into the mandate of different organisations and development actors. This includes lack of dedicated climate funds, specialised skills and technologies for assessing climate risks and selecting the evidence-based and effective options for climate adaptation. These challenges directly affect the most vulnerable communities, who are already at the bottom of income poverty and lack the capacity to address climate impacts on their lives and livelihoods (Ali et al., 2023). Moreover, lack of political will at the higher decision-making level and low public awareness about climate risks now and in the future result in a lack of effective climate mainstreaming and resource allocation to address climate change challenges.

## Mainstreaming Climate Change into Development Planning

### Policy Integration Strategies

### Figure 2

*Climate Mainstreaming Process and Steps*




One of the key development challenges in the South Asian region is the lack of climate integration into various development policies and strategies to enhance climate resilience (Mirza, 2011). Given the increasing frequency and severity of climate-induced disasters—ranging from floods to droughts—

integrating climate considerations into policy, planning, and fiscal frameworks ensures that development gains are not only protected but made sustainable in the long term (Ayers & Dodman, 2010). This process involves embedding climate risk assessments into project appraisal cycles, aligning national and subnational budgets with climate adaptation goals, and enabling institutional coordination across planning, finance, and environmental bodies. In Pakistan's case, where public investment through the Public Sector Development Programme (PSDP) shapes much of the country's infrastructure and service delivery; the inclusion of climate screening in planning instruments such as PC-I to PC-V marks a critical institutional shift toward climate-informed development. Such integration requires not just technical tools and data, but also political commitment, capacity-building, and public engagement to ensure that planning becomes both inclusive and climate-responsive (Tanner & Allouche, 2011).

The effects of climate change are already manifesting in key sectors, further exacerbating Pakistan's current developmental challenges. It is necessary to incorporate climate change into development planning through ecologically focused initiatives to reduce vulnerabilities and move towards climate-compatible development. Goals related to climate change must be in line with national development priorities. Prioritising interventions that provide both development and climate benefits at the same time is crucial, as is arranging policy actions in a realistic order according to their relative urgency and overall impact. To carry out this agenda, institutional capacity must be increased. It is necessary to develop and implement the NAP and the NDC. A crucial first step is integrating climate priorities into larger development plans. Additionally, to increase the efficiency and transparency of public spending on climate actions, climate budgeting and risk screening for climate and disasters should be integrated into the public financial management system.

## Climate Risk Screening

The Planning Commission of Pakistan has developed a *Handbook on Climate Risk Screening for Public Sector Development Planning* to complement the revised *Manual for Development Projects*, which now includes climate risk screening across all project stages from PC-I to PC-V. Provincial Planning and Development Departments have adopted the revised manual. This handbook, aligned with SDG-13, provides practical guidance and user-friendly templates for Principal Accounting Officers (PAOs) and project proponents to integrate climate change considerations throughout the development project lifecycle—from Project Concept Note (PCN) to evaluation. As the first nationally approved guideline for climate screening, it introduces three assessment tools: Climate and Hazard Initial Assessment (CHIRA), Climate Adaptation and Resilience Assessment (CARA), and Climate Mitigation Assessment (CMA), aimed at evaluating project vulnerability and promoting climate-resilient development planning.

## Climate Integration into Budgeting and Financing

Integrating climate change into the public investment framework is a fundamental step for mainstreaming climate change into budgeting and financing. For example, the Climate-Public Investment Management Assessment (C-PIMA) by the International Monetary Fund (IMF) aims to incorporate climate aspects into the existing budgeting processes of the Government of Pakistan. C-PIMA evaluates the Finance Division's procedures and capacities for climate-resilient development investments. It evaluates mechanisms for identifying weaknesses and suggests incorporating improvements in public investments and institutional processes by making them climate-resilient and low-carbon (Hallegatte et al., 2019; IMF 2021).

The C-PIMA is designed to support systematic changes, facilitates access to climate finance, and aligns these with federal and provincial development and investment policies and strategies (UNEP, 2022). These institutional capacity-building mechanisms are especially relevant for vulnerable countries like Pakistan to reduce the impacts of climate change and related disasters for climate-resilient development planning and budgeting processes, including budget tagging. Multilateral Development Banks and other development partners have developed mandatory requirements for climate risk screening of all their development assistance for coordinated efforts to reduce climate-related impacts on their development programmes. Pakistan's C-PIMA also promotes knowledge exchanges and learning among similar countries in the South Asian region to promote climate-resilient development and financing. This collaborative element fosters a community of practice among developing nations, enhancing the collective capacity to pursue low-carbon, climate resilient development pathways (Feruglio et al., 2023)

### Integrating Climate Change in Sectoral Policies and Planning

Addressing climate change vulnerabilities in various sectors requires a continuous process of integrating climate adaptation and mitigation into sectoral policies (such as those relating to energy, water, and agriculture). This involves i) identification of gaps for climate integration into all sectoral policies, ii) identification of entry points for climate integration in line with the goals and objectives of NCCP 2021, NDCs 2021, NAP 2023, and SDG targets, iii) revision of sectoral policies, and vi) capacity and institutional strengthening for climate-sensitive project design and other organisational processes.

Pakistan's pathway to climate resilience hinges on a set of interrelated and urgent priorities. Chief among these is the need to enhance water management and governance, particularly through improved irrigation systems, the establishment of effective flood early warning mechanisms, and the exploration of alternative water sources such as desalination. In the agricultural sector, promoting climate-smart practices—including the adoption of drought-resistant crop varieties and diversification of livelihoods—offers a vital buffer against the growing threats to food security. To enhance urban resilience, it is important to invest in climate-proofing of infrastructure with interventions such as urban forests, green spaces, clean energy, and greening of public transport to reduce air pollution and improve urban populations' health outcomes.

### Mainstreaming Climate Change in Education

The higher education sector plays a key role in mainstreaming climate change for building long-term adaptive capacity and awareness among society by designing curriculum development and mandatory requirements of climate change subjects for undergraduate and graduate level degrees across academic disciplines in Pakistan. The Higher Education Commission of Pakistan (HEC) has initiated the process of designing climate-related modules such as climate data and modelling, climate-smart agriculture and food systems, policy and governance of climate change, gender and disaster risk reduction, and ecosystems and climate change. These modules will enable students and teachers to understand the scientific basis of climate change, socio-development processes and multidisciplinary perspectives on climate change. This will require sustained capacity development efforts and training to build knowledge and technical capacities of faculty and management for teaching climate-related subjects at all levels (UNESCO, 2021). Establishing institutional coordination mechanisms with universities and research institutes is also essential to promote applied research on climate vulnerabilities and impacts in key sectors such as agriculture, water resources, health, and urban development, especially in climate-sensitive regions of Pakistan. Collaborative research initiatives can inform policy, support innovation, and drive evidence-based adaptation strategies.

At the primary and secondary education levels, climate change education should be embedded within science, geography, and social studies curricula to nurture environmental awareness and responsible citizenship from an early age. Simplified modules on topics such as weather patterns, ecosystems, human-environment interactions, and sustainability practices can help instil foundational knowledge and climate-conscious values among young learners (Mihelcic et al., 2006).

### Institutional Structure for Addressing Climate Change

Despite the formulation of policies and institutional structures, Pakistan's efforts in tackling climate change face challenges in terms of ineffective coordination, lack of capacity and enforcement, and political prioritisation. The institutional framework includes the Ministry of Climate Change (MoCC) as the apex body with the mandate of designing climate policies and vertical and horizontal coordination among various ministries, departments and other organisations and actors. It also coordinates with the United Nations Framework Convention on Climate Change (UNFCCC) for mandatory reporting and data sharing (Umar et al., 2023). The recently formed Pakistan Climate Change Council serves as an apex body chaired by the Prime Minister to provide strategic guidance and ensure political commitment. Following the Pakistan Climate Change Act (2017), the Pakistan Climate Change Authority is also established to implement climate change policies and strategies by coordinating with various sectors to align national-level policy processes with the country's international obligations. The provincial Environmental Departments and Environmental Protection Agencies (EPAs) are mandated for enforcement of existing environmental regulations as well as devising rules and regulations for assessment of environmental impacts caused by regular development projects and programmes (Khalid, 2017).

Despite these policies and institutional frameworks, there are significant challenges that hamper meaningful integration and mainstreaming climate into provincial and federal level development planning. Some of these challenges include weak inter-ministerial and inter-departmental coordination, working in silos, lack of data generation and integration and capacity gaps. After the 18th Constitutional Amendment, environment and climate change subjects have been devolved at the provincial level, where provinces faced numerous challenges due to fragmented approaches, lack of synergy between federal and provincial climate policies, overlapping mandates and capacity gaps (Bakhsh et al., 2021). Moreover, limited technical capacity including inadequate budgetary allocations and lack of trained human resources are hindering MoCC's ability to effectively formulate and monitor the implementation of existing climate change policies (SDPI, 2024). This results in weaker climate integration into budgeting and planning processes and devising climate screening tools.

While policies and regulations exist, their effective implementation and monitoring remain a challenge. The absence of clear penalties for non-compliance and a lack of robust monitoring and evaluation systems undermines the impact of climate policies on the ground (Institute of International Peace Leaders, 2025). This is compounded by limited public awareness and political will, as noted in the original paper. Without sustained public pressure and strong political backing, climate change often takes a backseat to more immediate socio-economic concerns, hindering the prioritisation and effective implementation of long-term climate resilience strategies.

## Mobilising Climate Finance

Mobilising climate finance is a critical pillar in mainstreaming climate change into Pakistan's development planning and budgeting processes. Climate change presents a disproportionately high burden on developing nations, and Pakistan is a stark example. The devastating 2022 floods, triggered by an anomalous 500% increase in rainfall, impacted over 33 million people and caused economic losses of USD 30.1 billion—USD 14.9 billion in damages and USD 15.2 billion in broader economic losses (Development et al., 2022). In response, Pakistan submitted its updated Nationally Determined Contributions (NDCs) in 2021, committing to a conditional reduction of 50% in projected greenhouse gas (GHG) emissions by 2030. This ambitious target necessitates substantial financial investments—estimated at USD 101 billion for energy transition alone and an additional USD 40 billion to meet the 20% reduction target by 2030 (Nam, 2023). Adaptation needs are equally urgent, projected at USD 7–14 billion annually until 2050, with 70% of this earmarked for climate-resilient infrastructure. Given the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report's warning that the 1.5°C global warming limit is increasingly out of reach, the frequency and intensity of climate-induced disasters are expected to escalate (Traverso). Therefore, Pakistan must adopt a forward-looking, resilience-building approach that integrates climate adaptation, mitigation, disaster preparedness, and risk reduction into its national development agenda.

However, despite its high vulnerability, Pakistan's access to international climate finance has remained limited. To date, the country has received only USD 177.76 million through four projects funded by the Green Climate Fund (GCF), one project from the Adaptation Fund, and 19 projects supported by the Global Environment Facility (GEF) (Kalinowski, 2023). These figures fall short of the scale of investment needed to drive a transformative, climate-resilient transition. It is essential to capacitate the public sector to utilise the existing and future international climate finance in an effective manner by establishing collaboration with wide-ranging development partners such as the MDBs, UN agencies and other bilateral development partners to unlock climate-related financial flows and enhance institutional readiness. Public-private partnerships can also contribute by leveraging additional financing through innovation and technical expertise in key economic sectors such as renewable energy, sustainable agriculture, and climate-resilient infrastructure. This also includes blended finance mechanisms to incentivise the participation of the private sector to advance Pakistan's climate change goals (UNDP, 2022).

## Community Engagement and Capacity Building

Meaningful participation and engagement of local communities with targeted awareness raising and capacity development is a key element for climate change mainstreaming at all levels and ownership of resilience-building efforts. The means of community engagement include engaging with non-governmental organisations (NGOs) and other civil society organisations (CSOs) that represent the most vulnerable groups and have strong community networks to disseminate climate-related information in culturally

relevant and accessible formats (Devi & Salam, 2025). These groups can facilitate the participatory nature of vulnerability assessment to collect ground-level data and lived realities of people in vulnerable areas and help co-design grounded and context-specific climate mitigation and adaptation strategies. These groups and networks are also instrumental in building local technical and institutional capacity through training programmes in key areas and sectors such as climate-smart agriculture, water conservation, and disaster preparedness that affect people's livelihoods. This will ensure that climate policies, strategies and programmes are inclusive, targeted and sustainable and contribute towards climate resilience (Rana, 2019).

## Case Studies and Best Practices

### Successful Initiatives in Pakistan

There are a number of successful case studies from climate-induced flood-affected areas in Pakistan that can inform designing climate-resilient interventions to reduce long-term climate impacts.

For example, the storage capacity of Pakistan's major reservoirs, such as Tarbela, has been receding over the past few decades due to various reasons, including increased sedimentation caused by poor watershed management in catchment areas. In 2014, the provincial government of Khyber Pakhtunkhwa designed the Billion Tree Afforestation Project (BTAP) and planted one billion trees by 2017 all over the province, focusing on catchment areas of major reservoirs for watershed management. Scientific methods and tools such as Soil and Water Assessment Tool (SWAT) modelling were utilised to forecast Land Use and Land Cover (LULC) changes and their impact in three scenarios: before plantation (2013), after plantation of one billion trees (2017), and after planting ten billion trees (Shafeeque et al., 2022).

Another successful example is the "Ten Billion Tree Tsunami Program (TBTTP). The TBTT was designed at the national scale, covering the entire country in order to fulfil Pakistan's commitments under the Bonn Challenge. The goal of this massive project is to plant and preserve 10 billion trees around the country. In addition to encouraging a resilient, inclusive, and green recovery, the programme produces green jobs, manages wildlife parks, and plants 10% fruit trees to increase ecotourism. Both domestically and internationally, the effort has gained widespread recognition. The TBTTP's impact on land use, land cover, and regional climate was evaluated in one study by contrasting the pre-project (2015–2018) and post-project (2019–2023) periods. The overall forest area has increased by 3.36%. If global forest cover grows by 36%, coordinated regeneration might greatly reduce climate change and restore ecosystems, according to an article by Michael T. Niles (Aleem et al., 2024).

Balochistan Province (347,190 km² with 12.34 million people) faces challenges in farming because of water shortages, droughts, and weak infrastructure. The Balochistan Water Resources Development Sector Project was implemented in the Zhob and Mula river areas to improve farming, raise farmers' incomes, and improve water management. The project costs $136.14 million, with funding from the ADB ($100 million), the government of Pakistan ($31.14 million), the Japan Fund for Poverty Reduction ($3 million), and the High-Level Technology Fund ($2 million). The project improved irrigation (17,225 hectares), benefiting more than 40,000 farmers, and enhanced the province's irrigation infrastructure, improving land and soil conservation, water harvesting and increased water storage capacity. The project contributed to reducing the risks of major climatic extremes for drought and flood mitigation as well as rangeland management.

### Lessons from Other Countries

There are several noteworthy global case studies on climate-resilient projects, focusing on afforestation and water management. In the village of Douar Elounda in Morocco's High Atlas Mountains, the Amsing Association implemented a community-based adaptation programme combining reforestation with integrated water management. The initiative included planting cypress, apple, and walnut trees, along with constructing water towers and rock dams, to reduce erosion, improve water availability, and enhance community resilience to climate variability (Reis & Dutal, 2019).

To combat desertification and restore degraded lands in the Sahel, an ambitious project, the Great Green Wall, was designed for planting an 8,000 km long belt of vegetation and forests across eleven countries in the African region. The afforestation activities contributed to improving soil fertility and carbon sequestration, enhancing food security, rehabilitating millions of hectares of degraded land, and

creating green jobs (Madekivi, 2017). In 2008, another initiative in South Africa planted more than 500,000 indigenous plants in the buffer zone at the Buffelsdraai Landfill Site, which resulted in offsetting GHGs that were caused by the FIFA World Cup in 2010. The project resulted in carbon sequestration and generated numerous livelihood opportunities for local and affected communities (Mugwedi et al., 2018).

## Conclusion and Way Forward

This paper found that mainstreaming climate change into Pakistan's development planning and budgeting processes is not an option anymore. It has now become an urgent necessity to reduce climate impacts and safeguard decades of development gains from the changing climate's impacts. The increasing intensity and frequency of climate-related disasters, such as recurring floods and droughts across the country, are increasing already higher levels of poverty and placing strains on our fragile and agriculture-based economy. The paper suggests several pathways for mainstreaming climate change considerations: i) integrating climate risk assessments across all stages of development planning and programming; ii) aligning budgetary allocations with climate change risks and goals; iii) institutional mechanisms for inter-departmental and inter-provincial coordination. The adoption of climate-risk screening mechanisms and tools developed by the Planning Commission is a step in the right direction for climate-informed decision-making coupled with capacity-building initiatives. Integrating climate considerations into public financial management systems, such as the C-PIMA framework developed by the IMF, is an initial step to ensure that development investments are climate-proof and low-carbon.

Our findings also highlight several challenges for climate-resilient development planning and budgeting, such as weak institutional coordination among key actors, technical capacities, availibility of sufficient financial resources, low public awareness and a clear political will.

A multi-faceted approach is required to address these challenges, including building capacities of key actors and institutions at all levels, increasing wider public engagement through awareness and education, and ensuring sustained political commitment to address climate-induced long-term challenges. The paper also highlights some successful programmes and strategies in the areas of afforestation and water management that demonstrate the potential for reducing climate-related challenges. The next steps involve building on these initiatives to scale up similar initiatives and mobilising domestic and international climate finance for translating ambitious policy goals into actions. The ambitious goal of mainstreaming climatic changes in Pakistan's development planning requires a fundamental shift in the mindset of all actors. It requires an understanding that climate change is a cross-cutting challenge and affects all aspects of society and sustainable development goals.

## Policy Recommendations and Way Forward

Some of the policy recommendations include strengthening interdisciplinary collaboration, enhancing institutional capacity, and increasing climate finance to successfully address climate change challenges. National and provincial development planning such as the Public Sector Development Programme (PSDP) and Annual Development Plans (ADP) need to systematically incorporate climate change at all stages of formulation. The updated "Planning and Project Manual" of the Planning Commission now includes climate risk screening guidelines, which must be implemented at all stages of project design, appraisal, implementation and monitoring. Establishment of dedicated and specialised climate change units within the planning and development departments is essential for ensuring climate integration into development planning and budgeting. Since climate change is a cross-cutting challenge, sectoral policies and programmes must climate-proof their projects by following these guidelines in their budgetary frameworks to account for the costs of climate action. Moreover, capacity-building efforts through designing climate change modules for regular training of government officials in the Civil Services Academies curriculum are steps in the right direction.

Adopting a comprehensive structure and funding plan for climate and catastrophe resilience is also necessary, combining cutting-edge tools like carbon pricing systems and green bonds. For climate and environmental concerns to be mainstreamed into development planning, the suggested provincial action plans must be implemented. The last step in encouraging climate-aligned investment is greening the financial system through taxonomies, disclosure requirements, regulatory changes, and the creation of sustainable finance products.

## References


Aleem, M., Khan, S. N., Akbar, M. U., Arshad, A., Alsubhi, Y., Pandey, M., Javaid, A., Aleem, M., Ali, M. H., & Mansaray, A. (2024). Ten Billion Tree Tsunami Project Reveals Climate Change Mitigation and Precipitation Increase in Khyber Pakhtunkhwa Province, Pakistan. *Earth Systems and Environment*, 1-18. https://doi.org/10.1007/s41748-024-00533-7

Ali, S., Khan, F., & Ahmed, R. (2023). Climate change vulnerability and adaptation strategies in marginalized communities of Pakistan. *Journal of Environmental Management*, *330*, 117145.

Ayers, J., & Dodman, D. (2010). Climate change adaptation and development I: the state of the debate. *Progress in Development studies*, *10*(2), 161-168. https://doi.org/10.1177/146499340901000205

Bakhsh, K., Latif, A., Ali, R., & Yasin, M. A. (2021). Relationship between adaptation to climate change and provincial government expenditure in Pakistan. *Environmental Science and Pollution Research International*, *28*(7), 8384–8391. https://doi.org/10.1007/s11356-020-11182-4

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27–40. https://doi.org/10.3316/qrj0902027

Development, M. o. P., Development, & Initiatives, S. (2022). PAKISTAN FLOODS 2022: post-disaster needs assessment. In: Government of Pakistan, Asian Development Bank, European Union, United ….

Devi, S. H., & Salam, J. (2025). Resilience, Mitigation and Adaptation Strategies to Combat Climate Change for a Sustainable Future. *International Journal of Environment and Climate Change*, *15*(4), 423-438. https://journalijecc.com/index.php/IJECC/article/view/4822

Feruglio, N., Saxena, S., & von Thadden-Kostopoulos, S. (2023). Climate Public Investment Management Assessment (C-PIMA). *Assessment (C-PIMA)*.

Feulner, G. (2015). Global challenges: Climate change. *Global Challenges*, *1*(1), 5. https://doi.org/10.1002/gch2.1003

Gasper, D., Portocarrero, A. V., & St.Clair, A. L. (2013). The framing of climate change and development: A comparative analysis of the Human Development Report 2007/8 and the World Development Report 2010. *Global Environmental Change: Human and Policy Dimensions*, *23*(1), 28–39. https://doi.org/10.1016/j.gloenvcha.2012.10.014

Guest, G., MacQueen, K. M., & Namey, E. E. (2011). *Applied thematic analysis*. SAGE Publications.

Hallegatte, S., Maruyama Rentschler, J. E., & Rozenberg, J. (2019). Lifelines: The Resilient Infrastructure Opportunity (Vol. 2).

Hussain, A., & Khan, M. A. (2021). Institutional barriers to climate change adaptation in developing countries: A case study of Pakistan. *Climate Policy*, *21*(4), 534-548.

Hussain, M. A., Shuai, Z., Moawwez, M. A., Umar, T., Iqbal, M. R., Kamran, M., & Muneer, M. (2023). A review of spatial variations of multiple natural hazards and risk management strategies in Pakistan. *Water*, *15*(3), 407. https://doi.org/10.3390/w15030407

Jamali, H. (2015). Framing climate change adaptation: from international discourse to local realities: a case study from Pakistan. PhD Thesis. Graduate Institute of International and Development Studies (IHEID), Geneva, Switzerland

Jamali, H., Jamali, M., Hayat, S., & Iqbal, J. (2023). Indus river delta: Contested narratives in the climate of change. *Asian Journal of Social Science*. https://doi.org/10.1016/j.ajss.2023.06.001

Kalinowski, T. (2023). The Green Climate Fund and private sector climate finance in the Global South. *Climate Policy*, 1–16. https://doi.org/10.1080/14693062.2023.2276857

Khalid, I. (2017). The current state of environmental impact assessments (EIAs) in Pakistan and the way forward. *Islamabad: Heinrich Böll Foundation. Accessed February 12*, 2019.

Lebel, L., Li, L., Krittasudthacheewa, C., Juntopas, M., Vijitpan, T., Uchiyama, T., & Krawanchid, D. (2012). Mainstreaming climate change adaptation into development planning. *Bangkok: Adaptation Knowledge Platform and Stockholm Environment Institute*, *8*.

Madekivi, T. (2017). Effectiveness of recycling initiatives in the city of Lusaka, Zambia: case of Ng'ombe compound.

Mall, R. K., Srivastava, R. K., Banerjee, T., Mishra, O. P., Bhatt, D., & Sonkar, G. (2019). Disaster risk reduction including climate change adaptation over south Asia: challenges and ways forward. *International Journal of Disaster Risk Science*, *10*, 14-27. https://doi.org/10.1007/s13753-018-0210-9

Mihelcic, J. R., Phillips, L. D., & Watkins, D. W., Jr. (2006). Integrating a global perspective into education and research: Engineering international sustainable development. *Environmental Engineering Science*, *23*(3), 426–438. https://doi.org/10.1089/ees.2006.23.426

Mirza, M. M. Q. (2011). Climate change, flooding in South Asia and implications. *Regional Environmental Change*, *11*(S1), 95–107. https://doi.org/10.1007/s10113-010-0184-7

Mugwedi, L. F., Ray-Mukherjee, J., Roy, K. E., Egoh, B. N., Pouzols, F. M., Douwes, E., Boon, R., O'Donoghue, S., Slotow, R., Di Minin, E., Moilanen, A., & Rouget, M. (2018). Restoration planning for climate change mitigation and adaptation in the city of Durban, South Africa. *International Journal of Biodiversity Science, Ecosystems Services & Management*, *14*(1), 132–144. https://doi.org/10.1080/21513732.2018.1483967

Nam, V. (2023). Updated Nationally Determined Contribution (NDC).

Owen, G. (2020). What makes climate change adaptation effective? A systematic review of the literature. *Global Environmental Change*, *62*, 102071.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (Vol. 3). SAGE.

Rana, A. W., Pakistan Agricultural Capacity Enhancement Program PACE, & International Food Policy Research Institute (IFPRI). (2019). *Comprehensive institutional review for climate resilient agriculture*. International Food Policy Research Institute. https://doi.org/10.2499/p15738coll2.133441

Ravindranath, N. H., Sathaye, J. A., Ravindranath, N., & Sathaye, J. A. (2002). *Climate change and developing countries*. Springer.

Rehmat, A., Ahmad, S. M., Danish, S., Umar, A., Khaver, A., & Khan, R. M. (2023). Claiming reparation for loss and damage due to floods 2022: the case of Pakistan. *Sustainable Development Institute.* https://sdpi.org/assets/lib/uploads/Claiming_Reparation_for_Loss_and_Damage_Due_to_Floods2022.pdf

Reis, M., & Dutal, H. (2019). Determining the effect of deforestation on sustainable water supply in a semi-arid mountainous watershed by using storm water management model. *International Journal of Global Warming*, *17*(1), 108-126. https://doi.org/10.1504/IJGW.2019.096767

Scoville-Simonds, M., Jamali, H., & Hufty, M. (2020). The Hazards of Mainstreaming: Climate change adaptation politics in three dimensions. *World Development*, *125*(104683), 104683. https://doi.org/10.1016/j.worlddev.2019.104683

Shafeeque, M., Sarwar, A., Basit, A., Mohamed, A. Z., Rasheed, M. W., Khan, M. U., Buttar, N. A., Saddique, N., Asim, M. I., & Sabir, R. M. (2022). Quantifying the impact of the Billion Tree Afforestation Project (BTAP) on the water yield and sediment load in the Tarbela reservoir of Pakistan using the SWAT model. *Land*, *11*(10), 1650. https://doi.org/10.3390/land11101650

Sperling, J. (2003). Eurasian security governance: new threats, institutional adaptations. *Limiting institutions*, 3-26.

Tanner, T., & Allouche, J. (2011). Towards a new political economy of climate change and development. *IDS bulletin*, *42*(3), 1-14. https://doi.org/10.1111/j.1759-5436.2011.00217.x

Traverso, A. An Engineering Perspective on Climate Change: Mitigation or Adaptation? *Available at SSRN 5224500*.

Umar, M. A., Danish, S., Rehmat, A., Khaver, A., Khan, R. M., & Ahmad, S. M. (2023). PAKISTAN'S INSTITUTIONAL CAPACITY FOR CLIMATE ACTION: AN ANALYSIS. *SDPI. Retrieved Pakistan's Institutional Capacity for Climate Action: An Analysis…-publication details.*