

IMPACT OF CLIMATE CHANGE ON PAKISTAN AS A NON-TRADITIONAL SECURITY THREAT

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Abstract

Climate change has developed as a non-traditional security threat with far-reaching global implications, yet international responses remain fragmented and inadequate. This article examines climate change as a critical security challenge for Pakistan, a country disproportionately vulnerable despite its minimal contribution to global emissions. The study first outlines the global dimensions of the climate crisis and gaps in response. It then assesses Pakistan's specific exposure, highlighting impacts on water security, food systems, extreme weather events, and internal displacement, through case studies and their cascading effects on political stability, economic resilience, and national security. The analysis identifies key governance deficits at federal and provincial levels, including weak institutional coordination, policy implementation gaps, and insufficient climate financing. In response, the article proposes a renewed governance framework centered on institutional strengthening, inter-provincial coordination, and mainstreaming climate risk into security planning. Additional measures include capacity building of climate change institutions, scaling adaptation strategies for vulnerable sectors, and pursuing low-carbon mitigation pathways. Likewise, social sector reforms measures in the academic domain and climate change diplomacy have also been touched upon. The findings underscore that addressing climate change as a security threat in Pakistan requires moving beyond environmental ministries to a whole-of-government approach integrating security, development, and governance reforms.

Keywords: Climate Change, Environmental disasters, Carbon Emissions, Global North, Greenhouse gases

Introduction

The twenty-first century has witnessed the transformation of security discourse beyond traditional military threats to include non-traditional challenges that undermine state stability and human well-being. Among these, climate change has emerged as a “threat multiplier” that exacerbates existing vulnerabilities and generates new risks across economic, social, and political domains. Despite growing scientific consensus and repeated warnings from the Intergovernmental Panel on Climate Change, the global response remains characterized by uneven commitments, financing gaps, and a persistent deficit in implementation of the Paris Agreement. This mismatch between the scale of the crisis and the adequacy of collective action has left climate-vulnerable states to bear disproportionate costs.

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Pakistan presents a compelling case of climate change as a non-traditional security threat. Contributing less than 1% to global greenhouse gas emissions, the country ranks consistently among the top ten most climate-vulnerable nations. The implications extend far beyond environmental degradation. Receding glaciers and erratic monsoons threaten water security for over 220 million people. Rising temperatures and shifting rainfall patterns undermine agricultural productivity, endangering food security and rural livelihoods. The increasing frequency of extreme weather events - from the 2022 super-floods to recurring heat waves and droughts - has triggered internal displacement, strained urban infrastructure, and intensified resource competition. These climate-induced stresses have direct and indirect consequences for national security, fueling socio-economic instability, exacerbating regional disparities, and complicating internal security management.

Yet Pakistan's capacity to respond is constrained by governance challenges at both federal and provincial levels. Institutional fragmentation, weak coordination between climate and security agencies, limited technical capacity, and underfunded adaptation programs have hindered effective policy execution. While national climate policies and provincial action plans exist on paper, translating them into measurable resilience remains elusive.

This article examines climate change as a non-traditional security threat to Pakistan by first situating the issue within the broader global context and identifying gaps in international responses. It then analyses the specific pathways through which climate impacts threaten Pakistan's national security, followed by a critical assessment of governance and institutional shortcomings. Finally, it proposes a set of measures emphasizing renewed governance focus, institutional reform, and integrated adaptation and mitigation strategies to strengthen Pakistan's climate resilience and security posture.

Establishing Context for the Issue beyond Borders

As the policy makers around the globe gathered for COP-30 in Brazil, marking it the completion of three decades of collective efforts by the global community against the peril of Climate change, the outcome is too little too late since everybody's problem becomes nobody's problem. Climate change is no longer a distant environmental concern but an urgent, multidimensional crisis that is reconfiguring global security and human survival. Insufficient global action has escalated Climate change into a severe existential threat, where the world is now confronting this alarming reality of Climate change, pushing it to the brink. Fueled by carbon emissions, fossil fuels, and deforestation, global warming triggers devastating consequences- melting glaciers, rising sea levels, altered rain patterns, and more frequent heat waves. Persistent rise in heat since the last decade, surpassing all previous records, underscores the urgency of the situation. Recent studies

illustrate shifts in animal breeding and migratory patterns, while mountain glaciers' rapid decline imperils water supplies for millions. With the global sea level rising, surpassing 2.5 centimetres in the past decade alone, the climate crisis demands immediate attention.

Broad Contours of Global Response

The global response is spearheaded by UNO in the form of UNFCCC, UNDG⁸, and other major United Nations agencies (UNEP, WMO, IPCC) through a three-pronged approach with measures comprising: adaptation/ mitigation, sustainable development, and resilience. In the implementation of Global policies, various platforms working at the regional level are playing their part through collective implementation models. The success of these models varies, subject to the seriousness and strength of financial support. Key role towards implementation has to come from individual countries that have to mount their response through legal machinery at various tiers in implementing self-committed pledges towards Climate change in the shape of National Determined Contributions (NDC) in line with Global milestones. Despite formal global guidance with multi-faceted implementation efforts at the regional/ individual countries level, as well as other departments and institutions, the world has not been able to harness the phenomenon. While battling the problem, a deep divide can be witnessed between the Global North and the Global South in their stance towards tackling the threat. Most recent findings of the Global Stock Take (GST) point in the same direction. Projected scenarios calculated by various scientific firms display a very dismal future and decades demanding a very high set of actions by all to reverse the effects.

Pakistan's Climate Odyssey: Navigating Challenges and Embracing Resilience

Exploring the Impact of Climate Change on Pakistan

Nestled within its diverse topography, Pakistan is a land of contrasting landscapes, from soaring mountain ranges to arid plains. Yet, this very diversity contributes to the complexity of its climate, rendering it susceptible to an array of physical and environmental hazards. From floods and earthquakes to droughts, cyclones, and the looming threat of forest fires, Pakistan finds itself at the intersection of climate challenges.

Figure -1: Provincial Vuln Risk Index - Worked out to ascertain the spectrum of climate hazards

Province	Hazards							
	Flood	Landslide	Earthquake	Tsunami	Cyclone	Drought	Avalanche	GLOF
Punjab	Very High	Low	High	No Hazard	Low	Medium	Low	No Hazard
Sindh	Very High	Low	Medium	Low	Medium	Very High	Low	No Hazard
KPK	Very High	High	Very High	No Hazard	Low	Medium	Medium	Medium
Balochistan	Very High	Low	High	No Hazard	Low	Very High	Low	No Hazard
G. Baltistan	High	Very High	High	No Hazard	Low	No Hazard	High	High

Severity Index: Very High (Red), High (Orange), Medium (Light Green), Low (Green), Very Low (Blue), No Hazard (Grey)

Despite contributing minimally to global greenhouse gas (GHG) emissions, Pakistan stands at the crossroads of climate vulnerability and disaster risk, ranking among the top due to climate change impacts. A stark projection looms over the nation, with estimated GHG emissions set to triple by 2030, underscoring the urgency for decisive and immediate climate action.¹⁰

Temperature Rise and Climatic Extremes

Pakistan experiences a unique pace of climate change, with a temperature rise occurring twice as fast as the global mean temperature increase.

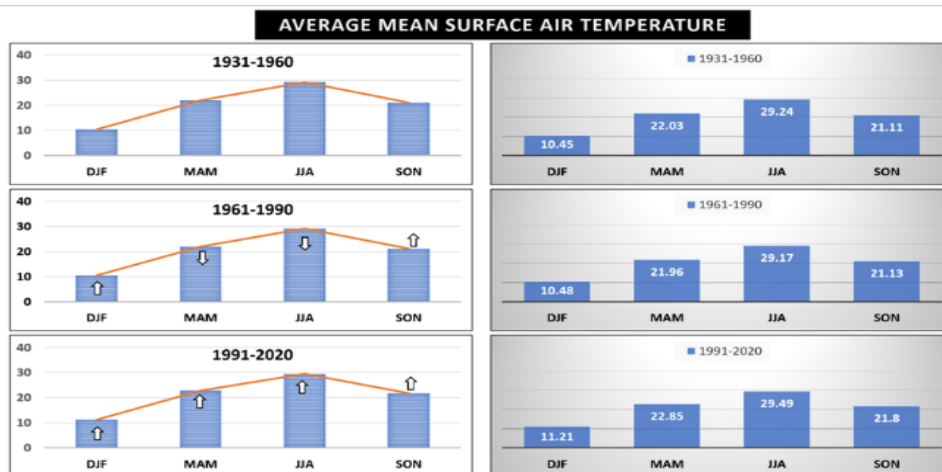


Figure - 2 (as referenced): Thirty-year comparative analyses demonstrate rising temperature trends across all four seasons, confirming that warming is not confined to summers but extends to spring, autumn, and even winter. This pattern is reshaping Pakistan's ecological and economic systems in profound ways.

These climatic shifts have not only altered the landscape but have also triggered a surge in extreme weather events since the turn of the century.

Climate Change & Its Impacts on Pakistan

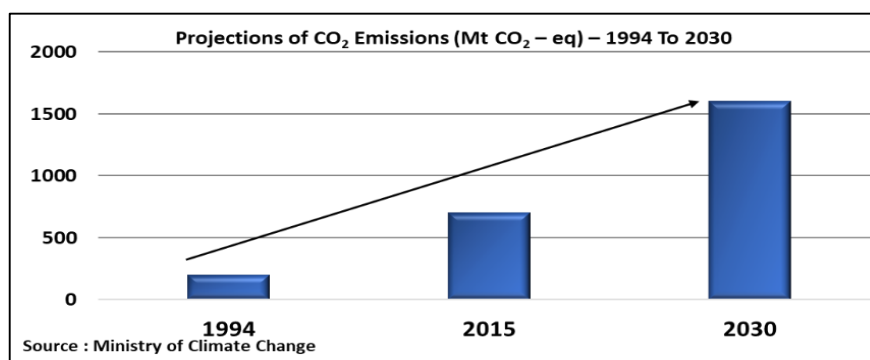
Pakistan's Greenhouse Gas (GHG) Contributions. Pakistan is an almost negligible contributor to global warming / Climate change. The details of Pakistan's contribution towards Climate change in various fields show that energy and agriculture are the main sectors contributing to emissions.

- Energy Sector - 0.45%.
- Modern Agriculture - 0.34%.
- Industrial Processes - 0.05%.
- Land Use Activities & Forests - 0.02%.
- Waste - 0.02%.

However, the emission projections of 2030 depict a 300 times rise as compared to 2015, as follows:-

(Statistics from Pakistan Report submitted to UN)

It clearly indicates the fact that, despite being among the lowest in GHG emissions, our emission projections are very dismal



Summary of Case Studies

To assess the socio-economic impacts of climate change on Pakistan, six representative case studies have been examined: the 2005 Earthquake, 2010 and 2022 Floods, 2020 Locust Attack, winter smog events, the 2022 heat wave, and Glacial Lake Outburst Floods (GLOFs). These cases, spanning natural disasters, climate-induced hazards, and environmental shocks, reveal recurring themes of systemic vulnerability, governance gaps, and resilience deficits.

Key conclusions of these studies are: -

- Permanent vulnerability of the country to earthquakes and floods due to its geographic location.
- Lack of infrastructure and meagre resources exacerbate existing vulnerabilities.
- Recurrence of floods and earthquakes leading to food and water security issues.
- Severe impacts of hazards on the health sector.
- Economic over-taxation of the country is impeding routine development.

Impacts on Society and National Security

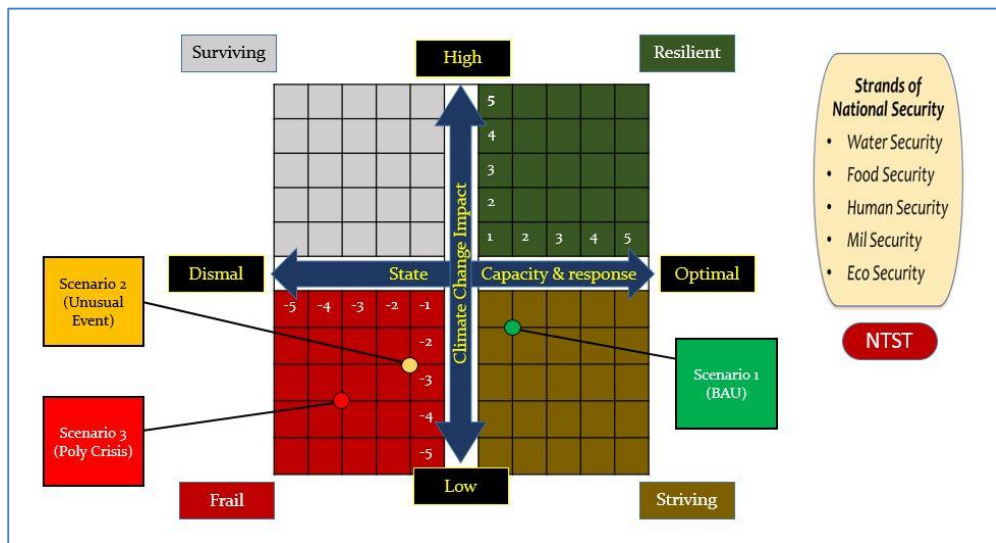
The consequences of these climatic upheavals extend far beyond environmental shifts, permeating every facet of society. The intricate interplay of national security strands encompassing water, food, economic, health, and physical security has created a web of challenges that threaten to unravel the fabric of social cohesion. The increased frequency and magnitude of extreme weather events since 2000 have left an indelible mark on the socio-economic landscape of Pakistan. As the nation faces the aftermath of floods, the strain on water resources, disruptions in food supply chains, and the toll on public health, the spectre of social unrest looms large. The challenges posed by climate change have become a litmus test for national integration, requiring a holistic response to safeguard the well-being of the population.

Current and Projected Scenarios

Keeping in view, strands of national security being affected in Pakistan under different scenarios (Business as usual (BAU), Single Climate Event or a Poly Crisis¹¹ *vis-a-vis* persistent sectoral vulnerabilities coupled with inadequacies in response and limited capacity of disaster preparedness, climate change, manifested as non-traditional security threats to Pakistan; drawing the country towards serious security implications in the near future. An endeavour has been made to ascertain Pakistan's future under a cross-section of two basic parameters, i.e., climate change impact *vis-a-vis* state capacity and response as under: -

- | | | |
|--|---|---------------------|
| • Scenario 1 (BAU; Existing Situation) | - | Striving |
| • Scenario 2 (Single Unusual Event) | - | Mild to Med Frail |
| • Scenario 3 (Multiple Unusual Events) | - | Med to Severe Frail |

Scenario Matrix (2025–2035): Climate Hazard Severity × State Capacity



Pakistan's climate change mosaic can be predicted in event of unfolding of these scenarios to be moving from surviving to frail category; which in case of poly crisis can impinge upon the national security¹

Implications / Challenges due to Climate Change Impact

Various national security strands such as Water, Food, Health, Military, and Economy are already under stress due to Climate Change. In case of a single unusual event, it would further exacerbate the stress. Like, in case of poly crisis, water sector may face early scarcity, food sector may face a decrease of agricultural production, health sec may cripple in its responses, the military may face degradation of equipment, and economic impact can be envisaged in light of the existing economic situation. The combined effect of all these strands would impinge directly upon the country's national security.

Key conclusions of challenges in national security strands are: -

- Impact of climate change will result in aggravated existing social inequalities of resources, thus leading to resource scarcity.
- Mass migration leads to the displacement of people and causes a demographic shift.
- Having the potential to lead to socio- economic instability and conflicts.
- The interface of all national security strands has the potential to intensify social unrest and challenge national integration.

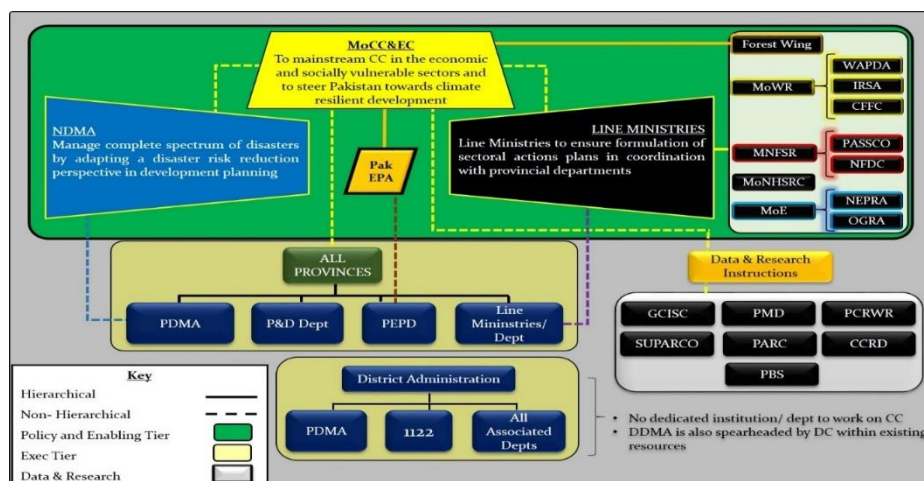
Pakistan's Climate Governance and Response - Upholding Commitments and Implementing Strategies

Existing Hierarchical Landscape of Climate Governance

At the core of Pakistan's climate governance lies a two-tiered structure: The Ministry of Climate Change (MoCC) and the Environmental Change (EC) serve as the policy and enabling tiers at the federal level. Operating in tandem are associated departments, comprising line ministries and departments, each contributing to the intricate mosaic of climate governance. Post the 18th Amendment, the political landscape introduced a transformative shift. Provinces and local governments became the implementation tier, fostering localized responses to climate challenges. Within the overarching umbrella of the MoCC and EC, specialized line ministries such as Water Resources (MoWR), National Food Security and Research (MNFSR), National Health Services, Regulations and Coordination (MoNHSRC), and Energy (MoE) play pivotal roles. The decentralization of governance is further exemplified by the devolution of Disaster Management, with districts and municipalities constituting the primary tier of response. Provincial Disaster Management Authorities (PDMA) operate as the second tier at the provincial level, while the National Disaster Management Authority (NDMA) holds the third tier at the federal level.

Recognizing the multifaceted threats posed by climate change, stakeholders across various sectors are actively engaged in formulating plans and executing actions. The Energy, Industry, Transport, Building, Forest, Agriculture, and Solid Waste Management sectors are key battlegrounds against the looming climate crisis. As the climate variability and change threats persist, a slew of plans and actions have been set into motion each catering to the unique challenges within their respective domains.

Figure - 4 - CC framework at federal and provincial level with associated



The involvement of Civil Society and Academia, albeit marginal, signifies a growing awareness of the collective responsibility in combating climate change. Yet, the Private Sector's role demands a critical review and redirection. The potential of private enterprises in contributing to climate resilience remains largely untapped, urging a recalibration of efforts and contributions.

The Crucial Role of Armed Forces

Amidst these efforts, the Armed Forces of Pakistan emerge as instrumental players in the nation's climate mitigation and response strategies. However, the enormity of the challenge demands a deeper and more extensive engagement. The Armed Forces, with their structured approach and operational prowess, hold the potential to act as catalysts in driving transformative change. Collaborations and partnerships between military authorities, policy-makers and civilian agencies can amplify the impact of climate action initiatives.

Unravelling Climate Governance in Pakistan: A Mosaic of Challenges and Opportunities

Pakistan's journey through the tumultuous landscape of climate change demands a unified and resolute response. As the nation confronts its vulnerabilities and charts a path toward resilience, the intertwined strands of national security, social stability, and environmental conservation form the essence of a comprehensive strategy. Pakistan's odyssey through climate challenges is a testament to the urgency of collective action and global cooperation in safeguarding our shared planet. In the face of the escalating climate crisis, Pakistan faces complex challenges within its existing climate governance framework. The intricacies extend from the federal to the provincial levels, intertwining legal, administrative, and financial snags that hinder the creation of a cohesive and effective response mechanism.

Vision Deficit: A Federal Conundrum

One of the overarching challenges lies in the deficit of a clear vision, particularly at the federal level. The federal government and provinces engage in collaborative efforts post-18th amendment, addressing legal challenges. However, the effectiveness is marred by administrative, jurisdictional, financial, and capacity issues. Legislative shortcomings act as shackles, preventing the formulation of a unified and all-encompassing action plan. At the provincial level, a myriad of issues compound the challenges. The absence of focal authorities dedicated to climate change, coupled with a lack of common understanding and legal conflicts, underscores the need for a more harmonized approach. Divergent

priorities at federal and local levels further complicate the landscape, hindering the seamless execution of climate policies.

Sectoral Fragmentation: Expanding the Divide

Within the sectoral domain, the inability to seamlessly integrate sectors with climate change-related aspects emerges as a significant hurdle. Existing policies and action plans lack the translation into adaptive actions and mitigation measures. A comprehensive focus is yet to be formalized, and the initiation of follow-up action plans remains sporadic, with limited progress observed in select sectors.

Economic Downturn and Global Funding Woes

Dwindling economic indicators amplify the challenges, rendering Pakistan unable to execute essential climate change-related actions. The country faces a double bind with meager assistance from international climate change funding sources, further restricting its capacity to address the unfolding crisis. Global initiatives, including Carbon Markets, Climate Insurance and Green Alliances, remain largely untapped, representing a missed opportunity for bolstering Pakistan's climate resilience.

Tracking Targets and Policy Ineffectiveness

Pakistan's revised Nationally Determined Contributions (NDCs) Report-2021 sets ambitious cumulative greenhouse gas (GHG) reduction targets¹⁴. However, the absence of a mechanism to track NDCs through private sector entities poses a significant hurdle. The Global Change Impact Studies Centre (GCISC)¹⁵, responsible for tracking progress, struggles to gather comprehensive data across various sectors. Policy measures in critical sectors such as energy, agriculture, and Land Use Changes and Forestry (LUCF) prove ineffective, exacerbating mitigation challenges. Simultaneously, the unchecked consumption of fossil fuels by both public and private sectors contributes substantially to greenhouse gas (GHG) emissions, further escalating the climate crisis.¹⁶

Adaptation, Stagnation, and Policy Voids

The non-implementation of the National Adaptation Plan (NAP) 2023-2030¹⁷ and the persistence of outdated practices in crucial sectors, including water, agriculture, and forestry, severely impede Pakistan's ability to adapt to climate change. The absence of policy and planning bodies in health, biodiversity, gender, and urban resilience sectors compounds existing challenges. The adaptive capacity of the nation remains stunted, leaving vulnerable communities exposed to the escalating impacts of a changing climate.

Snags in Disaster Management

The challenges faced by Pakistan's National Disaster Management Authority (NDMA) highlight the urgent need for significant changes in how we address climate issues. The core impediments, ranging from outdated technology to financial constraints, intertwine to hamper the effectiveness of the NDMA in addressing the escalating impacts of climate change. The potential restructuring of disaster management at the federal level, integrating it into the MoCC hierarchy, could be a pivotal step, streamlining efforts towards a unified and effective response.

Impact of Rapid Population Growth

Pakistan faces rapid population growth, which has a direct impact on excessive fossil fuel consumption. The burgeoning population exacerbates the strain on resources, intensifying the vulnerability of communities to climate risks. The trajectory of current trends forecasts an alarming future, where a growing population is increasingly exposed to the far-reaching impacts of climate change. From compromised health and food security to economic instability, the projected fallout paint a stark picture of the vulnerabilities that lie ahead. Urgent and concerted efforts are imperative to address the root causes of these challenges and pave the way for a sustainable and resilient future for Pakistan.

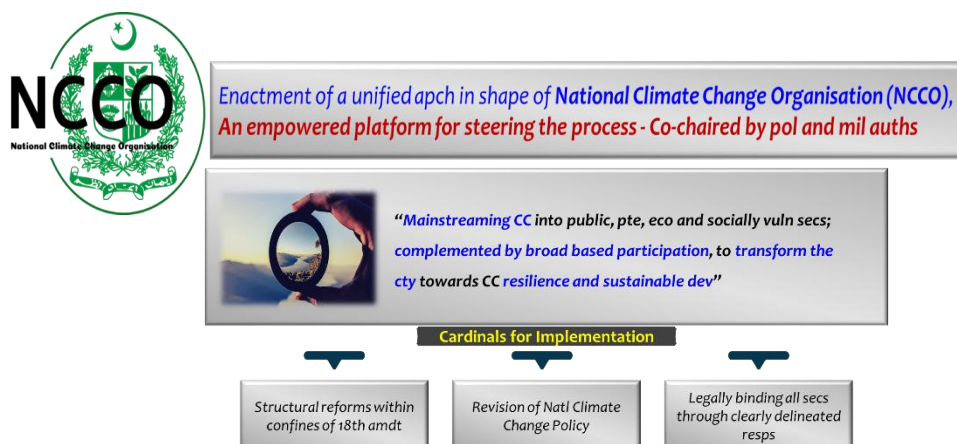
A Call for Transformative Measures

In navigating these challenges, Pakistan stands at a crossroads – a junction where transformative measures can reshape the narrative of climate governance. The complexities of climate change require a sophisticated and flexible approach, blending adaptation and mitigation strategies seamlessly. Given Pakistan's complex challenges, it's essential to recalibrate its climate governance framework. A transformative vision needs to be etched at the federal level, transcending administrative barriers and fostering synergy among provinces. Legislative gaps must be addressed, empowering the nation to enact an all-encompassing climate action plan. Sectoral integration demands urgency, with policies translating into actionable measures. Economic revival must be coupled with strategic global engagements, leveraging initiatives like Carbon Markets and Climate Insurance to secure necessary financial support. The tracking and consolidation of progress demand an overhaul, involving private sector entities as integral partners. To bolster adaptation efforts, the National Adaptation Plan (NAP) must not remain a dormant document; instead, its implementation should be fast-tracked. Crucial sectors like water, agriculture, and forestry necessitate innovative policies and practices, steering Pakistan towards climate resilience. The inclusion of policy and planning bodies in health, biodiversity, gender, and urban resilience sectors is a prerequisite for addressing the comprehensive impact of climate change on communities.

Revitalizing Pakistan: A Blueprint for Climate Resilience

In the relentless pursuit of a sustainable and climate-resilient future for Pakistan, a visionary set of recommendations emerges, aiming to reconfigure the national response to Climate change (CC). This strategic blueprint underscores the urgency of mainstreaming Climate change considerations across all sectors and fostering broad-based participation.

Figure 5 - National Climate Change Organization (NCCO)



The proposed vision advocates for a National Climate Change Organization (NCCO)¹⁸ to steer the nation towards a transformative and sustainable trajectory.

Renewed National Focus: Mainstreaming Climate Change

The heart of the proposed vision of NCCO lies in the paradigm shift towards mainstreaming climate change considerations into the fabric of public, private, economic, and socially vulnerable sectors. This all-encompassing approach seeks to facilitate a comprehensive transformation, propelling Pakistan towards resilience and sustainable development. To translate this vision into reality, a pivotal recommendation calls for the reconfiguration of the national response under a climate emergency. This entails the establishment of the NCCO, an integrated and unified approach that harmonizes Climate change governance with policies at both federal and provincial levels.

The key pillars of this approach include effective governance, clearly designated mandates, and a systematic, legally binding integration of all sectoral and cross-sectoral aspects. An innovative suggestion involves the creation of an empowered platform to steer the NCCO process, co-chaired by political and military authorities. This collaborative effort aims for optimal horizontal-vertical synergy, drawing inspiration from successful models such as the National Command and Operation Centre (NCOC), Financial Action

Task Force (FATF), and Special Investigation and Forensic Cell (SIFC). The proposed platform is envisioned as a dynamic and responsive engine, facilitating efficient coordination among various stakeholders.

The Green Pakistan Initiative (GPI), a hallmark of environmental stewardship, is recommended to be seamlessly integrated into the newly proposed NCCO. This amalgamation is envisioned to amplify the impact of both initiatives, fostering a holistic and synergistic response to climate challenges.

Structural Reforms: Institutionalizing Climate Action

Complementary to the NCCO model, structural reforms are proposed to institutionalize climate action within the nation's governance framework. A significant step involves formalizing the NCCO as a constitutional body under the Prime Minister, with the Ministry of Climate Change (MoCC) as its focal ministry. This strategic positioning ensures the centrality of climate considerations in the nation's policy-making apparatus. To strengthen federal response mechanisms, the incorporation of Climate Change and the Environment Subject into the Federal Legislative List (FLL) is recommended. This legislative enhancement seeks to fortify the federal response to climate challenges, providing a robust legal foundation. Simultaneously, provincial Climate change Acts are suggested, accompanied by the establishment of requisite institutions and departments to ensure effective coordination between provincial and federal bodies. These institutional reforms are envisioned to create a comprehensive framework, underpinned by legislative support and collaborative governance, facilitating a united front against climate change.

Integrating Disaster Management and Climate Finance: A Holistic Approach for Resilient Futures

Pakistan needs to seek to enhance its disaster management capabilities and financial resilience through a comprehensive structural overhaul. The proposed integration of Disaster Management at the federal level with the MoCC signifies a paradigm shift from policy formulation to implementation.

At the federal level, the envisaged attachment of Disaster Management to MoCC's hierarchy of implementation framework marks a pivotal moment in aligning climate and disaster responses. This integration necessitates amendments in the MoCC Rules of Business (RoBs), emphasizing the transition from policy development to on-the-ground disaster management efforts. This shift recognizes the intrinsic link between climate change and the increasing frequency and intensity of disasters.⁹ However, this restructuring is contingent upon the establishment of dedicated institutions for Climate

change (CC) at the provincial level. Amendments in the National Disaster Management Authority (NDMA) Act of 2022 are a critical step in fortifying the response mechanism. These amendments promise to revitalize the legal and institutional framework for disaster management, fostering a more adaptive and resilient nation.

The call for a Climate Change Financing Framework system (e.g., National Disaster Risk Management Fund (NDRMF) and Green Climate Fund (GCF)) with built-in financial transparency echoes the need for robust financial planning to confront the challenges ahead. This framework advocates for prioritized budget allocations to projects and infrastructure designs, scrutinized through federal and provincial Public Sector Development Programs (PSDPs). Embracing Public-Private Partnerships (PPPs) as an investment mode emerges as a strategic move to bridge financial gaps, ensuring that climate resilience projects receive the necessary support for successful implementation.

In the realm of data-driven decision-making, the MoCC, working in tandem with the Global Change Impact Studies Centre (GCISC), is urged to interface with all data-related institutions. This collaborative effort aims to create synergy and streamline data-related efforts and outreach. Harnessing the power of data is crucial for informed decision-making and effective implementation of climate and disaster response strategies. As Pakistan embarks on this transformative journey, integrating disaster management, fortifying financial frameworks, and leveraging data for informed decision-making stand as pillars for a resilient future. By embracing these structural changes, the nation is poised to navigate the complex landscape of climate change and disasters with agility and preparedness, fostering a sustainable and secure tomorrow.

Pathways to Mitigation: Unleashing Pakistan's Potential in the Global Climate Arena

Amidst climate challenges, Pakistan's commitment to mitigation measures stands as a beacon of hope. The recently revised Nationally Determined Contributions (NDC-2021) serve as the roadmap for steering the nation toward a sustainable and resilient future. The first critical step involves a meticulous review of it. The need for a more realistic set of objectives, coupled with a bottom-up approach, emerges as a key consideration. Striking a balance between short-term gains and long-term sustainability forms the crux of this approach, ensuring that the goals set forth are not only ambitious but also attainable. Crucially, the implementation of Multilateral Environmental Agreements (MEAs) and NDCs necessitates a proactive stance by individual provinces. While the MoCC provides an overarching supervision, the provinces are entrusted with the onus of translating these goals into tangible actions. This decentralized approach

recognizes the unique environmental landscapes of different regions within Pakistan, fostering a sense of local ownership and responsibility.

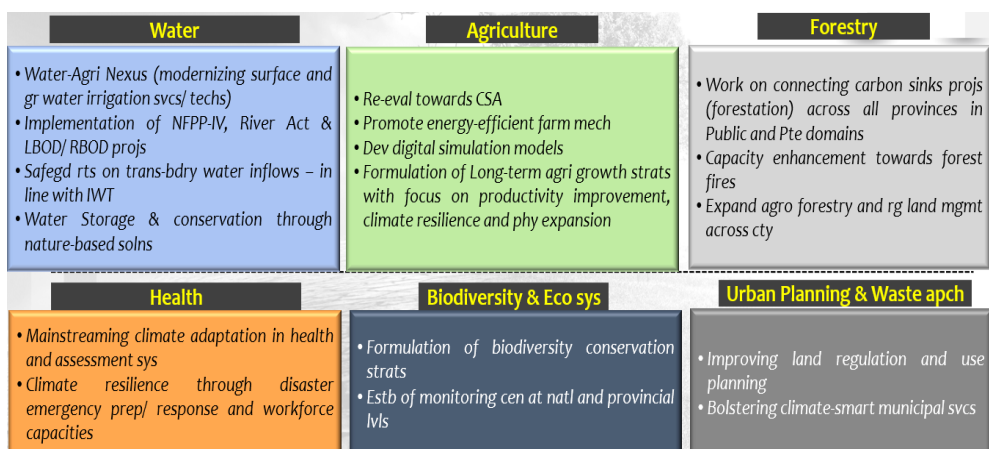
Several mitigation strategies outlined in the NDC warrant special attention due to their potential impact. Foremost among them is an aggressive afforestation campaign, acknowledging the pivotal role of forests in sequestering carbon and preserving biodiversity. Concurrently, the implementation of the Electric Vehicle Policy (EVP-2019) aims to reduce vehicular emissions by phasing out Euro-2 fuel vehicles and ushering in the era of Euro-5 standards. A collaborative effort between the Alternative Energy Development Board (AEDB) and the National Energy Efficiency and Conservation Authority (NEECA) brings forth mechanisms for streamlining renewable energy. This collaboration not only supports the NDC goals but also paves the way for a sustainable energy future. Addressing the environmental footprint of brick kilns, a significant contributor to air pollution, involves the enforcement of innovative technologies. The Happy Seeder and Zig Zag technology, endorsed by the NDC, present ecologically sound alternatives for brick production.

Adaptation Measures in Sectoral Domain

Few Key areas of focus in priority sectors as proposed are as reflected below. Keeping in view importance of agriculture and water for the country there is a need to accelerate adaptation measures in these sectors at priority having a direct linkage with all other sectors.

Disaster Preparedness by NDMA

Figure – 6: Adoption Measures in Sectoral Domain



For Capacity Enhancement of Institution and efficient and effective disaster response suggestions for NDMA are: -

- Modernizing weather & flood forecasting & EW cap.
- Finalization of NDMP – 2022-2032 and strategizing measures to strengthen disaster management.
- Investing in DRR and an enhanced mechanism for the implementation of DRR Policy to bolster the resilience of communities and critical infrastructure.
- Introduce insurance in disaster risk financing through creating the National Risk Financing and a micro-level insurance mechanism.
- Development of Provincial harmony in disaster management wherein, PDMA / DDMA are suggested to formulate policy in line with national policies and their implementation mechanism be streamlined and aligned with the risks specific to zones/districts.
- In order to enhance the response, there is a need to strengthen and expand the Emergency Services Institution of Rescue 1122 to local levels in all provinces. A separate appointment may be introduced under the Deputy Commissioner for DDMA.

Social Sector Reforms

A renewed effort to involve local communities in population control programs and in managing natural resources, as it is directed to balanced and diversified livelihood opportunities for all communities. Likewise, initiating a drive at all levels to better inform and empower local communities, particularly women, for an effective climate response.

Reforms in the Academic Domain

Incorporation of the subject in the curriculum, maintaining a data bank of qualified individuals (SMEs), and arranging interactive discourse/mentoring by SMEs, compilation of selected books, key policy instruments at the global/national level, and expanding the network of Climate change activists and experts for the circulation of the national narrative are suggested.

Climate Change Diplomacy

Successful Climate change diplomacy is the hallmark of garnering support for climate actions. In the face of non-functional regional platforms on Climate change, Pakistan must introduce a platform inspired by geographic connectivity, namely the Karakoram Initiative and the Indus Climate Initiative. Likewise, efforts in collaboration with the UN for the establishment of the UNDRR Regional Centre on Hydro Meteorological Study for working on research and mitigation measures for floods in

Pakistan. If a breakthrough is achieved towards this initiative, it can be clubbed with the telemetry system being installed as part of GPI.

Pakistan's untapped potential in the carbon trading sector also emerges as a game-changer in the global climate arena. A recent survey by a team of Global Technical Experts underscored the country's prowess in this domain. To harness this potential, a comprehensive Legal and Regulatory Framework, aligned with the NDC goals, becomes imperative. This framework not only facilitates carbon trading but also ensures increased revenue and co-benefits for Pakistan.

Conclusion

As Pakistan charts its course in mitigating climate change, the proposed measures emphasize a holistic and inclusive approach. From reviewing and refining national goals to empowering provinces and embracing innovative technologies, the nation's commitment to sustainability stands poised to leave an indelible mark on the global stage. In the context of individual nations like Pakistan, preparedness by the armed forces for disaster management and addressing security implications on both internal and external fronts becomes imperative. This holistic approach acknowledges the interconnectedness of climate change and security, posing threats not only to individual nations or regions but to the entire global governance system. Thus, international coordination and resource allocation are vital to mitigate these risks and shape a more sustainable and secure environment. Pakistan has the potential to emerge not only as a responder to climate challenges but as a pioneer, showcasing sustainable and resilient pathways for nations facing similar struggles.

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 - ⁷ Akhtar, Nasreen. 2023. "Climate Change: Rising Security (Non-Traditional) Threat to Pakistan." *Journal of Development and Social Sciences* 4 (III). [https://doi.org/10.47205/jdss.2023\(4-iii\)91](https://doi.org/10.47205/jdss.2023(4-iii)91).
 - ⁸ Helgason, Kristinn Sv, and Silke Weinlich. Post-2015: recharging governance of United Nations development. No. 6/2015. Briefing Paper, 2015.
 - ⁹ Greenhouse gases are gases that trap heat in the atmosphere, causing global warming and CC. The main greenhouse gases released by human activity are carbon dioxide, methane and nitrous oxide, as well as fluorinated gases used for cooling and refrigeration.
 - ¹⁰ Chapter 1, Pakistan First Biennial Update Report – BUR-1 2022.
 - ¹¹ All these scenarios have been worked out based on existing CC threats.
 - ¹² Rogelj, Joeri, Michel Den Elzen, Niklas Höhne, Taryn Fransen, Hanna Fekete, Harald Winkler, Roberto Schaeffer, Fu Sha, Keywan Riahi, and Malte Meinshausen. 2016. "Paris Agreement Climate Proposals Need a Boost to Keep Warming Well Below 2 °C." *Nature* 534 (7609): 631–39. <https://doi.org/10.1038/nature18307>.
 - ¹³ United Nations Framework Convention on Climate Control (UNFCCC) is an international environmental treaty adopted in 1992 to combat dangerous human interference with the climate system.
 - ¹⁴ Pakistan's First Biennial Update Report (Bur-1) to UNFCCC April 2022, Pakistan has surpassed mitigation contributions and has taken CC beyond Nationally Determined Contributions (NDCs) and took initiatives which contributed to reduction of 8.7% emissions between 2016-2018.
 - ¹⁵ An attached depart of MoCC, the main objectives of GCISC are, to keep a track of the current and likely future trends of CC, globally and within Pakistan.
 - ¹⁶ The projected emission from this Sector by 2030 is also witnessing the visible rise. Mitigation in this sector is mainly through afforestation which is ultimate solution to reduce GHG emissions (carbon sink).
 - ¹⁷ National Adaptation Plans (NAPs) help countries plan and implement actions to reduce vulnerability to the impacts of CC and strengthen adaptive capacity and resilience.
 - ¹⁸ Mainstreaming CC into public, private, economic and socially vulnerable sectors; complemented by broad-based participation to transform the country towards CC resilience and sustainable development.
 - ¹⁹ Alam, Rafay. "Climate Governance in Pakistan after the 18th Amendment," 2019. doi:10.1080/1943815X.2015.1096797.