DECEMBER 2025

CLIMATE & ECONOMIC DEVELOPMENT

Policy Brief on Roundtable held on Future's Forum at FAST-NUCES, Islamabad

Policy Brief

Authors: Nameer Urfi, Ebadat Ur Rehman Babar

Authors

Nameer Urfi | Carbo-X (Private) Limited

Ebadat Ur Rehman Babar | Carbo-X (Private) Limited

Acknowledgement

Carbo-X extends its deepest gratitude to all experts, and guests who have contributed to the development of this policy brief by being part of the roundtable. Their insights, efforts, and valuable contributions have been instrumental in shaping the analysis and recommendations presented herein.

Disclaimer

The views and opinions expressed in this publication are solely those of the authors and do not necessarily reflect the official stance of Carbo-X (Private) Limited. While every effort has been made to ensure the accuracy of the information presented, Carbo-X does not assume any responsibility for errors, omissions, or consequences arising from the use of this publication.

Cite as

Carbo-X. (2025). *Climate and Economic Development: Policy Brief on Roundtable held on Future's Forum at FAST-NUCES, Islamabad* (Policy Brief). Carbo-X (Private) Limited. https://carboxconsulting.com/

Executive Summary

The roundtable *"Climate & Economic Development"*, co-hosted by Carbo-X, SMEDA, and The Society 5.0 Initiative on 3 December 2025 at FAST NUCES Islamabad, convened a multidisciplinary group of academics, private-sector leaders, legal experts, development consultants, think-tank representatives, youth organizations, and international partners. The objective was to critically assess how Pakistan can strategically align climate action with economic development at a time when climate vulnerability and economic pressures are reinforcing one another.

Pakistan is experiencing a convergence of systemic climate risks, floods, heatwaves, air pollution, energy insecurity, with structural macroeconomic constraints. This convergence has rendered the traditional separation between "environmental issues" and "economic planning" both outdated and counterproductive. Small and medium enterprises (SMEs), which form the backbone of Pakistan's economy, are increasingly exposed to climate-induced disruptions that directly affect productivity, supply chains, costs, and competitiveness. Against this backdrop, the roundtable sought to articulate practical, evidence-driven pathways for integrating climate considerations into Pakistan's development strategy, while identifying the institutional reforms and governance innovations needed to enable this transition.

Participants discussed several critical themes shaping the country's climate-economic landscape. These included Pakistan's preparation for COP31 and its position within evolving global climate negotiations; the need for effective and transparent public-private partnerships to scale climate solutions; the growing intersection of artificial intelligence, economic planning, and climate action; strategic approaches for accessing Loss and Damage (L&D) finance; the importance of ensuring continuity and coherence in Pakistan's COP delegations; and the role of ethical, mutually beneficial data-sharing frameworks as a foundation for climate-informed decision-making.

Consensus among participants coalesced around four priority areas requiring urgent attention. First, Pakistan must strengthen data collaboration and integration both within government institutions and between government and the private sector, enabling evidence-based climate and economic planning. Second, universities should embed foundational data-governance courses to prepare a future workforce capable of managing climate-relevant information systems. Third, youth must be systematically included in national policy processes, particularly in the drafting of policy briefs, research papers, and negotiation strategies. Fourth, Pakistan should adopt a proactive approach to climate finance by developing pre-designed, investment-ready project pipelines—potentially in collaboration with Global South partners—to enhance its competitiveness in securing funding from sources such as the Green Climate Fund (GCF), the International Climate Initiative (IKI), and the Fund for Responding to Loss and Damage(FRLD).

In summary, the roundtable underscored that Pakistan's economic resilience depends on embedding climate intelligence, technological innovation, and institutional coherence at the core of national development planning. The discussions and conclusions captured in this brief provide a roadmap for policymakers, development partners, and industry leaders seeking to advance a climate-smart, economically robust future for Pakistan.

Background and Rationale

Pakistan's development trajectory is increasingly shaped by the compounding effects of climate change and economic vulnerability. Recurrent floods, prolonged heatwaves, worsening air pollution, water stress, and energy insecurity are no longer episodic shocks but structural risks with direct macroeconomic consequences. These climate stresses are amplifying fiscal pressures, disrupting supply chains, eroding productivity, particularly for small and medium enterprises (SMEs), and constraining long-term growth prospects. In this context, the long-standing institutional separation between environmental policy and economic planning has become untenable.

The urgency of this convergence has been reinforced at the global level through recent climate negotiations, most notably COP30, where climate finance and adaptation were elevated as central pillars of international cooperation. A landmark outcome of COP30 was the operationalization of the Fund for Responding to Loss and Damage (FRLD), which represents a critical shift in the global climate finance architecture. For climate-vulnerable countries such as Pakistan, the FRLD offers a potential avenue to address irreversible climate impacts that cannot be mitigated or adapted away. However, access to this fund is neither automatic nor guaranteed. It requires strong institutional readiness, coherent national strategies, credible data systems, and investment-ready project pipelines aligned with global funding criteria.

Despite its high vulnerability and demonstrated need, Pakistan risks underutilizing emerging climate finance mechanisms due to persistent structural gaps. These include limited coordination across government institutions, weak integration between public and private actors, insufficient project preparation capacity, and fragmented data ecosystems. Climate finance windows increasingly favor countries that can rapidly present well-designed, technically robust, and financially viable projects, often developed through public-private collaboration and supported by rigorous evidence. The absence of pre-designed, investment-ready projects significantly undermines Pakistan's ability to compete for resources from funds such as the FRLD, the Green Climate Fund (GCF), and bilateral initiatives.

Public–private collaboration remains another critical gap. While the private sector, particularly SMEs, bears a disproportionate share of climate-related economic losses, it is rarely integrated meaningfully into climate policy formulation or financing strategies. Similarly, innovative technologies, including artificial intelligence and data-driven tools, remain underutilized in national climate and economic planning due to regulatory uncertainty, limited trust frameworks, and weak data-sharing mechanisms. This disconnect reduces the scalability and effectiveness of climate interventions and constrains the country's ability to align climate resilience with economic competitiveness.

Equally significant is the under-representation of academia in policymaking processes. Universities and research institutions possess critical analytical capacity, technical expertise, and long-term institutional memory that are essential for evidence-based policy design. Yet academic insights are often siloed from decision-making, resulting in policies that lack empirical grounding or fail to reflect emerging global best practices. Integrating academia into policy formulation can strengthen data governance, improve project design quality, and support the development of a skilled workforce capable of managing climate finance, technology, and compliance requirements.

Against this backdrop, the *Climate & Economic Development* roundtable was convened to create a multidisciplinary platform for candid dialogue across government-linked institutions, the private sector, academia, development partners, and youth organizations. The roundtable aimed to move beyond abstract commitments by identifying actionable pathways for aligning climate action with economic development, strengthening institutional coordination, accelerating access to global climate finance, particularly in the post-COP30 landscape, and positioning Pakistan to respond proactively to the opportunities presented by the Fund for Responding to Loss and Damage.

Objectives of the Roundtable

- To examine the convergence of climate vulnerability and economic development in Pakistan, with a focus on identifying policy gaps, institutional constraints, and structural risks that impede the integration of climate resilience into national and sub-national development planning.
- To assess Pakistan's readiness to engage with emerging global climate finance mechanisms, particularly in the post-COP30 context, including the Fund for Responding to Loss and Damage (FRLD), by exploring pathways for developing investment-ready, technically robust, and finance-aligned project pipelines.
- To explore the role of public–private collaboration and technological innovation, including artificial intelligence and data-driven tools, in enhancing climate risk management, economic competitiveness, and evidence-based policymaking.
- To identify governance, data, and capacity-building requirements necessary to strengthen institutional coordination, ethical data-sharing frameworks, and regulatory clarity across government, private sector, and academic stakeholders.
- To foster inclusive and forward-looking policy dialogue, ensuring the meaningful inclusion of academia, youth, and technical experts in climate and economic policy formulation, research, and international engagement processes.

Overview of Contributors

The roundtable brought together a diverse and multidisciplinary group of participants, reflecting the cross-cutting nature of climate and economic challenges. Attendees included representatives from government and public-sector institutions, private-sector enterprises, project developers, development and policy consultants, academic and research institutions, legal experts, technology and artificial intelligence specialists, as well as climate finance and disaster-risk professionals. The presence of youth organizations and international development partners further enriched the dialogue, enabling a broad exchange of perspectives spanning policy, practice, innovation, and implementation.

Key Themes Discussed

Climate Action and Economic Development Alignment

Participants emphasized that climate resilience must be treated as a core economic priority rather than a parallel environmental agenda. The discussions underscored that climate-induced shocks are directly undermining productivity, fiscal stability, and long-term growth, particularly affecting SMEs and vulnerable sectors. Integrating climate risk considerations into economic planning, industrial policy, and development financing was identified as essential to safeguarding economic competitiveness and stability.

Pakistan's Positioning in the Post-COP30 Landscape

The roundtable highlighted the strategic importance of Pakistan's engagement following COP30, particularly in light of the operationalization of the Fund for Responding to Loss and Damage (FRLD). Participants noted that while Pakistan's vulnerability positions it as a priority country, effective access to emerging finance mechanisms will depend on institutional readiness, policy coherence, and the availability of credible, investment-ready projects. Ensuring consistency and continuity in Pakistan's COP delegations was seen as critical for sustaining negotiating leverage and translating diplomatic commitments into tangible outcomes.

Public–Private Collaboration and Investment Readiness

A key theme was the persistent gap between public policy frameworks and private-sector participation in climate action. Discussions stressed the need to strengthen public–private partnerships to mobilize capital, accelerate implementation, and de-risk climate investments. The absence of pre-designed, finance-aligned project pipelines was identified as a major constraint, reinforcing the need for structured project preparation facilities capable of producing bankable proposals for international climate funds and development finance institutions.

Technology, Artificial Intelligence, and Data Governance

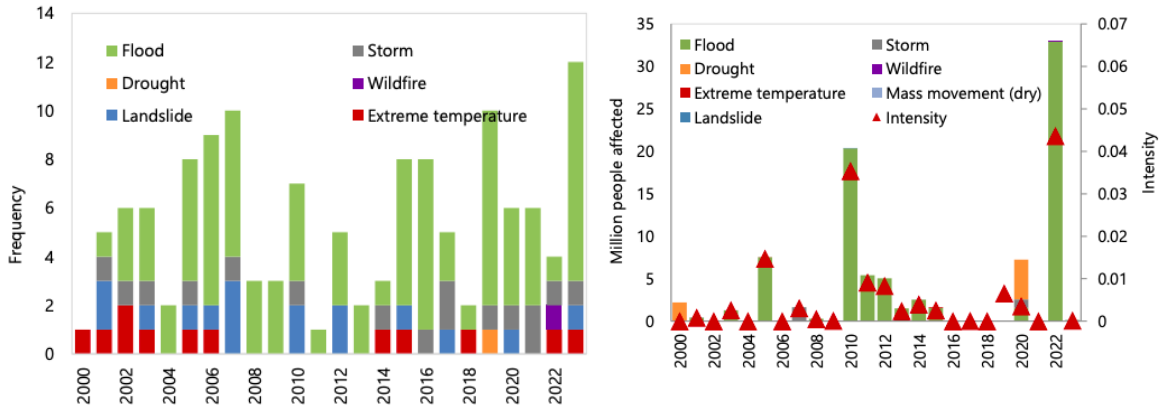
Participants examined the growing intersection of technology, economic planning, and climate action, with particular attention to the role of artificial intelligence and data-driven decision-making. While technological tools offer significant potential to improve climate risk assessment, monitoring, and economic planning, their adoption is constrained by fragmented data systems, limited interoperability, and weak governance frameworks. Ethical, transparent, and mutually beneficial data-sharing arrangements between government, private sector, and research institutions were identified as a foundational requirement.

Role of Academia, Capacity Building, and Youth Inclusion

The discussions underscored the critical role of academia in strengthening evidence-based policymaking, improving project design quality, and building long-term institutional capacity. Participants highlighted the need to embed data governance and climate finance fundamentals within higher education curricula to prepare a future-ready workforce. Meaningful inclusion of youth in policy research, drafting, and international engagement processes was also identified as essential for sustaining institutional knowledge and fostering innovation.

Key Insights

Pakistan's climate vulnerability has translated into substantial economic losses and human costs, underscoring the urgency for integrated climate-economic policy responses. Analysis of recent national and sectoral data shows that extreme weather events such as floods and heatwaves are already imposing multi-billion-dollar impacts on the economy. The catastrophic floods of 2022 affected roughly 33 million people, displaced nearly 8 million individuals, and inflicted $15.2 billion in economic losses, equivalent to approximately 4.8 per cent of Pakistan's gross domestic product (GDP), with critical sectors such as housing, agriculture, and transport bearing the brunt of damage.



Air quality deterioration in major urban centers further exemplifies the asymmetric burden of environmental degradation on socioeconomic outcomes. Persistent smog and high particulate concentrations continue to exceed both national and international health thresholds, contributing to annual economic losses estimated at $22 billion (6.5 per cent of GDP) and elevated mortality rates, with Senatorial testimony citing up to 256,000 pollution-related deaths annually. Real-time environmental data demonstrates that cities like Lahore routinely record fine particulate matter (PM2.5) and Air Quality Index (AQI) levels far above safe limits, revealing chronic public health and productivity risks that are closely tied to urban emissions, transportation patterns, and energy use. These quantified impacts reflect broader systemic vulnerabilities: Pakistan is classified among the most climate-impacted countries globally despite contributing less than 1 per cent of global greenhouse gas emissions, a stark indicator of the inequitable distribution of climate risk and the need for targeted adaptation and loss and damage finance. The recent operationalization of the Fund for Responding to Loss and Damage (FRLD) at COP30 represents a pivotal opportunity for Pakistan to access dedicated finance for irreversible climate impacts. However, participants underscored that accessing and utilising these global funds effectively requires significant enhancement of national data systems, institutional coordination, and project preparation capabilities, as finance mechanisms increasingly demand robust, verifiable evidence and investment-ready proposals.

A recurring analytical theme was the critical role of data governance and technological infrastructure in enabling policy responsiveness. Advanced data platforms and high-resolution environmental monitoring — including integration of satellite analytics, sensor networks, and predictive modeling — are essential for accurately quantifying risks, informing cost–benefit analyses, and shaping investment priorities. Academic research into spatiotemporal air quality mapping and remote sensing for flood impact assessment illustrates the potential for combining sparse sensor data with machine learning to generate actionable intelligence for policymakers.

Despite these technical capacities, institutional gaps in data sharing, public–private collaboration, and evidence-based policymaking persist. Policy design and implementation often remain fragmented, leading to duplication of effort and underutilisation of available analytics. This fragmentation highlights the importance of formalised data governance frameworks and standardized protocols for cross-sectoral information exchange that can drive coherence between government agencies, private sector actors, academia, and civil society stakeholders. The integration of academic expertise into policy processes not only enhances analytical quality but also strengthens the development of candidate projects that are technically sound and finance-ready.

Policy Recommendations

1. Establish a National Climate–Economic Data Governance Framework

The Government of Pakistan should develop and notify a National Climate–Economic Data Governance Framework to enable structured, secure, and ethical data sharing across federal ministries, provincial departments, regulators, academia, and the private sector. This framework should define data ownership, interoperability standards, access protocols, privacy safeguards, and liability mechanisms, while promoting the use of climate, economic, and geospatial data for evidence-based policymaking. A centralized, AI-ready data architecture would significantly enhance risk assessment, planning accuracy, and climate finance eligibility.

2. Create a Cross-Institutional Climate–Economy Coordination Mechanism

A permanent **inter-ministerial coordination platform** should be established, linking climate, finance, planning, commerce, energy, IT, and disaster management institutions. This mechanism should be mandated to integrate climate risk into

economic decision-making, harmonize policy positions, and oversee Pakistan's engagement with global climate finance instruments. Institutional fragmentation has emerged as a key constraint; a formal coordination structure would improve coherence, accountability, and speed of response.

3. Develop a National Pipeline of Pre-Designed, Investment-Ready Climate Projects

Pakistan should institutionalize a project preparation and structuring facility dedicated to developing pre-designed, technically robust, and finance-aligned climate projects. This facility should operate through public–private partnerships and draw upon expertise from academia, consultants, project developers, and financial institutions. Priority should be given to projects that are scalable, data-driven, and aligned with eligibility criteria of major climate funds, including the Fund for Responding to Loss and Damage (FRLD), the Green Climate Fund (GCF), and bilateral mechanisms. Maintaining a standing pipeline of "investment-ready" projects would allow Pakistan to respond rapidly to emerging funding windows.

4. Institutionalize Public–Private Partnerships for Climate Innovation and Financing

The government should strengthen regulatory and contractual frameworks to enable long-term public–private partnerships (PPPs) focused on climate resilience, technology deployment, and economic adaptation. Clear risk-sharing arrangements, predictable policy signals, and transparent procurement mechanisms are essential to crowd in private capital. PPPs should also be leveraged to deploy AI-based monitoring, reporting, and verification (MRV) systems that can reduce costs, improve transparency, and enhance credibility in international finance applications.

5. Embed Academia into Policy Design, Data Systems, and Project Development

Formal mechanisms should be introduced to integrate **universities and research institutions** into climate and economic policymaking processes. Academia should play a central role in data analysis, impact modeling, project design, and evaluation. Additionally, the introduction of foundational courses on data governance, climate finance, and policy analytics within higher education curricula would help build a pipeline of skilled professionals capable of supporting government institutions and climate finance implementation over the long term.

6. Strengthen Pakistan's Strategic Diplomacy and Continuity for COP31 (Türkiye)

In preparation for COP31 in Türkiye, Pakistan should ensure continuity, technical depth, and strategic alignment in its negotiating teams. Diplomatic engagement should be closely linked to domestic preparedness, particularly around Loss and Damage financing, adaptation priorities, and project pipelines. Early engagement with host country institutions, Global South partners, and key donor blocs can enhance Pakistan's influence and improve access to climate finance. Consistent representation and institutional memory are critical to translating international commitments into tangible national outcomes.

7. Align Climate Finance Strategy with Economic Resilience and SME Competitiveness

Climate finance strategies should be explicitly linked to economic resilience, SME protection, and productivity enhancement. Given the central role of SMEs in Pakistan's economy, targeted interventions—supported by data-driven risk assessments—can reduce climate-induced economic losses while improving competitiveness. Integrating SMEs into national climate strategies will also strengthen the social and economic case for international financing.

Carbo-X (Private) Limited

290, Capital Street, H-13 Sector, Islamabad, 44000, Pakistan
info@carboxconsulting.com | +92 333 6669630