



In this Issue

Confronting Pakistan's Climate Reality: Shifting Paradigms

*By Hassaan Sipra**

Executive Summary

Pakistan's high vulnerability to climate change necessitates an urgent response. Strategies that catalyse low-carbon and create resilient development in the near-, mid- and end-of-century scenarios must be given momentum. Building capacity at home is integral to this process. Pakistan's focus on China-Pakistan Economic Corridor and the prevailing need for establishing long-term expertise on climate services can shape Pakistan's climate response. Other international partners can assist the evaluation of evidence as well as leverage international climate finance for mitigation and adaptation. The recommendations provided in this brief are aimed at mainstreaming climate change in the national development agenda and across all levels of society.

The new landscape of climate change

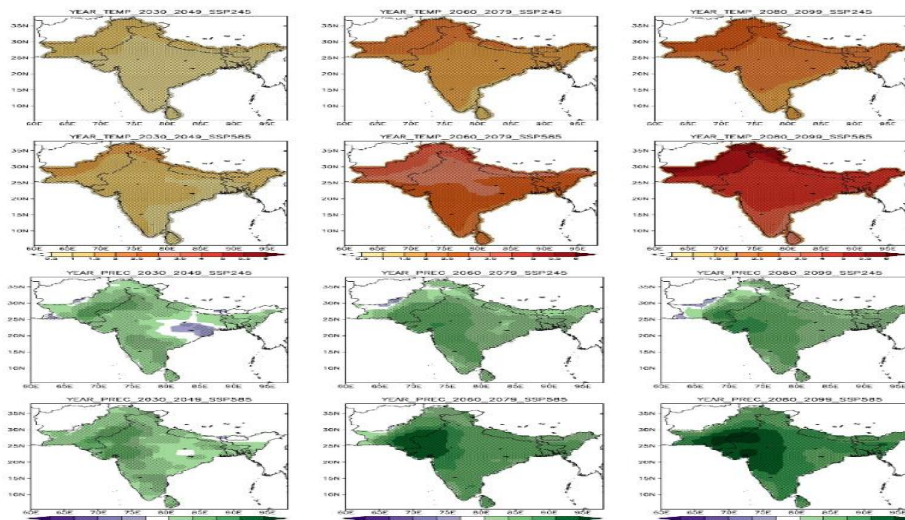
As the geopolitics of climate change unfolds in the near-term, Pakistan must proactively ratchet up its climate ambitions to secure its population and resources from an increasingly uncertain future. 2015 was a landmark year that created global consensus on tackling development challenges. This meant the framing of disaster risk reduction, the articulation of development finance mechanisms, promotion of sustainable development and putting in safeguards against climate change, the single largest threat to future development and the planet. The key message of the four international agreements signed that year (see Box 1) was that without the deployment of strategic global partnerships, sustainable development would not occur, especially when faced with the onslaught of human-induced climate change. The consensus came more than two decades on from the 1992 signing of the United Nations conventions on climate change, biological diversity, and the movement/disposal of hazardous waste. They highlighted that despite overwhelming scientific evidence of humanity hurtling the planet past various tipping points, support in politics and governance proved slow to build. By 2020, the shifting global climate change paradigm reflects a receding United States, in the face of burgeoning Chinese climate leadership and the European Green New Deal (a climate neutral Europe by 2050). It is also the year of the Paris Agreement operationalisation and implementation, with increasing reporting and compliance requirements expected for all countries within this decade. This policy brief highlights key activities undertaken, avenues ahead and recommendations for changing the national climate change narrative, in line with international obligations, and the national sustainable development agenda.

Climate change and threats to sustainable development

Since 1992, the climate change context for Pakistan has been one of devastation. While countries debated responsibilities and financing, global temperature rose by 0.8°C–1.2°C as compared to the Industrial Revolution (circa 1850). This put Pakistan fifth on the Climate Vulnerability Index (1999–2018)¹, with direct impacts including extreme weather, floods, droughts, heatwaves, air pollution and sea level rise, all increasing in frequency and intensity. The World Bank estimates natural catastrophes in Pakistan affect 3 million people on average annually, with 77 percent affected by flooding. The rising risk of hydro-meteorological disasters due to climate change presents serious implications for both upstream and downstream communities, with 11 million people facing high-end flood risk by 2040².

The diverse geographic domain of Pakistan in South Asia makes it critically sensitive to a warming climate. The latest iteration of climate models reveal accelerated land warming and shifting monsoon precipitation over South Asia (see Fig. 1), denoting the importance for Pakistan of regional cooperation on fostering climate resilience measures, such as early warning systems and flood control techniques. Within a geopolitical powder keg where regional cooperation remains difficult, Pakistan's climate reality is one of accelerating direct impacts, with the associated indirect (spillover) impacts on socio-economic and environmental systems jeopardising the country's ability to ensure sustainable development. Primarily, action along the water-energy-food nexus can facilitate climate mitigation and adaptation, under the ambit of human security. Within this context, the South Asian monsoon's 60 per cent contribution to the Pakistan economy makes its variability the backbone of Pakistan's climate adaptation and resiliency efforts by way of the water-energy-food nexus³. An observed 100-km westward shift in the monsoon, delays in monsoon onset, and extreme precipitation in late-stage monsoon necessitate the formation of an effective and representative climate response.

Fig. 1: Changes in temperature and precipitation in South Asia due to climate change in this century



Analysis of 27 CMIP6 models, the largest representation available for South Asia, revealed increasing temperature and precipitation in South Asia under mitigation (SSP2-4.5) and business-as-usual (SSP5-8.5) scenarios. For Pakistan, temperature is rising faster per decade than any other South Asia country, at the rate of 0.29°C per decade under SSP2-4.5 and at the rate

of 0.70°C per decade under SSP5-8.5. Pakistan's precipitation is rising at 0.28 mm/year per decade under SSP2-4.5

* The writer is a climate and environment researcher currently serving at COMSATS University Islamabad. He is a former Andrew Sabin International Environment Fellow.

¹ Global Climate Risk Index 2020 – Briefing Paper: https://germanwatch.org/sites/germanwatch.org/files/20-2-01e%20Global%20Climate%20Risk%20Index%202020_10.pdf

² Flood risk for Pakistan will double by 2040, says report – Dawn: <https://www.dawn.com/news/1382203>

³ Ibrar ul Hassan Akhtar & H. Athar. 2019. Contribution of changing precipitation and climatic oscillations in explaining variability of water extents of large reservoirs in Pakistan. <https://www.nature.com/articles/s41598-019-54872-x>

and 2.39 mm/year per decade under SSP5-8.5. Pakistan sees less precipitation increase as compared to other South Asian countries due to the dissipation of the clouds as they deposit rainfall over India.

Legislative hurdles to climate response

Across multiple sectors, Pakistan's climate response meanders. The country was among the first to establish a National Conservation Strategy in 1992, followed by the Environmental Protection Act (PEPA) of 1997. The Act, designed under the 'polluter-pays' principle, remained sluggish in monitoring and enforcing National Environmental Quality Standards. In 2010, the 18th Amendment to the Constitution of Pakistan devolved the subject of environment to the provincial levels, creating confusion on the role of federating units with respect to climate change. Capacity constraints within provinces in monitoring and enforcement remain even now, with critics proposing to abolish the amendment or to devolve further to district and sub-district levels. Next, the National Climate Change Policy 2012, developed on the recommendations of the Pakistan Planning Commission Task Force on Climate Change 2010, lacks scientific backing, is non-binding in nature and requires integration into multiple sectors⁴. The policy wish list presented through the Framework for Implementation of Climate Change Policy (2014-2030) exemplifies the challenges associated with moving from policy to action; most of the recommendations classified as priority (within 2 years) and short-term (within 5 years) have or are lapsing this year, highlighting the lack of coordination on pragmatic, solutions-oriented implementation strategies. Similarly, operationalisation of the National Climate Change Act 2017 is pending, which calls for convening a Climate Change Council, establishing a Climate Change Authority, and creating a Climate Change Fund. Without these structural engagements, integrating climate change into a sustainable development agenda for Pakistan will remain challenging.

For a country with climate adaptation needs of \$7-\$14 billion per year for 40 years, Pakistan's actions towards scaling up its climate response are slow. Daily inaction places the country's increasingly vulnerable populations and resources at significantly higher climate risk, with the cost of climate action rising fast, making the above \$7-\$14 billion amount calculated as part of national needs assessment in 2011⁵ outdated by now. Assessments are only as powerful as the response they elicit with respect to policy formation and implementation. Undergoing iterative and granular assessments depends on empowering and holding accountable district level policy and decision makers to climate action through enhanced coordination at the national and provincial levels. To that end, the Climate Public Expenditure and Institutional Review (CPEIR) for the 2015-2016 budget was a successful exercise in visualising the changing roles of federating units after the 18th Amendment. With an overall budgetary contribution towards climate change of 8.4 per cent, the review found that the majority of spending on climate mitigation came from the federal government, with a focus on energy and transportation projects, while provincial spending focused on climate adaptation. Since public expenditure is likely to support growing climate mitigation and adaptation measures in Pakistan, the CPEIR is a positive step towards incorporation of climate practices into public expenditures.

⁴ Muhammad Mumtaz. 2018. The National Climate Change Policy of Pakistan: An Evaluation of Its Impact on Institutional Change. <https://link.springer.com/article/10.1007%2Fs41748-018-0062-x>

⁵ National Economic & Environmental Development Study. <https://unfccc.int/files/adaptation/application/pdf/pakistanneeds.pdf>

Mainstreaming climate finance through CPEC

Pakistan requires climate smart investments to reduce the burden on public expenditure. Investments in the China-Pakistan Economic Corridor (CPEC), through the various energy and infrastructure projects valued at \$62 billion, present an opportunity to increase Pakistan's climate finance flows. CPEC development projects are simultaneously growing emissions sources in the country, and providing new avenues for climate mitigation (through solar and wind) and climate adaptation, with upcoming investments tagged for progress along the water-energy-food nexus. Despite these projects running through all levels of government and its development agenda, they retain a decidedly central (federal) characteristic, leaving inter-provincial coordination a question mark. In the latest push towards CPEC realisation, Pakistan established the CPEC Authority to streamline development processes, with limited provincial involvement. Owing to the large investments underway, the path defined under CPEC obligations will affect the rollout of climate change strategies and test centre-province relations.

Accusations abound that the government's policy position on CPEC is to ignore the recommendations of environmental impact assessments conducted for various projects, which have the potential to reduce the long-term viability of these projects, just to appease Chinese backers. However, this is inaccurate. With 4,620 MW of coal-fired power plants operational, 1,980 MW scheduled to open in March 2021, another 1,620 MW under negotiation, and a price tag over \$10 billion⁶, Pakistan faces coal infrastructure lock-in for approximately 30 years. The health ramifications just at Thar coal facilities—29,000 deaths, 19,900 new asthma cases and 32,000 pre-term births⁷, point to a fundamental flaw in Pakistani governance strategy—the thinking that economic growth cannot occur without dirty energy and that the public health burden is politically acceptable. It is through this political justification that Pakistan chooses to raise its GHG emissions over 400 per cent by 2040, arguing the merits of cheap coal, when in reality the public health burden alone would dwarf any potential savings, particularly as solar and wind now outcompete coal⁸.

The Chinese Belt and Road Initiative (BRI), the trillion-dollar infrastructure investment plan that includes CPEC, faces criticism for its overseas development financing. Beyond questions of debt repayments, policy concerns regarding the initiative stem from its far-reaching impact on GHG emissions. The green potential of BRI depends entirely on countries negotiating projects based on their emissions intensity, something Pakistan fails to assess. The situation is critical, as developing country investments backed by China in dirty energy and infrastructure today will account for two-thirds of global emissions by 2050. Despite being the global leader in renewable energy, China also remains the largest user of fossil fuels. As such, the vast

Box 1: International Obligations for Pakistan

The United Nations adopted the Sendai Framework for Disaster Risk Reduction in March 2015, followed by the Addis Ababa Action Agenda in July, which introduced measures to overhaul global finance practices to generate investments for tackling economic, social and environmental challenges, specifically for developing countries. Next, in September, the United Nations formally launched their commitment to 17 aspirational Sustainable Development Goals, as part of the Post-2015 Development Agenda to raise the global living standard. Finally, in December, with the Paris Agreement, 175 signatory countries pledged to tackle climate change, noting that the global average temperature should not exceed 2°C from pre-Industrial Revolution times, with all efforts to keep temperatures below 1.5°C through greenhouse gas (GHG) emissions mitigation. Further, the agreement established the need for developed countries to support developing countries in adapting to the already felt adverse impacts of climate change in a sustainable manner, while contributing to the global stocktake and assessment of loss-and-damage. In order to reach global net zero emissions by the second half of the century, the agreement seeks to raise climate ambition and monitor progress on countries' nationally determined contributions towards climate mitigation, adaptation and financing.

⁶ China Pakistan Economic Corridor, Ministry of Planning, Development and Special Initiatives. <http://cpec.gov.pk/>

⁷ Air quality, health and toxic impacts of the proposed coal mining and power cluster in Thar, Pakistan. https://energyandcleanair.org/wp/wp-content/uploads/2020/05/Thar-Coal-Cluster-Case-Study_Pakistan.pdf

⁸ Wind and solar PV will keep taking the lead—Community Report. http://www3.weforum.org/docs/WEF_Wind_and_Solar_2030.pdf

network of state-owned enterprises that export Chinese dirty and clean energy are in flux within China⁹. However, the onus is on Pakistan to prioritise decarbonisation pathways for foreign investors. China is fulfilling its climate leadership role, but the country is balancing its dirty and clean energy streams, with the implication that developing countries like Pakistan need to be cognisant of the long-term consequences of their Chinese investments and make informed decisions. While working under CPEC will build Pakistan's experience in jointly executing mega projects at an unprecedented level, a major point of contention remains the secretive nature of the various deals. Establishing fiduciary standards and environmental and social governance for CPEC investments, with proper disclosure, lays the foundation for climate investments, particularly as those investment demands dwarf even CPEC.

Overcoming the information gap – the market for climate services

Many of the gaps in Pakistan's climate response are the result of a lack of systematic evidence gathering and evaluation. Keeping in view Pakistan's tremendous vulnerability to climate change, securing the \$60 billion-plus CPEC investments against climate impacts requires identification and scaling up of targeted interventions that build climate resilience and help achieve sustainable development. Beyond CPEC, iterative climate diagnosis and subsequent upgradation of policies, strategies and implementation plans provides the basis for submission of competitive bids to donor agencies, particularly through the Green Climate Fund, the main financing window under the Paris Agreement, as well as fulfilling other reporting requirements enshrined in the agreement.

While the science of climate change provides assessments over decadal time spans, its impacts occur at multiple smaller orders of magnitude; in seconds, minutes, hours, days and weeks. Similarly, changing weather patterns at the global and regional levels cause disruptions at the local level. Thus, the framework for climate adaptation in Pakistan rests on building local (municipal) climate resiliency at the nexus of information systems and decision-making, in public, private and civil society sectors. Climate services refer to the use of such climate information to diagnose and build resilience against climate impacts, generally undertaken in a public-private partnership format.

The provision of climate services depends on the development and analysis of climate models. The latest models, the Coupled Model Intercomparison Project Phase 6 (CMIP6), provide enhanced accuracy in projections for global and regional climate change as compared to previous versions. More than 40 climate models, developed at national levels by 24 countries (see Fig. 2), form the core scientific input for the Intergovernmental Panel on Climate Change's Sixth Assessment Report (AR6), expected in 2022.

⁹ Isabel Hilton. How China's Big Overseas Initiative Threatens Global Climate Progress. <https://e360.yale.edu/features/how-chinas-big-overseas-initiative-threatens-climate-progress>

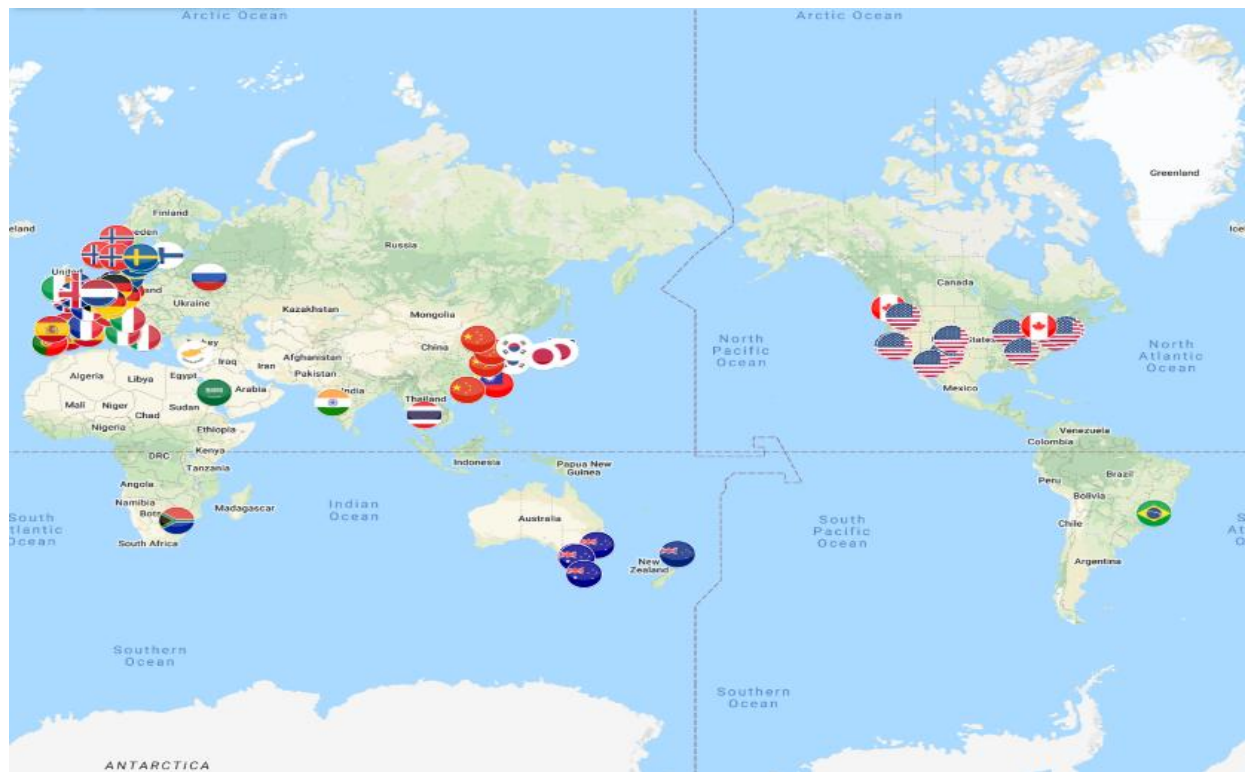


Fig. 2: Map of CMIP6 participating models by country¹⁰

A distinct Northern bias in the collection of weather and climate parameters and the generation of forecasts and projections is visible in the CMIP6 models globally. Alongside overcoming the North-South Divide on the subject, there is a need for Pakistan to pursue local optimisation of its climate and weather to develop a climate services industry.

It is crucial to understand that climate models, though increasingly accurate at the global and regional scale, need improvements in projecting climate change and forecasting associated extreme weather at the national and subnational scales for Pakistan. These models depend on mathematical algorithms (parameterisations) that simulate the dynamics of climate and weather elements. They also depend on a strong repository of meteorological data. At present, no climate modelling group exists in Pakistan; however, the institutional structures to house such activities exist in the Ministry of Climate Change (Global Change Impact Study Centre), the Pakistan Meteorological Department and the Space & Upper Atmosphere Research Commission. Climate change remains limited at the academic and research level in universities across the country, with only one institution thus far mandated with climate research – the Centre for Climate Research and Development at COMSATS University Islamabad launched in 2014, and a newly launched Masters of Science in Climate Change at University of Agriculture Faisalabad. Dedicated efforts to decouple climate change from environmental science will build the academic and research specializations within the large youth base of Pakistan, and address the capacity needs for implementation of climate services in the country within this decade.

Climate services is the lynchpin industry for effectively addressing challenges to sustainable development and climate action. Through advancements in computational capacity and numerical modelling, research groups worldwide are providing high-resolution, accurate analysis of climate simulations and projections, as well as numerical weather prediction. Largely produced by entities based in the United States, Europe

¹⁰ CMIP6 - Coupled Model Intercomparison Project Phase 6. <https://pcmdi.github.io/CMIP6/>

and Australia, global and regional climate models form the basis of numerical weather prediction, by incorporating hardware and software to engage big data analytics that generate forecasts. Over the decades, these models have gained in sophistication and accuracy, but they retain regional bias that fails to project the South Asian climate accurately¹¹. The lack of technical capacity in the South is limiting in terms of expensive computational power and highly skilled researchers, with lack of publicly available, observed data creating undue constraints for development of evidence-based policy measures. Northern countries have spent decades collecting granular data on climate parameters and correlated relationships that have allowed them to gain accuracy in climate projections and weather forecasts. At present, Pakistan records data from 97 meteorological stations across the country, and an additional \$188 million investment from the World Bank seeks to increase the number of such stations under the five-year Pakistan Hydromet and Ecosystem Restoration Services Project¹².

The success of such investments in shoring up local data sources presents another opportunity to reduce the Northern bias in direct climate assessments, depending on political will allowing the augmentation of data transparency and access for the growing research community specialized in assessing the changing climate for the Pakistan sustainable development perspective. Outside of Northern partners, integration with Chinese climate and weather monitoring services, through the World Meteorological Organization and the National Satellite Meteorological Center of the China Meteorological Administration, can improve deployment of early warning systems, monitoring of CPEC development and near-term planning for sustainability. Such attempts to optimise and localize climate parameterisations to Pakistan and subnational scales will yield fruitful results at low cost. Their results and projections provide essential information that better informs decisions of national, regional, and local importance, such as water resource management, agriculture, transportation, tourism and urban planning, under the umbrella of climate services, an industry requiring attention.

¹¹ Vimal Mishra, Udit Bhatia & Amar Deep Tiwari. 2020. Bias-corrected climate projections for South Asia from Coupled Model Intercomparison Project-6. <https://www.nature.com/articles/s41597-020-00681-1>

¹² Pakistan wins World Bank US\$ 188 million funding for first nature-based solution project. <https://www.ndrmf.pk/pressreleases/pakistan-wins-world-bank-us-188-million-funding-for-first-nature-based-solution-project/>

Recommendations

By implementing the following recommendations, Pakistan can reframe its climate change narrative from a wish list into action.

1. Operationalise the Climate Change Act 2017

The Act sets up three institutions, the Climate Change Council, the Climate Change Authority, and the Climate Change Fund, with none activated yet. The council serves in a supervisory and enforcement capacity, the authority serves as the corporate and executing body its climate mandate, while the fund is a climate risk financing instrument. It goes against the established urgency to leave these institutions vacant as climate change realisation looms over Pakistan.

2. Prioritise iterative sectoral needs assessment at the district level for climate action

The geography of Pakistan leads to diverse, localised climate impacts that demand localised action to mitigate or build resilience. District level exercises on climate change related sectoral needs helps building ownership among local stakeholders with reference to climate financing and project sustainability. This bottom-up approach enhances the public's capacity to engage on climate issues and prioritise per local needs.

3. Conduct regular national (and regional) climate change assessments

Establish the capacity to undertake climate modelling, optimisation of local climate parameters, and their changing impacts on socio-economic and environmental systems. Several key institutions have the technical expertise to develop, test and utilise optimised climate models for more accurate climate projections, such as the Global Change Impact Study Centre, Pakistan Meteorology Department and the Space & Upper Atmosphere Research Centre. Update climate assessments in line with Paris Agreement reporting obligations.

4. Improve coordination between federal and provincial units by mainstreaming climate change into the overarching development agenda

Set up an inter-ministerial and inter-provincial taskforce for policy planning and reviewing progress, ensuring efficient resource utilisation, removal of barriers and enforcing corrective measures. Further, streamline climate change into the reporting mechanisms for district units.

5. Enhance climate finance absorption capacity and climate services provision

Pakistan's ability to absorb the climate finance required for mitigation and adaptation remains low. Leveraging CPEC under the BRI green potential can enhance the country's climate finance flows. Incorporating updated climate impact information into toolkits for decision support builds evidence-based justifications for bidding on climate related projects. Further, engagement of Pakistan's large youth base on these issues today will produce the solutions-oriented population ready to tackle the climate and sustainability challenge by the end of the decade.