By: ICMA Research and Publications Department

Strengthening Pakistan's Climate Response: Reforming Finance, Carbon Markets, and ESG Governance

Preamble

Pakistan faces a pressing climate paradox as it contributes less than 1% of global greenhouse gas emissions yet remains among the most climate affected countries globally. The 2022 floods alone submerged one third of the country, displaced over 8 million people, and caused losses exceeding USD 30 billion, highlighting the urgency of addressing its acute vulnerabilities. These challenges are compounded by a fragmented climate finance architecture that relies heavily on concessional loans, an underdeveloped carbon market with limited measurement, reporting, and verification systems, a disproportionately low adaptation finance pipeline, weak private sector engagement, fragmented governance and transparency, and limited operationalization of climate justice and loss, and damage mechanisms.

The ICMA Research and Publications Department emphasizes that overcoming these gaps requires integrity driven, market enabled reforms. ICMA Pakistan proposes a comprehensive framework that focuses on professionalizing the carbon market through standardized accounting, costing, pricing, and ICMA certified measurement, reporting, and verification and assurance programs. It also supports the development of Panda and green bonds through technical advisory, structured use of proceeds tracking, and post issuance impact reporting. Integrating ESG into financial decision making is another critical pillar, with practical measurement standards, assurance guidelines, and ESG linked lending frameworks, while institutional strengthening is achieved through technical support to regulators, public, private platforms for bankable project pipelines, and capacity building for provincial institutions on carbon revenue, measurement, reporting, verification, and fiscal reporting.

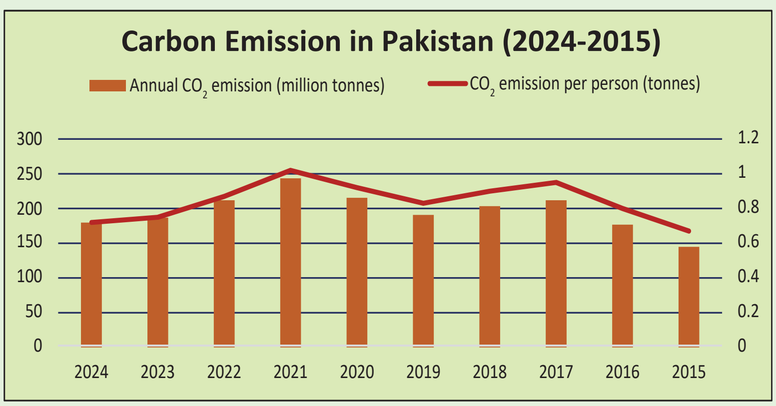
Pakistan's Climate Vulnerability and CO_2 Emissions Trend (2015–2024)

Pakistan remains highly vulnerable to climate change despite low per capita CO_2 emissions. Between 2015 and 2021, emissions rose to 243.6 million tons (1.0 ton per person) due to population growth, fossil-fuel reliance, industrial expansion, and post-COVID recovery. By 2024, emissions fell to 179.8 million tons (0.7 ton per person) as economic slowdown, greater hydropower and renewable adoption, energy efficiency, and alignment with updated NDC commitments helped curb emissions.

Table 1: Carbon Emission in Pakistan from 2015-2024

Year	CO_2 emission per person (tonne)	Annual CO_2 emission (million tons)
2024	0.7	179.8
2023	0.8	186.9
2022	0.9	212.0
2021	1.0	243.6
2020	0.9	215.5
2019	0.8	190.8
2018	0.9	203.5
2017	1.0	212.0
2016	0.8	176.7
2015	0.7	144.9

Source: *Our World in Data*
https://ourworldindata.org/profile/co2/pakistan



Climate Action Measures by Government and Institutions in Pakistan

Initiative / Reform	Key Details (2024–25)
Climate Financing	
National Climate Finance Strategy (NCFS)	Launched at COP29 (2024); targets mobilization of public, private & international finance to bridge Pakistan's climate financing gap (around USD 348 billion by 2030); introduces climate-responsive public investment & monitoring frameworks
Sovereign Green Sukuk (Pakistan's first)	Issued in 2025 to finance renewable energy & climate-resilient infrastructure (dams, clean energy); aligned with Green Budget Tagging
Green Budget Tagging	Federal budget expenditures tagged for climate relevance to improve transparency & climate accountability
Carbon Market Policy Guidelines	Announced at COP29 (2024); establishes voluntary & compliance carbon market framework; aligned with Article 6 of Paris Agreement
ADB Climate & Disaster Resilience Program	USD 500 million program supporting climate resilience, disaster risk financing & green sukuk issuance
World Bank Country Partnership Framework (CPF)	2025 CPF prioritizes climate resilience, flood protection, water security & private climate finance mobilization
Provincial Climate & Environmental Funds	Punjab Climate & Environmental Endowment Fund (USD 50 million); provinces aligning PSDPs with climate priorities
ESG Reforms	
ESG Disclosure Guidelines (Voluntary)	Issued in June 2024; aligned with IFRS-ISSB, TCFD; encourages structured ESG & climate risk disclosures by listed companies
Mandatory Sustainability Governance Reforms	Amendments to Corporate Governance Regulations: board-level ESG oversight, sustainability committees, gender diversity & anti-harassment policies
Adoption of IFRS S1 & S2 (ISSB Standards)	Phased adoption from 2024 onwards; aligns Pakistan with global sustainability reporting standards
Green Banking & Sustainable Finance Framework	Green Banking Guidelines; renewable energy refinance schemes; climate risk integration in financial supervision
National Green Taxonomy (in progress)	Defines environmentally sustainable economic activities to guide banks & investors
UK–Pakistan Green Compact	Launched 2025; GBP 35 million to mobilize climate finance, improve ESG regulation & develop bankable green projects
Updated NDC (NDC 3.0)	17% unconditional & 33% conditional emission reduction by 2030; finance-linked climate commitments

Insights from Developed Economies: A Comparative Review

Pakistan can draw important lessons from developed economies, where large-scale climate finance, high-integrity carbon markets, and integrated ESG frameworks have been successfully implemented. By studying how countries like China, Japan, Singapore, Sweden, Finland, Denmark, and Switzerland link carbon pricing, green bonds, and sustainable investments to national climate goals, Pakistan can adopt practical strategies to strengthen its climate finance ecosystem, enhance market credibility, and accelerate the transition from climate vulnerability to resilience.

China – Green Finance, Carbon Markets, and Sustainable Investment

China has rapidly emerged as a global leader in sustainable finance and carbon markets, issuing a record USD 70.3 billion in certified green bonds in 2025 [over 17% of global issuance] to finance renewable energy, clean transport, and emissions-reduction projects, and to signal its strategy of leveraging debt markets for climate investment while planning further international green sovereign bond issuances to attract global capital.

At the same time, China's nationwide emissions trading system (ETS), operational since 2021 and expanding to include major sectors such as power, steel, cement, and aluminum, has become one of the world's largest carbon markets, enabling companies to buy and sell emissions allowances and incentivizing reductions in energy-intensive industries.

Complementing these market mechanisms, Chinese regulators have launched an updated Green Finance Endorsed Project Catalogue, a unified green finance taxonomy defining eligible green investments and aligning financial flows with national climate priorities to enhance transparency and mobilize capital for low-carbon infrastructure and clean technologies. Beyond policy frameworks, corporate ESG integration is gaining ground, with Chinese companies expanding non-financial reporting and embedding sustainability into core business strategies to support long-term environmental and social value creation, thus reinforcing the connection between sustainable investment, climate action, and governance reforms.

Japan – Transition Finance, Climate Bonds, and Collaborative Carbon Reduction

Japan has strategically deployed its Green Transformation (GX) strategy to mobilize substantial climate finance and accelerate decarbonization, issuing Climate Transition Bonds under a framework designed to channel up to ¥20 trillion over the next decade toward low-carbon industrial transformation, renewable energy, hydrogen research, and other climate-aligned sectors with clearly defined use-of-proceeds criteria to ensure emissions-reduction and economic competitiveness. As part of this broader approach, the strategy also includes the introduction of mandatory emissions trading, set to begin in 2026, and the integration of climate risk into financial assessments to internalize carbon costs and redirect capital toward decarbonization, strengthening Japan's domestic carbon pricing and sustainable investment landscape.

Complementing domestic actions, Japan supports international climate cooperation through the Joint Crediting Mechanism (JCM), a bilateral initiative that facilitates the diffusion of low-carbon technologies and infrastructure in partner countries while enabling Japan to count quantified emission-reductions toward its climate targets. In parallel, Japan has developed ESG and sustainable finance frameworks, including green bond guidelines and broader sustainability disclosure standards, to reinforce its domestic sustainable finance market, enhance corporate climate reporting and risk management, and align financial flows with long-term environmental and social value creation.

Singapore – Carbon Market Development, Taxation, and Climate Finance Hub

Singapore is building a high-integrity carbon market ecosystem through coordinated inter-agency efforts involving the National Climate Change Secretariat, Ministry of Trade and Industry, Enterprise Singapore, and the Monetary Authority of Singapore (MAS), which together are issuing guidance on corporate use of carbon credits, promoting industry coalitions to boost demand for quality credits, and offering a Financial Sector Carbon Market Development Grant to help financial institutions participate in carbon trading and carbon project finance. Alongside these market-building measures, Singapore's carbon tax, first introduced in 2019, is being progressively raised from S$25 per tonne in 2024 to S$45 per tonne by 2026-27, with long-term targets of S$50-80 per tonne by 2030 to strengthen the price signal for emissions-reduction and incentivize investments in low-carbon technologies and energy efficiency.

Complementing these efforts, the Monetary Authority of Singapore has secured USD 510 million for the Green Investments Partnership fund, designed to support sustainable infrastructure such as renewable energy, sustainable transport, and energy storage across Southeast and South Asia by blending commercial and concessional capital to de-risk projects. These combined initiatives position Singapore as a carbon services and trading hub, promoting innovative financing solutions and creating regulatory frameworks that support both compliance and voluntary carbon markets. This approach helps mobilize climate finance and strengthens the integrity of regional carbon market participation.

Sweden – Green Bonds, International Climate Finance & ESG Alignment

Sweden has developed a robust sustainable finance ecosystem underpinned by a well-established green bond market that supports investments in transport, renewable energy, and climate adaptation, with Swedish banks and financial institutions issuing significant volumes of green and sustainability bonds aligned with international standards to scale infrastructure deployment and enhance investor confidence. In parallel, Sweden is a major contributor to international climate finance, pledging substantial resources to multilateral funds such as the Green Climate Fund to support mitigation and adaptation projects in developing countries, reinforcing its role in global climate action and development cooperation.

At the same time, Swedish regulators and market participants emphasize robust ESG reporting and corporate governance frameworks aligned with EU sustainable finance standards, which improve transparency and strengthen investor confidence in sustainability performance, while financial institutions continue to expand green-financing products that integrate environmental and social impact considerations into capital allocation.

Finland – EU ESG Alignment & Nordic Sustainable Finance Cooperation

Finland aligns its financial regulation with European sustainable finance standards, including EU taxonomy alignment and enhanced ESG disclosure requirements, to harmonize climate risk reporting and unlock private capital for sustainable projects, while Finnish financial institutions and regulators increasingly integrate ESG criteria into risk assessment and reporting to support climate-aligned investment. The country channels significant climate finance through bilateral and multilateral mechanisms — contributing to instruments like the Inter-American Development Bank's NDC Pipeline Accelerator trust fund to support climate-aligned infrastructure and sustainability planning and through domestic blended finance initiatives with partners such as the International Finance Corporation to catalyze private investment in low-carbon and resilience-focused sectors. Finland also plays an active role in regional climate cooperation via institutions such as the Nordic Development Fund (NDF), a joint Nordic climate and development finance institution that provides concessional financing and partnerships to support mitigation and adaptation projects in low-income countries, reflecting broader Nordic collaboration to mobilize climate finance and knowledge sharing for impactful climate action.

Denmark – Carbon Pricing, Green Bonds & Climate Investment Vehicles

Denmark has implemented carbon pricing and tax mechanisms to incentivize emissions-reductions across key sectors such as energy and transport, with ongoing reforms that include broad environmental fiscal tools and proposed carbon taxes designed to support the transition to cleaner technologies and help meet its climate targets. Simultaneously, the country has advanced green bond issuance aligned with European Green Bond standards, using proceeds to finance renewable energy, sustainable transport, and nature restoration projects that channel public and private capital toward climate-positive outcomes while reinforcing transparency and impact reporting frameworks. Denmark also plays an active role in international climate finance, having significantly increased its pledges to multilateral climate funds such as the Green Climate Fund, where it doubled its contribution to support mitigation and adaptation efforts in developing countries, signaling strong commitment to global climate action and finance mobilization.

Switzerland – Carbon Tax, Emissions Trading & ESG Reporting

Switzerland's Federal CO_2 Act combines a broad carbon tax with an emissions trading scheme that incentivizes emissions-reductions across sectors while reinvesting revenue in climate protection, innovation, and low-carbon technologies to support both mitigation and adaptation efforts. Complementing its domestic climate policies, Swiss regulatory reforms are expanding corporate sustainability reporting obligations to align with global ESG standards, requiring large companies, banks, and insurers to disclose climate-related risks and impacts, thereby enhancing transparency for investors and stakeholders. On the international front, Switzerland continues to contribute to global climate finance initiatives, including a pledge of CHF 135 million (about USD 148 million) to the Green Climate Fund for the four years replenishment period, supporting mitigation and resiliency-focused projects in developing countries.

Carbon Markets and ESG for Climate Action in Pakistan

Pakistan's carbon market, operational under policy guidelines of Article 6 of the Paris Agreement, represents a pivotal step in aligning national climate action with broader environmental finance and sustainability reforms. Projects that reduce or remove greenhouse gas emissions can generate tradable carbon credits, creating new avenues for climate finance while supporting Pakistan's climate commitments. This development comes at a time when global confidence in carbon credits is under scrutiny due to documented governance, transparency, and social inclusion failures in some voluntary markets. Weak monitoring, poor baseline setting, and exclusion of local stakeholders internationally have highlighted risks of "phantom" credits- certificates that do not reflect real emission-reductions, undermining climate integrity and investor trust. These concerns are directly relevant as Pakistan designs its own market mechanisms, emphasizing integrity, transparency, and robust governance to ensure real climate impacts and sustainable outcomes.

In Pakistan, tradable carbon credits can be generated under compliance mechanisms aligned with Paris Agreement cooperation (Article 6.2 and 6.4) and voluntary crediting systems.

The government's carbon market policy guidelines provide a regulatory backbone for these systems, aiming for credible measurement, reporting, verification (MRV), and equitable benefit sharing among stakeholders. Reports highlight Pakistan's potential to produce 40–75 million tradable carbon credits annually if a share of national emissions is channeled into well-governed carbon projects, generating potentially hundreds of millions of dollars in climate finance. However, structural challenges remain. Institutional capacity for consistent emissions data, coordinated baselines, and clear legal frameworks for carbon rights still need strengthening to avoid replicating governance weaknesses seen in low-integrity markets elsewhere. Addressing these gaps is essential for climate outcomes and ESG reform, as environmental credibility, social safeguards, and governance transparency are core pillars of sustainable investment and corporate reporting.

ESG reforms increasingly require firms and institutions to integrate climate risk, emissions performance, and social responsibility into decision-making and disclosure practices. A transparent carbon market enhances this by providing quantifiable environmental metrics businesses can incorporate into ESG frameworks, demonstrating measurable climate action rather than broad commitments. Governance enhancements — including standardized reporting, third-party verification, and inclusive stakeholder engagement — further reinforce the "G" in ESG by building oversight, accountability, and trust in carbon finance instruments.

For a country highly vulnerable to climate impacts, carbon markets can serve as a strategic climate finance tool, channeling investment into renewable energy, forestry, waste, and other mitigation sectors while supporting national climate targets. The integration of strong governance and ESG-aligned practices will determine whether this market can deliver real emission-reductions, catalyze sustainable investment, and enhance Pakistan's climate resilience to meet both international expectations and domestic development goals.

Pakistan's Key Gaps in Climate Finance, Carbon Markets & ESG Reforms

Area	Global Practice	Pakistan Status	Key Gap	Actionable Lesson
Carbon Pricing & Demand	China, Japan, Singapore, Switzerland, Denmark apply carbon taxes or ETS to create domestic demand for credits	No carbon tax or domestic ETS; carbon market mainly voluntary and export-oriented	Absence of price signal and compliance demand	Introduce carbon pricing to anchor carbon markets in real economic demand
Carbon Market Governance	Singapore and Japan use centralized, inter-agency governance with legal mandates	Fragmented responsibilities across federal and provincial institutions	Weak coordination and unclear authority	Establish a single legally empowered national carbon authority
Market Integrity	ICVCM CCPs, strict baselines, third-party ratings, strong safeguards	Early-stage market with weak baselines and MRV systems	Risk of low-credibility or "phantom" credits	Adopt integrity-first standards and strict eligibility rules
MRV & Data	China and Singapore deploy centralized digital MRV using satellites and sensors	Data dispersed; limited digital MRV capacity	Inability to verify outcomes at scale	Build national digital MRV infrastructure as public climate data backbone
ESG & Finance	Mandatory ESG reporting tied to financial supervision (EU, Nordics)	Voluntary until 2029	ESG not linked to capital allocation	Make ESG reporting mandatory and financially binding
Climate Finance	Large-scale green/transition bonds (China, Japan)	One PKR 1 billion green bond issued	Instruments too small to meet NDC financing needs	Instruments too small to meet NDC financing needs
Blended Finance	Crowds-in private capital (Singapore)	Reliant on donors/IFIs	Limited private participation	Create blended finance vehicles
Regional Competitiveness	China and India combined have a combined 1,600+ registered carbon projects	Pakistan has very few registered projects	Underutilized potential	Improve project pipelines with integrity and scale

ICMA Proposed Measures for Carbon Market and Panda Bonds in Pakistan

ICMA proposes a set of practical, market-oriented policies to strengthen Pakistan's carbon market and sustainable finance ecosystem. These proposals draw on ICMA's core strengths in accounting, costing, assurance, and governance to enhance market integrity, investor confidence, and project bankability. The objective is to position carbon markets and instruments such as Panda and green bonds as credible tools for mobilizing long-term climate finance in Pakistan. ICMA presents the following measures to strengthen Pakistan's carbon market and sustainable finance ecosystem, leveraging its expertise in accounting, costing, assurance, and governance to enhance market integrity, investor confidence, and project bankability:

1) Carbon Market Standards

- Establish standardized carbon accounting, costing, and pricing frameworks to guide Pakistani industries and carbon projects.
- Publish sector specific carbon readiness and abatement cost toolkits to support high-quality project development.

2) Sustainable Bond Development

- ICMA members could serve on the board or be consulted to ensure professional oversight and credibility in green project costing and bond proceeds tracking.
- Build issuer capacity through targeted training on bond preparation, disclosure, and post issuance impact reporting.

3) ESG Integration

- Develop practical ESG cost and performance measurement standards to convert disclosures into decision useful financial data.
- Issue ESG assurance and internal audit guidelines for corporates and financial institutions.
- Promote ESG linked lending, procurement, and investment screening frameworks based on internationally proposed metrics.

4. Institutional and Government Support

- Act as a technical partner to government and regulators on carbon markets, climate finance instruments, and ESG frameworks.
- Facilitate public private platforms to develop bankable climate and carbon project pipelines.
- Deliver capacity building programs for provincial institutions on carbon revenue accounting, MRV oversight, and fiscal reporting.

Conclusion

Pakistan's climate challenge is no longer a future risk. It is a present and escalating reality marked by extreme vulnerability, repeated economic shocks, and deep social costs, despite the country's minimal contribution to global emissions. The evidence presented in this article underscores a central paradox. Pakistan ranks among the world's most climate affected countries, yet its ability to respond is constrained by institutional, financial, and market level limitations rather than by a lack of intent or policy vision.

Recent reforms, ranging from updated NDCs and climate finance strategies to green sukuk issuance and emerging carbon market guidelines, signal important progress. However, global experience clearly shows that climate ambition delivers results only when supported by credible markets, enforceable governance, and finance guided by integrity. Without robust MRV, Measurement, Reporting, and Verification systems, legal clarity, and professional standards, carbon markets risk becoming symbolic instruments rather than reliable sources of climate finance and resilience.

In this context, the role of professional institutions such as ICMA becomes critical. By embedding sound accounting, costing, assurance, and governance frameworks into carbon markets, sustainable bonds, and ESG practices, Pakistan can close the credibility gap that often deters long term investors. Well structured carbon markets and instruments such as Panda and green bonds can then evolve from pilot initiatives into scalable financing channels aligned with both national development priorities and global climate standards.

Ultimately, Pakistan's pathway forward lies in shifting from fragmented responses to a climate finance ecosystem guided by integrity and supported by functional markets. If executed with transparency, coordination, and accountability, climate finance can move beyond rhetoric to deliver measurable reductions in emissions, resilient infrastructure, and tangible benefits for communities most exposed to climate risk. The decisive question is no longer whether Pakistan needs climate finance but whether it can build the institutional and market foundations required to make that finance effective, credible, and transformative.

References

https://epd.punjab.gov.pk/system/files/3.1%20Restructuring%20Report.pdf

https://www.theenergymix.com/china-races-ahead-on-sustainable-finance/

https://www.climatebonds.net/news-events/blog/turning-point-japans-green-transformation

https://www.esgtoday.com/japan-launches-inaugural-11-billion-climate-transition-bond-offering/#:~:text=The%20government%20of%20Japan%20announced,major%20improvements%20in%20energy%20efficiency.

https://www.nccs.gov.sg/singapores-climate-action/mitigation-efforts/carbontax/

https://www.mas.gov.sg/news/media-releases/2025/gip-achieves-first-close-with-usd510-million-in-committed-capital

https://www.eda.admin.ch/countries/ireland/en/home/news/news.html/content/eda/en/meta/news/2024/4/10/100665

https://transparency.org.pk/PUBLICATION/Addressing-Governance-Gaps-and-Safeguarding-Against-Integrity-Risks.pdf

https://www.pakenvironment.org/newsletters/could-voluntary-carbon-credits-be-a-200-million-industry-for-pakistan/#:~:text=Unfortunately%2C%20Pakistan%20has%20made%20limited,energy%20and%20waste%20management%20sectors.

https://irm.edu.pk/pakistans-climate-change-paradox-vulnerability-responsibility-and-internal-action/

https://ccpi.org/country/pak/

https://mocc.gov.pk/

(This article is prepared by Dr. Maiyra Ahmed, Assistant Director, R&P, under the guidance of Shahid Anwar, Senior Director R&P)