

CLIMATE CHANGE

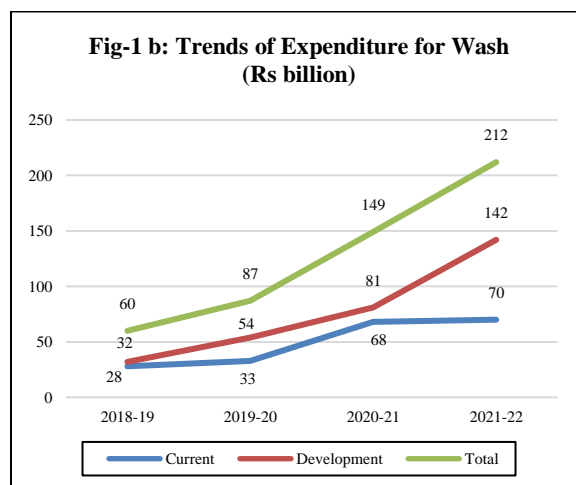
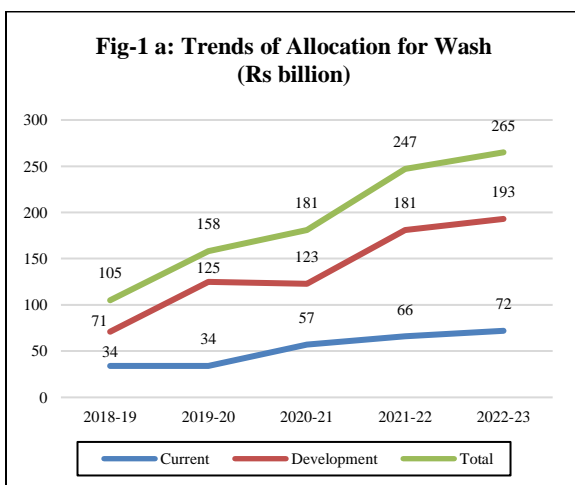
Climate change poses serious challenges to social, environmental and developmental activities, and leads to migration within and across national borders. The effects of global climate change in Pakistan are already evident in the form of growing frequency of droughts, floods, erratic weather behavior, changes in agricultural patterns, reduction in fresh water supply and the loss of biodiversity. Mitigating and adapting actions are considered to be the two key ways of combating climate change. The immediate and pressing task for the country is to prepare itself for adaptation to climate change. Notwithstanding the fact that Pakistan’s contribution to global greenhouse gas (GHG) emissions is small, its role as a responsible member of the global community in combating climate change is dedicated by giving due importance to mitigation efforts in sectors such as energy, transport, forestry and agriculture.

Water, Sanitation and Hygiene (WASH)

In Pakistan due to huge urbanization and environmental changes, there is a dire need to focus on the quality of drinking water in the country. Moreover, the growing population, further accelerates the demand for safe drinking water.

During FY2023, the government allocated Rs 265 billion for WASH services in the provincial and federal budgets of Pakistan. A review of the budget documents showed an upwards trend of WASH allocations from 2018 to 2023. There is an increase of 152 percent in budgetary allocations for WASH in FY2023 as compared to FY2019.

Similarly, an increase of more than 253 percent in WASH expenditures in FY2022 as compared to FY2019 has been observed.



The overall utilization of the allocated budget for WASH was 86 percent in FY2022, while it was 83 percent in FY2021, 55 percent in FY2020 and 57 percent in FY2019. For the last four years, the utilization of current budget for WASH services is more than 94 percent. On the other side, the

utilization of the development budget has also improved from 39 percent in FY2019 to 78 percent in FY2022. Overall and the provincial breakup of WASH budget for FY2023 are given in Table-1.

Table 1: Budget for WASH during FY2023 (Rs in millions)

Provinces/Region	Current	Development	PSDP	Total
Punjab	25,272	39,304	389	64,965
Sindh	22,613	55,345	23,584	101,541
KP (including NMDs)	15,872	38,639	200	54,711
Balochistan	8,530	31,502	3,621	43,652
Federal	-	-	538	538
Pakistan	72,286	164,789	28,332	265,408

Source: MoCC

There is a visible increase in the budgetary allocations for WASH during the last five years. This is coupled with investments made under enabling environment by different development partners along MoCC like Joint Sector Reviews, Policy Papers, WASH Sector Development Plans, etc.

An overview of overall WASH allocations for FY2023 in Pakistan reveals that highest allocations have been made in Sindh province (38.3 percent), followed by Punjab (24.5 percent), Khyber Pakhtunkhwa (20.6 percent) and Balochistan (16.4 percent), respectively.

Ten Billion Tree Tsunami Programme (TBTP)

The implementation of the TBTP was initiated in 2019 with a total cost of Rs 125.1843 billion on cost sharing basis for four years (2019-2023) to plant / regenerate 3.29 billion plants in the provinces / territories. An amount of Rs 3296.683 million (including both PSDP and ADP) has been utilized during 2022-23 (till March 2023) and 188.41 million plants were planted/regenerated/ distributed during July-March 2023. However, a cumulative total of 2027.01 million plants are planted/regenerated/ distributed till March 2023. The detail is given in the Table 2.

Table 2: Plantation/Regeneration/Distribution of plants under TBTP (2019-20 to March 2023) (in million)

S. No.	Province / Territory	Plantation/Regeneration/Distribution Progress				Total
		FY2020	FY2021	FY2022	FY2023 (till March 2023)	
1	Khyber Pakhtunkhwa	168.54	218.732	260.16	57.09	704.52
2	Punjab	58	74.251	151.75	44.00	328.0
3	Sindh	180.23	223.036	320	41.14	764.40
4	Balochistan	2.9	2.7496	6.514	2.94	15.10
5	AJK	69.087	35.447	37.48	21.57	163.59
6	GB	4.69	6.897	18.133	21.68	51.40
Total		483.447	561.1126	794.037	188.41	2027.01

Source: MoCC

Forests, Biodiversity and Wildlife Resources in Pakistan

Unfortunately, climatic conditions, rural poverty, dependence on natural resources, meager forest cover, and deforestation have rendered the country as one of the most vulnerable to climate change effects. Forest, biodiversity, and wildlife resources have suffered from the adverse effects of climate change. Besides, these resources are under tremendous pressure owing to changes in land

use and habitat destruction. Due to population increase, the consumption of fuel wood and timber extraction has increased.

The overall improvement of the sector in the country will require continuous efforts through a number of initiatives.

Membership of International Network on Bamboo and Rattan (INBAR)

Pakistan became a member of International Bamboo and Rattan Organization (INBAR).

INBAR is an Inter-Governmental Organization established in 1997 to promote environmentally sustainable use of Bamboo and Rattan. The network will support Pakistan in the propagation and value chain development of Bamboo in the country. Currently, the INBAR Secretariat is conducting a study on Bamboo Sector Development in Pakistan, mainly focusing on the following:

- Bamboo resource monitoring system;
- Bamboo market and value chain development;
- Enabling policies and regulations that support the use of bamboo for socio-economic and environmental development

Saudi Green Initiative (SGI) and Middle East Green Initiative (MGI)

An MoU has been signed with Kingdom of Saudi Arabia (KSA) to increase cooperation in the field of environment. Pakistan has welcomed the launch of the "Saudi Green" and "Middle East Green" initiatives by KSA. A meeting of the Joint Working Group was held under the Economic pillar of the Saudi Pakistan Supreme Coordination Council (SPSCC). Both sides have agreed to cooperate in the field of environment, vegetation development, and afforestation.

Forest Climate Leaders' Partnership

Pakistan joined Forests and Climate Leaders' Partnership as one of the members. The initiative is led by the UK and was launched at the first Ministerial meeting held at COP-27 in Sharm el Shaikh in November 2022.

National Tree Planting Campaign 2022

Tree planting campaigns were organized in 2022 to motivate people to maximize the tree cover and to supplement the natural forests in the country. National Tree Plantation Campaign 2022 was launched on 14th August 2022 with the target of planting 303.77 million during Monsoon 2022 season. Total achievement under the Monsoon 2022 was 181.79 million. Spring Tree Plantation Campaign-2023 has been launched in February 2023 with the total target of planting 240.05 million tree.

Mitigating Forest Fires

MoCC has devised a mechanism to mitigate the risk of forest fires. Standard Operating Procedures (SOPs) were prepared by the Ministry of Climate Change to prevent and control forest fires in consultation with provincial and other relevant stakeholders in May, 2022. Implementation plans to prevent forest fires based on SoPs have been operationalized in all provinces including territories.

The United Nations Climate Change Conference (COP27)

COP-27 of the United Nations Framework Convention on Climate Change was held from 6-20 November 2022 in Sharm el- Sheikh, Egypt. A delegation under the leadership of Prime Minister of Pakistan attended COP 27 and participated in a number of events. Pakistan has been able to perform a key role in COP 27 and raised issues for countries most adversely impacted by climate change. The key achievements are as under

- Pakistan chaired the G-77 & China group and through extensive efforts, got the L&D Fund placed on the agenda for COP 27, and later on pushed for a consensus agreement on it, which was successfully adopted. The establishment of the fund reflects Pakistan's ability to not only speak and deliver for itself, but also led the voices of developing countries at the international level. Pakistan's representation as the Chair of the G-77 & China has marked the country's important position at the international negotiations and Pakistan's presence at COP 27 was greatly recognized and appreciated.
- A Global Shield initiative receiving funding from the G-7 countries is set to mobilize funds to the Vulnerable 20 Group (V-20) countries and Pakistan will be amongst the first recipients, due to its climate vulnerable position and due to the recent heatwaves and floods. It aims to provide climate vulnerable countries with rapid access to insurance and disaster protection funding after floods or drought.

- The Global Fertilizer Challenge Ministerial announced \$135 million of funding for fertilizer efficiency projects, with the US funding to focus on Brazil, Colombia, Pakistan and Vietnam. Germany will also support the challenge with an additional €13.6 million, mostly centered on Sub-Saharan Africa, and will focus on efficiency and productivity.
- The demand for the establishment of the Global Goal on Adaptation Framework was echoed by the G-77 & China subgroups. Pakistan presented a very strong case given the catastrophic situation it is facing after the devastating floods.
- The agreement reached on establishing an Advisory Board of the Santiago Network on L&D (SNLD) as part of the Warsaw International Mechanism (WIM) on L&D. Pakistan had continuously pushed for WIM for the past two years and was successful to keep developing countries united to galvanize this support.

The Global Risk Modelling Alliance has launched the first climate risk and vulnerability assessment both at the national and sub-national level in Pakistan.

National Clean Air Policy (NCAP)

- Pakistan is currently facing extremely high levels of air pollution with some urban areas reaching hazardous pollution levels across the year. In 2019, Lahore's ambient Particulate Matter (PM_{2.5}) concentrations were as high as 123 µg m⁻³, 24 times higher than the WHO Air Quality Guideline.
- NCAP was launched in March, 2023; the objective of this policy is to improve air quality in the country by reducing pollution. The NCAP allows key institutions at national and provincial levels to understand the air quality status and identify, implement and monitor mitigation actions to reduce air pollution. The NCAP identifies one priority intervention in each of the five sectors with the aim of accelerating progress to reduce air pollutant emissions across all major sources. The five priority sectors are:
 - Transport: Implement Euro-5 and

Euro-6 Fuel Quality Standards

- Industry: Enforce emission standards for industries
- Agriculture: Prevent burning of agricultural residues
- Waste: Prevent open burning of municipal solid waste
- Households/ Residential: Promote the use of low emission cooking technologies

- The implementation mechanism of the NCAP requires that implementation plans at federal and provincial levels are devised. Moreover, resources would be required for the priority mitigation measures. Implementation of the NCAP will require active participation from stakeholders, including media, research institutions, civil society, and advocacy groups. The most polluting industries will be engaged to include air pollution reduction through enhance compliance and adoptions of actions as part of their Corporate Social Responsibility (CSR)

Pakistan Clean Air Action Plans

Pakistan is currently facing serious air pollution with some urban areas witnessing hazardous pollution levels across the year. The country faces regular smog episodes in winter, which are linked to high pollutant concentrations, resulting in severe impacts on the environment and public health. Moreover, crop yields have witnessed a reduction due to smog, posing food security challenges and impacting ecosystem production. The National Clean Air Policy provides overarching guidelines and recommendations to improve air quality which may be implemented on a provincial level. However, provinces need to have their own action plans contextualized to the ground realities. As such, the provincial action plans have been instigated by MoCC with the support from Clean Air Asia and Stockholm Energy Institute based on the integrated assessment of air pollution and climate change mitigation in Pakistan. The assessment identifies 13 mitigation actions which if implemented can reduce particulate matter air pollutant emissions by 83 percent and a 21.9 percent reduction in

total GHG emissions by 2050.

Nationally Determined Contributions (NDC) Implementation Plan

The updated Pakistan NDCs commit to abate overall 50 percent of Pakistan's projected GHG emissions by 2030. The federal and provincial NDC implementation plans were triggered by MoCC to strengthen enabling environment (e.g., policies, regulations, institutional arrangements) to overcome challenges and barriers to implementing activities committed, identify possible sources of funding and Monitoring Reporting and Verification (MRV) for the implementation of the NDC in all economic sectors, with a view to develop a financial investment plan and increasing awareness among stakeholders about what is required to achieve the NDC targets by seeking technical expertise, increasing buy-in for action in new areas and building knowledge capital in key institutions. The NDC focal persons from all line ministries and provincial governments were allotted to coordinate and collect the information for NDC Implementation plans. A series of consultations were organized by MoCC across Pakistan to identify priority actions on climate adaptation and mitigation specific to line ministries and provinces and have been compiled into implementation plans. The plans are under review and donors are already engaged to support resource mobilization to implement these priority actions.

Voluntary Carbon Markets (VCM)

Considering national circumstances and priorities; most importantly the external cost of damages caused by climate change and the ability of carbon markets to internalize such costs in part or full, the GoP had been striving to set up carbon markets in the country. A voluntary carbon market (VCM) is important for Pakistan because by voluntarily partaking in the carbon market, Pakistan has a great opportunity to offset the impacts of climate change induced disasters as well as for finance mobilization. Carbon trading will not only help Pakistan to achieve its NDC targets but also aid in navigating the investment for efficient technologies and processes, hence serving as a viable carbon-cutting policy. This will also

greatly benefit the population, especially those communities that are vulnerable and have little adaptive capabilities to withstand these impacts.

Currently, the Ministry of Climate Change is in the process of establishing and implementing a framework for VCM in order to be part of the global carbon market and for scaled up participation in VCM through transparent, verifiable, and environmentally robust VCM. The framework is developed to provide regulatory and political certainty to VCM transactions and establish a digital trade infrastructure to deliver greater transparency, efficiency and risk mitigation for buyers and sellers.

Net Zero Targets

A Net Zero goal and strategy will complement the long-term vision and strategy of the Government, as a responsible leader on climate ambition across the globe. Pakistan's Net Zero strategy will be coupled with sustainable economic growth while reducing the pressure on the environment and natural resources, with specific targets for every sector.

For Pakistan, Net Zero becomes a reality if the targets are informed by the evidence on the opportunities and associated risks, mitigation strategies and high stakeholders' buy-in on plan, priorities, and investments. Globally, countries that are making progress on Net Zero or carbon neutral futures are taking actions programmatically for transition across all prioritized sectors. Therefore, a long-term vision, supported by long-term low greenhouse gas emission development strategies (LT-LEDS) with periodic targets and checkpoints will be a key component in finalizing realistic Net Zero targets for the country. The main goal of the project is to delineate an evidence-backed plan to set realistic Net Zero targets for Pakistan aligned with its NDC 2021 that highlights the importance of "Just Transition", Vision 2025 and sustainable development. The activity plan will adopt bottom-up approach where stakeholders will be involved every step of the way to fulfill the objectives of building scientific evidence to inform net zero vision, setting up long-term ambition backed by sufficient near-term actions and leveraging private sector

potential to achieve net zero vision.

Short Lived Climate Pollutants

The MoCC developed Pakistan's first ever National Inventory for Short-Lived Climate Pollutants (SLCP) in consultation with stakeholders both at national and provincial levels in 2022. The inventory identifies the following priority actions:

- Improved vehicle inspection and maintenance
- Upgradation of fuel quality standards to Euro-5 or Euro-6
- Enhanced introduction of two/three-wheeler electric vehicles
- Development and improvement of mass transit systems
- Improved traffic management planning
- Promote low carbon fuel efficient infrastructure and technology within railways, maritime, and aviation sectors
- Promote urban forestry and management of green spaces
- Emission control in industry through compliance with emission standards
- Upgradation and management of brick kilns on clean technologies and practices
- Banning and promoting alternatives to crop burning
- Control of emissions from threshing and tilling
- Minimize and control forest fires through effective management
- Prohibition of open waste burning
- Improved waste management
- Use of improved and efficient cookstoves to reduce indoor air pollution
- Promote access to clean energy for indoor heating and cooking
- Promote energy efficiency and use of alternate energy across all sectors
- Promote clean energy in industrial sectors

National Adaptation Plan (NAP)

Pakistan is in the process of developing a National Adaptation Plan (NAP) for building resilience to climate change. The NAPs are widely seen as one of the most important

mechanisms for adapting to climate change. They aim to reduce vulnerabilities to climate impacts by creating comprehensive medium- and long-term plans, including the integration of adaptation measures into national policy. Pakistan will be using the National Adaptation Plan process and its outcomes to enhance the adaptation elements of the NDCs, a central aspect of the Paris Agreement. The NAP process will be in place by June 2023. The NAP project will help address the climate related challenges in the following priority areas;

- Water Resources
- Agriculture and Livestock
- Forestry
- Human Health
- Disaster Preparedness
- Urban Resilience
- Biodiversity and other ecosystems
- Gender

Natural Capital Accounts (NCA)

Environmental sustainability has been a global concern for many decades and the extent of concerns about the global response to issues of environmental sustainability has been articulated in many high-profile reports. There are also growing concerns about environmental sustainability in Pakistan. The World Bank's recent global report – The Economic Case for Nature (Johnson et al 2021) highlighted the significant impact that the loss of natural capital will have on global, national and sector economic growth. The results indicated that relative to a business-as-usual scenario, Pakistan is expected to face a 15 percent decline in GDP by 2030 (compared to a global GDP decline of 2.3 percent) with large impacts on the manufacturing sector (-32 percent).

MoCC, has shown proactive commitment towards strengthening NCA knowledge and foundation as part of its broader ambitions to build resilience against climate change and enhance biodiversity. Thus, MoCC envisions NCA as a key tool in:

- Updating, improving and implementing NDCs under the Paris Agreement as part of its revised 2021 National Climate Change Policy;

- Designing, implementing and monitoring progress on Pakistan’s NBSAP in the context of the UN Convention on Biological Diversity;
- Reviewing the National Forest Policy (2018) and identifying priority areas for reforestation under the Ten Billion Tree Project;
- Encouraging community engagement and green job creation in line with the Protected Areas Initiative (PAI) and formulating provincial climate change policies and livelihood plans
- Securing opportunities for sustainable finance including nature performance bonds, and reporting on the progress made towards achieving the SDGs.

NCA provides a framework for organizing biophysical and monetary data about the extent and condition of stocks of natural capital (ecosystems, natural resources, and biodiversity); and about the services and benefits natural capital supplies to businesses and society. The World Bank has supported MoCC in piloting NCA study for Chitral Gol and Juniper Forest in Ziarat.

Box: Living Indus Initiative

Pakistan has been consistently ranked amongst the top ten most vulnerable countries to climate change, mostly because of the impacts on the Indus system. The Indus river system is the lifeline of Pakistan, in more ways than one. More than 80% of Pakistan’s arable land is irrigated by the waters of the Indus. Nine out of the ten largest cities in Pakistan are situated within 50km or less of the waters of the Indus. The degradation of the Indus Basin presents a precarious economic, social, ecological as well as demographic challenge to Pakistan as a developing country.

The Living Indus Initiative¹, spearheaded by the MoCC, in collaboration with the United Nations, was approved by the Cabinet in September 2022 and presented at COP 27. The Initiative aspires to transform the Indus Basin into a thriving system by repairing and restoring the natural resources and ecosystems that are resilient in the face of climate change, thus advancing Pakistan’s commitment to SDG Goal 13 on Climate Action. The Initiative proposes a diverse set of 25 interventions to initiate coordinated executive efforts to restore the health of the Indus Basin in Pakistan with particular focus on water, ecology, biodiversity, and agriculture sectors. The ecological restoration of the Indus Basin under LII will require indicative investment of between \$ 11 billion to \$16 billion (from public, private and development sector) in the short to medium term in the next 10-15 years’ time.

Interventions under Living Indus Initiatives

1. Green Infrastructure for Flood Control and Groundwater Recharge	14. Zero Plastic Waste Cities Along the Indus
2. 100,000 Community Ponds	15. Urban Forests along the Indus
3. Sustainable Groundwater Governance through Provincial Water Acts	16. Indus Protection Act
4. Nature-Based Resilient Agriculture	17. Indus Protected Areas
5. Indus Clean-up: Industrial and Urban Effluent Treatment	18. Build Back Biodiversity in the Indus Basin
6. Salinity Control in the Lower Indus	19. Community Based Ecotourism
7. Climate Resilience on the Indus Delta	20. Indus Heritage Sites
8. Sustainable Aquaculture and Fisheries Management	21. Nature-Based Watershed Management
9. A Living Indus Knowledge Platform: Crowd sourcing knowledge	22. Expanded GLOF II
10. Indus Trust Fund	23. Promoting Permaculture
11. Climate and Nature Performance Bonds for a Living Indus	24. Managing Agricultural Wastewater
12. Social Entrepreneurship for a Climate Resilient Indus	25. Telling the Living Indus Story
13. Community Access to Clean Energy	
Source: FAO	

National Electric Vehicle Policy (NEVP)

The National Electric Vehicle Policy (NEVP) was approved by the Cabinet in November, 2019. Ministry of Climate Change is spearheading the Electric Vehicle Policy. This

initiative reflects net benefits in the range of US\$ 2.2 billion to US\$ 3.7 billion as net savings in Pakistan’s oil bills, under different scenarios in the 2020 to 2030 time period. Additionally, there are benefits on account of job opportunities;

¹ www.livingindus.com

potentially creating 35000-40000 jobs, reduction in emissions and air pollution/smog; associated health benefits; and long-term economic benefits from establishing local manufacturing. This is a flagship initiative of the Government of Pakistan to ensure that by 2030, 30 percent of total vehicles on the road will be Electric Vehicles.

The Economic Coordination Committee (ECC) of Cabinet has approved a scheme of e-Bikes and e-Rickshaws. Under this scheme up to three hundred thousand e-Bikes and e-rickshaws will be given to students, employees and low-income groups through easy installments for a period of three years at 0 percent interest rate. This scheme will be extended to second phase. By adoption of e-Bikes and e-rickshaws oil import bills will be reduced significantly. Currently, around 45 percent of annual total oil-import is used for bikes, passenger and loader rickshaws costing around USD 4.1 billion.

Climate Adaptation and Resilience (SAR)

Strengthening Climate Adaptation and Resilience Project launching in Pakistan marks a significant milestone in the country's efforts to address the challenges of climate change. It supports the measures at the local level as well as up scaling through international climate finance. It is also in line with "Pakistan 2025: One Nation - One Vision" which emphasizes the need for adaptation to climate change. More specifically, SAR project supports the Government of Pakistan in three areas:

1. Climate Risk Assessments
2. Planning and financial instruments for climate risk management
3. Accessing international climate finance.

GIZ has offered an estimated financial support of up to 10 million euros (grant) under the SAR project. Aiming to create an enabling environment and lay the ground for implementation of climate resilience and adaption initiatives in Pakistan.

Climate Impacts on the Fiscal Risk Position of the Government

Climate and natural hazard events pose two significant risks to the Government's fiscal

position, namely physical risks, and transition risks. The physical risks refer to the adverse impacts of climate change and natural disaster events that directly affect people and ecosystems through floods, droughts, heatwaves, and hurricanes, which in turn, strain the government's fiscal position. For example, the 2018 drought in Balochistan resulted in crop losses of up to 80 percent, leading to widespread food insecurity and migration. Similarly, the 2021 drought in Sindh affected over 5 million people and caused losses of over Rs 100 billion². Due to flash floods, which have caused significant damages to infrastructure and homes.

Most recently, August 2022 floods, Pakistan experienced disruption of economic activity, infrastructure damages and loss of crops, which adversely affected its tax income, stagnated public revenues and increased social transfer payments.

Contingent liabilities have also explicitly or implicitly exposed the Government to fiscal risks. With earthquakes and floods, natural disasters in Pakistan have damaged and destroyed physical government assets as well as public infrastructure, requiring significant expenditure on social protection programs and consequent liabilities to damage repair and reconstruction. Natural disasters have also affected the operations of SOEs. Pakistan Railways, for instance, closed the main line for 35 days during the last floods, resulting in loss in both passenger and freight revenues, whereas the National Highway Authority (NHA) experienced an almost 25 percent decline in its revenues year on year (YoY) due to its inability of commuters to use physical assets³.

Overall, such crisis response measures have been expensive and have a significant impact on public spending. Moreover, fiscal shocks from extreme climate events, although may seemingly come across as short term in nature, have lasting impacts on growth and public finances. Besides physical risks, there are transition risks that have also affected the Government's fiscal position. These risks arise from the need to reduce greenhouse gas emissions, which could result in stranded assets, reduced demand for carbon-

² Pakistan: Drought in Baluchistan and Sindh, WHO Situation Report, 2019 ([link](#))

³ Resilient recovery, rehabilitation, and recovery framework Pakistan, 2022 Ministry of Planning, Development and Special Initiatives, GoP

intensive products, and increased costs associated with the transition.

Strategies to Mitigate Climate and Disaster Risk

The cost arising from both physical and transition risk needs to be managed in a fiscally responsible manner. To alleviate the risk arising from climate and natural hazards, the Government has taken several measures as part of its fiscal risk mitigation strategy.

First, the Government now has a comprehensive climate change policy, which provides an overarching framework for climate action across different sectors. For instance, in the energy sector, the policy emphasizes the assessment of the impact of hydropower projects on the environment and local communities, futuristic building designs with solar panels, exploration of clean coal technologies, the introduction of carbon taxes, gradual introduction of Green Fiscal Reforms, incentivization of energy audits, and enactment of energy conservation legislation. By having a policy framework, the Government can now lead the way by investing in climate-resilient infrastructure and technology, thereby reducing the likelihood of damage and losses from climate-related disasters.

Second, the Government has undertaken broad based efforts for climate-proofing of existing infrastructure assets. Therefore, the Government has initiated several projects aimed at strengthening infrastructure resilience to climate change. For example, the NHA has initiated the "Climate Change Vulnerability Assessment of National Highways" project, which aims to identify the potential risks posed by climate change to the national highways and develop measures to mitigate these risks. In addition, the Government in partnership with development partners has planned investments to climate proofs and modernize vital irrigation assets. For instance, ADB is helping Punjab province to improve water resource management and increase agricultural productivity to enhance food security and build resilience against climate risks. The upgraded Trimmu and Panjnad

barrages are now equipped with modern technology and have expanded capacity to regulate the flow of water and protect vast farmlands from flooding. Also, as part of the CPEC, China's Lanzhou University has helped set up a state-of-the-art weather monitoring station at Pakistan's Peshawar University⁴.

Third, the Government has implemented Disaster Risk Reduction (DRR) measures. The Government through the National Disaster Management Authority (NDMA) has developed a National Disaster Risk Management Framework to guide the development of disaster risk reduction strategies and policies⁵. The framework includes measures to improve early warning systems, enhance disaster preparedness, and improve response and recovery.

Fourth, the Government is making efforts to align DRR projects on science-based principles, which will be necessary to mitigate impacts due to floods, droughts, earthquakes, and cyclones. The lead agency in this regard has been the National Disaster Risk Management Fund (NDRMF), which was established in 2016 to finance DRR and preparedness projects in Pakistan. NDRMF has been working on various projects, including the construction of disaster-resilient schools, hospitals, and emergency operation centers in disaster-prone areas, the installation of early warning systems, and capacity building of local communities to better prepare for natural disasters. For flood protection, NDRMF has invested in embankments, spurs, and other flood protection structures and has provided funding for the construction of a flood protection structure in the district of Shangla, Khyber Pakhtunkhwa, which has reduced the risk of flooding for over 1,600 households. NDRMF has also invested in earthquake resilience projects, such as retrofitting of school buildings and hospitals to make them more earthquake resistant. Last, it has supported community-based disaster risk management (CBDRM) initiatives in Pakistan.

As an extension of its science-based DRR efforts, the Government is also in the process of developing a first of its kind National Catastrophe (Nat-Cat) model. The Nat-Cat

⁴ China Is Climate-Proofing The Belt And Road, Starting With Pakistan, RuqiyahAnwer, UNDRR 2022 ([link](#))

⁵ National Disaster Risk Management Framework, NDMA, GoP 2007 ([link](#))

model is a joint initiative of the NDRMF and the Space and Upper Atmosphere Research Commission (SUPARCO) of Pakistan. It is aimed at developing a comprehensive modeling tool for natural disaster risk assessment and management in the country around four critical areas: floods, earthquakes, droughts, and cyclones⁶. The Nat-Cat model incorporates a range of factors such as geographic information, climatic and environmental data, and historical disaster records to predict the likelihood and impact of future natural disasters in Pakistan. The model is intended to help policymakers identify areas of high risk and prioritize resources for disaster preparedness and mitigation.

Fifth, the Government has implemented several community-based approaches to tackle climate change at the grassroots level. One such initiative has been a large afforestation project that involves local communities in planting and nurturing trees, providing them with employment opportunities and environmental benefits. Another example is the Clean Green Pakistan campaign, which is a nationwide initiative to address environmental challenges and promote sustainable development⁷. The Government has also been working with UNDP Adaptation Fund to provide financial assistance to communities for the development of climate-resilient infrastructure and projects⁸. Additionally, the government has established Community-Based Disaster Risk Management (CBDRM) committees in vulnerable communities to enhance their resilience to climate change-induced disasters.

Last, the Government has initiated efforts to improve access to international climate finance funds, such as the Green Climate Fund (GCF) to expand its fiscal space for climate resilient projects. For instance, as part of 2021 NDC mitigation actions, several urban transportation projects have been introduced in the cities of Karachi, Islamabad, Lahore, Peshawar, and

Multan. Work on the Green Line BRT in Karachi is ongoing with the support of \$583.5 million from the GCF and other multilateral donors. The Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the Agence Française de Développement (AFD) and the Green Climate Fund (GCF) are supporting the Karachi Bus Rapid Transit Red Line Project⁹. In Karachi, the Federal Government has approved a public-private-partnership (PPP) structure for the revival of the Karachi Circular Railway (KCR) to help reduce GHG emissions, for which a financing structure worth Rs 201 billion is already approved¹⁰.

Way Forward

Climate change is a global phenomenon which has been identified as one of the biggest threats to humanity in the 21st century. Pakistan is one of the most vulnerable countries to climate change despite being a low carbon emitter. Pakistan is at risk of extreme weather variations and unexpected occurrences. The gradual increase in air and soil temperature will cause water scarcity, while recurring heatwaves will intensify the situation and worsen droughts.

Climate change mitigation and adaptation is a national priority imperative for Pakistan and government aims to strengthen air and water pollution control. The government has developed the national climate Change Policy which is the strategic vision for climate change for Pakistan. The policy actions to combat the climate change are further supported by development of Implementation framework for NDC which will be the major pathway to track the progress in global milieu of climate action. Climate and Green Budgeting aims to use budgetary tool to achieve environmental and climate goals. Incorporating green budgeting in Public Financial Management (PFM) cycle, will be instrumental in tracking and monitoring climate related expenditure in federal government.

⁶ National Catastrophe Model, NDRMF ([link](#))

⁷ Pakistan's First Biennial Update Report (BUR-I), UNFCCC 2022

⁸ Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan, Adaptation Fund ([link](#))

⁹ Pakistan's First Biennial Update Report (BUR-I), UNFCCC 2022

¹⁰ CPEC Authority, Ministry of Planning, Development & Special Initiatives ([link](#))