Global Shield against Climate Risks: In-Country Process, Pakistan

Stocktake & Gap Analysis Report

UNDP & Global Shield Secretariat

Ministry of Climate Change & Environmental Coordination
Government of Pakistan

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Abbreviations

AAL	Average Annual Loss
ACF	Action Against Hunger
AHDRR	Anticipation and Humanitarian Disaster Risk Reduction
AJK	Azad Jammu and Kashmir
ASP	Adaptive Social Protection
AYII	Area Yield Index Insurance
BISP	Benazir Income Support Programme
BMZ	German Federal Ministry for Economic Cooperation and Development
BSDSB	Bright Star Development Society Balochistan
CCA	Climate Change Adaptation
CDRFI	Climate and Disaster Risk Finance and Insurance
CLIS	Crop Loan Insurance Scheme
CRCP	Climate Risk Country Profile
CRF	Climate Risk Facility
CRIF	Climate-Resilient Infrastructure Fund
CRISP	Crisis Resilient Social Protection
CSOs	Civil Society Organisations
CSSP	Civil Society Support Program
DDMAs	District Disaster Management Authorities
DDMUs	District Disaster Management Units
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EEC	Ehsaas Emergency Cash
EMIs	Electronic Money Institutions
FIFs	Federal Insurance Fee
G7	Group of Seven
GB	Gilgit Baltistan
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit

GLOF	Glacier Lake Outburst Flood
G-MSP	Government's Mark-up Subsidy Program
GPP	Green Pakistan Programme
GRMA	Global Risk Modelling Alliance
GS	Global Shield
GST	General Sales Tax
HICAP	Himalayan Climate Change Adaptation Programme
IAP	Insurance Association of Pakistan
ICP	In-Country Process
IDPs	Internally Displaced Persons
IPCC	Intergovernmental Panel on Climate Change
LISB	Livestock Insurance Scheme for Borrowers
MCSP	Mother and Child Support Programme
MFIs	Micro Finance Institutions
MHVRA	Multi Hazard Vulnerability & Risk Assessment
MiN	Microinsurance Network
MNOs	Mobile Network Operators
MoC	Ministry of Commerce
MoCC&EC	Ministry of Climate Change & Environmental Coordination
MoPASS	Ministry of Poverty Alleviation and Social Safety
MSMEs	Micro Small and Medium Enterprises
NCC-GAP	National Climate Change Gender Action Plan
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NDRMF	National Disaster Risk Management Fund
NEOC	National Emergency Operations Centre
NFIS	National Financial Inclusion Strategy
NGOs	Non-Governmental Organisations
NSER	National Socio-Economic Registry
OPM	Oxford Policy Management
PBM	Pakistan Bait-ul-Maal

PDMAs	Provincial Disaster Management Authorities
PEOC	Provincial Emergency Operations Centre
PHCSP	Pakistan Hydromet and Climate Services Project
PII	Pakistan Insurance Institute
PMD	Pakistan Meteorological Department
PMNHP	Prime Minister's National Health Program
PSDP	Public Sector Development Plan
PSHA	Probabilistic Seismic Hazard Analysis
PVA	Poverty and Vulnerability Assessment
SBP	State Bank of Pakistan
SDGs	Sustainable Development Goals
SDMA	State Disaster Management Authority
SDPI	Sustainable Development Policy Institute
SECP	Securities and Exchange Commission of Pakistan
SFB	Sustainable Finance Bureau
SMART	Strengthening Markets for Agriculture and Rural Transformation
SMEDA	Small and Medium Enterprises Development Authority
SMEs	Small and Medium-Sized Enterprises
SNG	Strengthening National Governance
SP	Social Protection
SPHF	Sindh Public Housing Foundation
SSPA	Sindh Social Protection Authority
SWAT	Sindh Water and Agriculture Transformation
SWOT	Strengths, Weaknesses, Opportunities, Threats
TVO	Trust for Voluntary Organisations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCC	United Nations Framework Convention on Climate Change
V20	Vulnerable Twenty
WFP	World Food Programme

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The TAG Recommendations shared with In Country Coordinator are intended as guidance, and their application to revise the Gap Analysis remains at the discretion of the In-Country Coordinator in **Pakistan.** This approach respects national priorities and contexts while leveraging the TAG's expertise to inform potential improvements.

Specific chapters were developed in collaboration with partner organisations:

Chapter 3 – Risk Assessment
Author – Global Risk Modelling Alliance (GRMA)
Contributor – Oxford Policy Management (OPM)

Chapter 4 – Country Priorities & Strategies
Contributor – Oxford Policy Management (OPM)

Chapter 5 – Enabling Environment
Section 5.3 – Capabilities of the Domestic Private Sector for Insurance and Banking
Author – Microinsurance Network (MiN)
Section 5.7 - Capabilities of Microfinance Sector
Author – World Bank

Chapter 6 – Financial Protection and Solution Linkages
Section 6.3 – Themes linking to Financial Protection
Contributors – Oxford Policy Management (OPM), GIZ, World Food Programme (WFP)

Chapter 7 – Gap Analysis
Section 7.4 – Insurance Sector Gaps
Author – Microinsurance Network (MiN)
Section 7.5 - Gender and Social Inclusion Gaps
Author – Oxford Policy Management (OPM)

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Forewords

MESSAGE FROM MINISTRY OF CLIMATE CHANGE & ENVIRONMENTAL COORDINATION

Pakistan's Global Shield Stocktake and Gap Analysis Report is a key outcome of the In-Country Process (ICP) initiated under the Global Shield against Climate Risks (GS), led by the Ministry of Climate Change & Environmental Coordination (MoCC&EC) with the technical support of UNDP Pakistan. Pakistan is the first country in Asia and the second globally to successfully complete the ICP under the GS. This significant milestone reflects Pakistan's commitment to strengthening Climate, Disaster Risk Finance and Insurance (CDRFI) mechanisms to enhance financial resilience against climate-induced disasters.

The report presents a detailed stocktake of existing CDRFI mechanisms in Pakistan, identifies critical protection gaps, and outlines key areas for financial and technical support. It highlights the country's economic and social vulnerabilities to climate-induced disasters, assesses the regulatory and policy environment, and examines the enabling conditions for CDRFI, including institutional capacities, insurance sector challenges, financial protection gaps and inclusion in key sectors.

A major finding of the gap analysis is the lack of financial protection for public infrastructure, as well as insufficient insurance coverage for agriculture and livestock losses. Additionally, the report identifies critical deficiencies in adaptive social protection, risk analytics, and risk modelling capacities, which are essential for structuring effective and innovative financial protection strategies and solutions. The report also underscores the need for targeted policy interventions, enhanced coordination among stakeholders, and greater investment in market-based risk transfer instruments to strengthen Pakistan's financial resilience against climate risks.

On behalf of MoCC&EC, I would like to extend my sincere appreciation to UNDP Pakistan for their valuable technical support in facilitating the ICP and leading the stocktake and gap analysis exercise across Pakistan. The support from provincial, regional and federal departments was instrumental in informing the Global Shield ICP. I also extend my gratitude to the Global Shield Secretariat for their continuous guidance, ensuring an inclusive and well-informed process. The contributions from partner agencies, including GRMA, OPM, MiN, WFP, the WB, and GIZ. Their support has been instrumental in shaping this report and laying foundation for Pakistan's request for support.

The in-country inclusive and participatory consultative process has marked the immense need of pre-arranged financing for climate and disaster risk financing in Pakistan. Given the scale of climate vulnerabilities, it is imperative to prioritize the most critical interventions to enhance overall financial resilience. The Pakistan Global Shield Stocktake and Gap Analysis Report serves as a foundation for targeted action. We remain committed to mobilizing the necessary resources and partnerships to bridge these gaps effectively.

I look forward on the next steps for advancing Pakistan's request for support and engaging with the Global Shield Coordination Hub to secure the necessary technical and financial assistance.

Aisha Humera Ch. Secretary, Ministry of Climate Change and Environmental Coordination

MESSAGE FROM GLOBAL SHIELD SECRETARIAT

The Secretariat of the Global Shield against Climate Risks is proud to present this Stocktake and Gap Analysis Report — a key milestone in Pakistan's journey as one of the Global Shield's pathfinder countries.

Pakistan stands on the frontlines of climate risk, facing mounting challenges that threaten lives, livelihoods, and economic stability. Recognising the urgent need for stronger financial protection, the Vulnerable Twenty (V20) Group and the G7 launched the Global Shield against Climate Risks to work

with national governments and partners to deliver more effective and timely pre-arranged finance that strengthens resilience where it matters most.

This report is a critical step in Pakistan's In-Country Process (ICP), led by the Ministry of Climate Change & Environmental Coordination (MOCC&EC) and supported by the United Nations Development Program (UNDP). It offers a clear, evidence-based assessment of existing prearranged financing mechanisms, the critical gaps that persist, and the priority areas where support is needed from the Global Shield, its partners and Financing Vehicles. The report provides a strong foundation for Pakistan's Request for Support to the Global Shield, helping align international support with national priorities and thus promoting long-term, sustainable solutions that protect the most vulnerable populations.

We commend Pakistan's leadership for its proactive commitment to closing financial protection gaps and express our deep appreciation to the MOCC&EC, UNDP and all national and international stakeholders for their contributions to this report. We look forward to continued collaboration to ensure that these findings translate into concrete actions that enhance Pakistan's financial resilience against climate risks.

Dr. Astrid Zwick & Nilesh Prakash, Co-Directors, Global Shield Secretariat

MESSAGE FROM RESIDENT REPRESENTATIVE, UNDP PAKISTAN

The rising frequency and intensity of climate-induced disasters in Pakistan, most notably the 2022 floods, have led to profound economic and human losses, particularly among the most vulnerable communities. These events not only threaten lives and livelihoods but also undermine long-term development progress.

Strengthening Climate and Disaster Risk Finance and Insurance (CDRFI) mechanisms has therefore taken centre stage as an urgent public policy priority for Pakistan. Effective CDRFI systems can provide timely financial protection, support recovery, and safeguard development gains, ensuring that Pakistan is better equipped to manage future shocks.

The Global Shield Against Climate Risks (GS) has played a transformative role in shaping Pakistan's disaster risk finance landscape. With the technical support from UNDP Pakistan, the Ministry of Climate Change and Environmental Coordination led an inclusive and participatory process to conduct a comprehensive assessment of the country's CDRFI ecosystem. As the first country in Asia — and second globally — to complete this process, Pakistan has demonstrated strong leadership in advancing financial preparedness for climate resilience.

This report on Pakistan Global Shield Stocktake and Gap Analysis is a cornerstone of the GS in-country process, offering valuable insights into the challenges and opportunities within the CDRFI landscape. It highlights protection gaps across critical sectors, outlines strategic interventions to enhance sovereign risk financing, expand pre-arranged financing tools, and integrate climate-responsive mechanisms into policy and social protection programs.

By addressing these priority gaps, Pakistan can establish robust financial mechanisms that mitigate the economic impact of climate-induced disasters and ensure the protection of its most vulnerable populations.

UNDP Pakistan remains committed to supporting the government and partners at all levels to scale up CDRFI solutions. Through strategic collaboration with the Global Shield Secretariat, Coordination Hub, and Financing Vehicles, UNDP will continue working for a more resilient and financially protected future for all Pakistanis.

Dr. Samuel Rizk, Resident Representative, UNDP Pakistan

Executive Summary

During COP 27, the G7, in collaboration with the Vulnerable Twenty Group (V20) of Finance Ministers, established the Global Shield (GS) against Climate Risks to increase protection for climate-vulnerable economies and communities by providing and facilitating more and better-prearranged finance against disasters and climate risks. Pakistan was selected as one of the Global Shield's pathfinder countries, giving the country the opportunity to access tailored technical and financial support to scale up prearranged finance for its most vulnerable people. Through an inclusive and government-led In-Country Process (ICP), the Global Shield works with countries to identify protection gaps and submit a request for support to the Global Shield Coordination Hub and the Global Shield Financing Vehicles. The key outcomes of the ICP includes the stocktake of existing Climate, Disaster Risk Finance and Insurance (CDRFI) programmes, a comprehensive gap analysis, and the request for CDRFI support.

In November 2023, The Ministry of Climate Change & Environmental Coordination (MOCC&EC) initiated the ICP for Pakistan with the partnership and technical support of UNDP Pakistan. Subsequently, the stocktake and gap analysis exercise has been conducted through inclusive and participatory, consultative sessions at provincial/ regional and federal levels, i.e. Punjab, Sindh, Khyber Pakhtunkhwa (KP), Balochistan, Azad Jammu and Kashmir (AJ&K), Gilgit Baltistan (GB) and Islamabad. These consultations were attended by stakeholders relevant for CDRFI, including the government agencies/ departments, private financial institutions and insurance companies, UN Agencies, development partners, private sector organisations/Non-Governmental Organisations and academia. Experts from the Global Shield Secretariat virtually joined all the sessions, observing the complete process.

This report captures the findings of the stocktake and gap analysis. Besides the findings of the consultative sessions, the report is also based on the available body of knowledge (laws, policies, research reports) on CDRFI in Pakistan, insights captured from the consultations, and input from the partner agencies, including GRMA, OPM, MiN, WFP, WB, and GIZ. The report focuses on Pakistan's economic and social situation, vulnerability to climate-induced disasters, the country's climate disaster-related regulatory and policy frameworks, the factors contributing to the enabling environment for CDRFI (institutions, legal and regulatory frameworks, capabilities of domestic private sector for insurance and banking etc), stocktake of existing CDRFI and related initiatives/projects, and the detailed gap analysis.

Pakistan is the fifth-largest country in the world, with a population of 241.5 million, most of whom are residing in rural areas. The rural economy is predominantly agriculture-based and a significant sector contributing to the country's Gross Domestic Product (GDP). Pakistan is a developing country with numerous socio-economic challenges. The relatively low GDP per capita reflects Pakistan's economic challenges, including a large population base and limited industrialisation. The country faces several fiscal problems, including budget deficits and debt burden.

According to the Global Climate Risk Index, Pakistan is among the most vulnerable countries due to climate change. The country is highly susceptible to a wide range of climate hazards, including floods, droughts, heat waves, and glacial melt, with historical data indicating an increase in the frequency and intensity of these events due to climate change. These climate-related hazards disproportionately affect vulnerable groups, exacerbating existing social inequalities. Women, people with disabilities, the elderly, children, youth, displaced individuals, indigenous communities, and other minorities are particularly vulnerable due to their limited access to resources, mobility, financial services and social protection.

Financial protection has gained significant attention over the past decade with the increasing recognition of climate change as a critical public policy issue. This has led to the development of more detailed policies and strategies to address its impacts. A review of the existing regulations and policies indicates sporadic coverage of disaster risk financing. Climate change policies and action plans, derived from environmental laws, mainly focus on financing mitigation and adaptation measures, ignoring financial protection during disasters. The rules and policies governing the Disaster Risk Management (DRM) mainly

cover the financing for risk retention instruments like reserve funds, contingency budgets, etc., with a little emphasis on market-based instruments like catastrophic bonds and insurance.

The analysis of the enabling environment for CDRFI captures the capacities of the institutions dealing with climate, disaster, and financial sectors like insurance, banking, mobile networks, etc. The analysis indicates that there are specific gaps in the enabling environment ranging from regulatory and policy framework, institutions implementing the government's policies related to climate and disaster, financial and insurance institutions. However, many positive developments can help to address these gaps. These include planned /under-process disaster risk financing strategies, continuous updating of climate change policies (example of Punjab and Balochistan), the focus of different regulatory bodies like SECP and State Bank on financial inclusion, the growing interest of international development agencies in helping Pakistan overcome the climate change-related challenges, and continuous technological developments and ICT adoption by business organisations and government agencies.

The initial stocktaking reveals that the costs of most large natural disasters are retained on government books, and only a few insurances or non-insurance CDRFI instruments are either under development or in pilot mode. There are certain programmes, primarily financed and managed by international development agencies, that focus on promoting CDRFI and supporting the national/sub-national governments in the CDRFI area. However, many programmes can be tagged as "CDRFI-related programmes" that primarily aim at Disaster Risk Management and Reduction (all areas, including infrastructure investments, early warning systems anticipatory actions), climate change adaptation (all relevant sectors/departments affected by the climate change and covered in the respective climate change strategy/ roadmap), social protection/safety nets, livelihood assistance, and a few projects about financial inclusion of affected people.

Thus, the stocktake and gap analysis also explores themes linked to financial protection. Adaptive Social Protection (ASP) is essential to build long-term climate resilience of poor and vulnerable households. However, social protection programmes are not (fully) designed to be responsive to shocks. There is a lack of a formal framework and financing mechanism for Adaptive Social Protection, and deficiencies also exist in the institutional framework, with a lack of synergies between DRM authorities and social protection institutions. Similarly, anticipatory action / Early Warning Systems are also weak. Overall, the government hardly avails any market-based risk transfer instrument, contributing to the slow growth of insurance and relevant financial institutions for macro-level disaster-related programmes.

The Gap analysis is the most significant portion of the exercise. Major findings about CDRFI gaps are a lack of financial protection for the restoration of public infrastructure, in the agriculture & livestock sector, and a lack of adaptive social protection. There are also deficiencies in CDRFI-relevant policies and strategies, such as a lack of consensus on the definition of climate finance and CDRFI, overemphasis on financing for climate change adaptation and mitigation measures, and a disconnect between general climate change adaptation policies and specific sectoral policies. In addition, there are certain deficiencies in the enabling environment, ranging from policy and institutional frameworks to the capacities of the insurance sector, mobile network operators, MSMEs, micro finance, CSOs, and subnational authorities.

The insurance sector, a prominent partner in every CDRFI initiative, faces challenges in Pakistan, including regulatory barriers, a lack of standardised product definitions, consumer awareness/trust issues, taxation, and cost barriers, etc. In addition, there are gaps related to gender and social inclusion, including limited focus on climate-related policies, lack of targeted financial tools, and limited access to financial products for marginalised groups and vulnerable populations, particularly women in rural areas.

One of the most significant gaps in the CDRFI area is the non-availability of accurate disaster risk analytics and risk modelling information and related capacities. A limited number of Multi-Hazard Vulnerability & Risk Assessment (MHVRA) analyses are inadequate for local adaptation planning or structuring local risk transfer mechanisms.

The exercise identifies the broader areas to be considered for Pakistan's request for CDRFI support to the Global Shield. These broadly include financial protection of public infrastructure (particularly schools), insurance for crop and livestock losses, and adaptive social protection. Moreover, developing risk modelling, analytics and capacity development has emerged as a potential area for technical assistance.

This stocktake and gap analysis, therefore, provides a base for developing Pakistan's consolidated request for CDRFI support to the Global Shield.

1. Introduction

The Vulnerable Twenty (V20) Group of Finance Ministers and the Group of Seven (G7) have acknowledged that 98% of nearly 1.5 billion people in V20 countries do not have financial protection against climate change impacts. To address this challenge, the Global Shield (GS) against Climate Risks has been established. Its goal is to increase protection for climate-vulnerable economies and communities by providing and facilitating substantially more and better prearranged finance against disasters and climate risks. The identification of country-specific needs and options for interventions/instruments is facilitated through an In-Country Process (ICP) that is demand-driven and grounded in the principles of transparency, inclusivity, complementarity, and country ownership.

During COP27, Pakistan was selected as one of the pathfinder countries of the 'Global Shield against Climate Risks' (GS). It gives Pakistan access to more and better-prearranged financing arrangements through tailored technical and financial support. An In-Country Process (ICP) is being led by the Ministry of Climate Change & Environmental Coordination (MOCC&EC) with United Nations Development Programme (UNDP) as a support structure. The ICP comprises stock-take, a gap analysis and request for CDRFI support. To facilitate the ICP, UNDP has further engaged the Sustainable Development Policy Institute (SDPI) in Pakistan.

The ICP, launched in November 2023, emphasised the importance of institutional harmonisation, public-private partnerships to boost capacity, and the development of cost-effective, prearranged financing solutions at all levels to address the country's protection gap. To make the ICP inclusive and participatory, consultative sessions were conducted at regional and federal levels, i.e. Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, Azad Jammu and Kashmir (AJK), Gilgit Baltistan (GB) and Islamabad. The consultations, aimed at taking stock of CDRFI interventions and identifying priority gaps, were jointly designed by MoCC&EC, UNDP, and SDPI under the guidance of the Global Shield Secretariat. These consultations were attended by stakeholders relevant to CDRFI, including the government agencies/ departments (dealing with disaster risk management/reduction, climate change adaptation, planning & financing, etc.), private financial institutions and insurance companies, private sector organisations/Non-Governmental Organisations engaged in climate change and disaster risk related interventions and academia. Experts from the Global Shield secretariat virtually joined all the sessions, observing the complete process and responding to the participants' questions. A summary of the key findings of the Regional and federal level consultations is given in Annex A.

This stocktake and gaps analysis report is based on the available body of knowledge (laws, policies, research reports) on Climate, Disaster Risk Finance and Insurance (CDRFI) in Pakistan, insights captured from the consultations, and input from the partner agencies, including Global Risk Modelling Alliance (GRMA), Micro Insurance Network (MiN), Oxford Policy Management (OPM), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and World Food Programme (WFP).

Following this introduction, Chapter 2 of the report captures Pakistan's general country profile, covering its economic and social situation. Chapter 3 discusses the risk assessment, elaborating upon available risk information regarding each significant hazard and the financial implications of these hazards in different sectors, and Chapter 4 provides an overview of national and sub-national level strategies/policy frameworks relevant to Disaster Risk Management (DRM), CDRFI, climate change adaptation, and social protection, etc. Chapter 5 discusses the enabling environment, capturing an overview of existing CDRFI-relevant legal and regulatory frameworks, capabilities of insurance and banking, mobile network operators / mobile money, Micro Small and Medium Enterprises (MSMEs), microfinance, Cooperatives/ Civil Society Organisations (CSOs) and Subnational authorities.

The remaining portion of this report focuses on the core stock take and gap analysis. Chapter 6 records the CDRFI projects and solutions currently in place or under development, as well as a description of the themes linked to financial protection, including the status of adaptive social protection systems, anticipatory action / early warning systems, and disaster risk reduction. Chapter 7 discusses the key findings and gaps identified in terms of hazards and perils where CDRFI instruments are missing/insufficient, relevant national strategies & policies for risk financing, enabling environment, and risk analytics and modelling. Finally, the report concludes with preliminary recommendations for the CDRFI request to the Global Shield.

2. General Country Profile

2.1. Economic Situation

Pakistan is the fifth-largest country in the world, with a large population of 241.5 million (PBS, 2023) divided between urban and rural populations. The population distribution between these zones matters to the country's socio-economic activities. The urban area has significant economic activity, with Karachi as the largest city and the economic nerve centre. It provides better employment opportunities, education, health, and infrastructure than rural areas.

On the other hand, the majority of the population in Pakistan resides in rural areas. According to the Population Census 2023 (PBS, 2023), the rural population constitutes 61% of the total population. Rural areas, primarily agricultural, are less developed in capital, utilities, accessibility, and resource availability. The rural economy is predominantly agriculture-based, and it is also a major sector that contributes to the Gross Domestic Product (GDP) of the country (Ahmed and Javed, 2016). Still, this sector is also suffering from several problems like low-tech agriculture, water crises, and the effects of climate change (Syed et al. 2022). This situation has exacerbated the socio-economic divide between urban and rural areas; rural areas have poorer living standards, higher poverty rates, poorer education, and poorer health than their urban counterparts (Javed et al. 2021). Lack of appropriate infrastructure in sectors such as education affects accessibility in less developed regions (Ahmed et al. 2021). This divide makes it difficult to sustain equal development across the country. It shows that there is a need to develop appropriate policies to capture the needs of the poor and vulnerable population.

Table 1. Population Distribution of Pakistan

Province	Total	Male	Female	Urban %	Rural %
Pakistan	241,499,431	124,324,406	117,154,694	38.88	61.12
Punjab	127,688,922	65,448,376	62,226,589	40.71	59.29
Sindh	55,696,147	29,014,424	26,677,501	53.97	46.03
Khyber Pakhtunkhwa	40,856,097	20,845,747	20,009,233	15.01	84.99
Balochistan	14,894,402	7,768,166	7,125,471	30.96	69.04
Islamabad	2,363,863	1,247,693	1,115,900	46.91	53.09

Source: Pakistan Bureau of Statistics (2023)

Table 1 indicates the population distribution of Pakistan across the provinces. It can be observed that Punjab is the major province in terms of total population whereas Balochistan is the least populated province. The smallest number of urban population resides in Khyber Pakhtunkhwa (15.01%) whereas the highest percentage of urban population resides in Sindh (53.97%).

Another issue that can be attributed to the country is poverty. As of 2023, the national poverty rate was predicted to be 37.2 percent (World Bank, 2023). Yet, when looking at the Multidimensional Poverty Index, which encompasses not only income but also access to education, health, and living conditions, the picture looks even worse, especially for the rural population. The rural population is most exposed to

economic fluctuations, natural disasters, and the effects of climate change, which can easily relapse people who live near the poverty line into poverty (World Bank, 2016). The poor, due to inadequate social protection and low levels of banked credit, have little means to rebound from adversity. In terms of economic performance, Pakistan's GDP per capita was estimated at approximately USD 1,407 in 2023 (World Development Indicators, 2023). IMF (2024) projected GDP's growth rate to remain 3.5% for FY 2024-25, which will improve to 4.5% in FY 2025-26.

Table 2. Economic Situation of Pakistan

Description	Statistics
Poverty	37.2%
GDP Per Capita	USD 1,407
Tax Revenues	PKR 7,260 billion
Non-Tax Revenue	PKR 2,520 billion
Debt to GDP Ratio	72%
Tax to GDP Ratio	9-10%
Current Expenditure	PKR 12,330 billion
Fiscal Deficit (as % of GDP)	3.7%

Source: Economic Survey of Pakistan 2023-24

The relatively low GDP per capita reflects Pakistan's economic challenges, including a large population base and limited industrialisation. While the country has a diverse economy, with agriculture, manufacturing, and services all contributing to GDP, the overall productivity of these sectors remains relatively low. Agriculture, for instance, accounts for about 24% of GDP and employs approximately half of the labour force (Pakistan Bureau of Statistics, 2023). Despite its importance, the sector struggles with low productivity due to outdated farming practices, inefficient water use, and limited access to modern technology. Moreover, the effects of climate change, such as erratic weather patterns and increasing temperatures, pose a significant threat to agricultural output, which in turn affects the livelihoods of millions of people dependent on farming (World Bank, 2017).

The manufacturing sector, particularly MSMEs, also plays a crucial role in Pakistan's economy, contributing around 14-16% to GDP (Rehman and Bakar, 2019). The textile and apparel industry are especially significant, given its role in exports and employment. MSMEs, which represent over 90% of enterprises in the country, are vital for economic growth and job creation (Shah D. S., 2018). However, these enterprises face numerous challenges, including limited access to finance, inadequate infrastructure, and a challenging regulatory environment. The lack of access to credit and financial services is a major impediment to the growth of MSMEs, which often rely on informal sources of funding to meet their capital needs. Additionally, the absence of a robust legal and regulatory framework makes it difficult for these enterprises to operate efficiently and expand their businesses.

The services sector can be considered as the most productive and contributing sector in Pakistan's economy as it dominates almost 59.6% of the GDP of the country (Rathore et al. 2019). Some of the subsectors of the services sector include trade, communication and transport, banking, and other related services. They are among the key industries supporting the country's economic activities through the provision of employment for its citizens as well as stimulus of economic growth. The telecommunications sub-sector has witnessed increased growth over the past few years owing to higher mobile phone and internet connectivity throughout the country (Javed and Ahmed, 2022). However, development of the services sector has its drawbacks, including issues such as the quality and availability of services, especially in rural areas due to the lack of infrastructure.

Table 3. Sectoral Contribution towards GDP in Pakistan

Sector	Contribution to GDP
Agriculture	24%
Large Scale Manufacturing	9.73 %
Micro, Small and Medium Enterprise	14-16%
Service	59.6%

Source: Economic Survey of Pakistan

The official unemployment rate is 11.5% in 2024, but these estimates are greatly thought to be underreported (Mian, 2024). Underemployment and informal employment are widespread, particularly among rural youth, (Javed, 2020). Rural labour force participation rate was 34.13% during 2020-21 whereas urban participation rate was 28.95% (PBS, 2023) with 45.39% of the total employed population working in the informal sector. The government's effective labour force participation rate is around 45%, though there exists a huge disparity between female and male participation, women's labour force participation (20.73%) is significantly lower than that of men (78.08%), this is because of socio-cultural factors, education and employment opportunities, and lack of proper care for their children (World Economic Forum, 2022). The negligible percentage of women in the labour force is indicative of the current lost opportunity of having women participate fully in the economy as consumers; this view highlights the importance of outlining and implementing gender-based economic policies that will help women get back to the workplace.

Pakistan continues to face several fiscal problems, including budget deficits and debt burden; its debt-to-GDP ratio was estimated to be at approximately 72% in 2023, this puts the fiscal deficit at about 3.7% of GDP and the current account deficit at around USD 0.2 billion of GDP (Ministry of Finance, 2024).

Table 4. Debt and Primary Balance Projections

Indicator	2025	2026	2027	2028	2029
General Government overall balance (including. grants, % of GDP)	-7.4	-5.8	-5.2	-4.7	-4.6
General Government debt (including IMF obligations, % of GDP)	70.0	68.8	67.2	65.3	63.5

Source: IMF Staff Report (2024)

The latest report by the International Monetary Fund (IMF, 2024) reported the government's overall fiscal balance and debt projections. As per the report, although the overall balance will decrease in coming years, the country will still face a higher level of fiscal deficit. Another critical challenge will be the persistently higher debt burden which will affect the fiscal operations.

Tax revenues as percentage of GDP were 9.5% whereas investment as percentage of GDP was 13.1% during FY 2023-24 (Economic Survey of Pakistan, 2024). The government has removed subsidies and implemented numerous other interventions in the last couple of years to bring stability to the economy and curb the fiscal deficit. These measures include reducing public spending, with a focus on cutting subsidies and selectively targeting expenditure on underperforming services, while implementing tax reforms to improve revenue mobilisation. Some improvement has been demonstrated in fiscal consolidation; however, it has not done much to the growth and poverty cut-off. This has also impacted social spending, reducing the budget for health, education, and welfare of the poor and other vulnerable groups.

Pakistan remains among the top ten countries most affected by extreme weather events over the past two decades (German Watch, 2024). The latest catastrophic flooding in 2022 exposed its vulnerability to climate-induced risks, which submerged a third of the country, impacting over 33 million people,

displacing nearly 8 million individuals, and claiming the lives of over 1,700 people - including women and children with economic losses amount to USD 30 billion (GoP, 2022). This resulted in a 2.2 percent loss in Pakistan's GDP, with the agricultural sector being the worst hit, accounting for 0.9 percent of this loss (GoP, 2022).

Hence, the capacity to respond to crises in Pakistan has remained restricted primarily by fiscal resources and the high public debt level (World Bank, 2024). It has had to rely on donor aid and humanitarian funding to source funds for eventualities, including disasters and health pandemics like COVID-19. However, this approach exposes Pakistan to risks of high debt levels and limited ability to finance long-term development projects. The government's capacity to raise and manage domestic resources for public spending is crucial for ensuring the country can respond to economic shocks and crises.

2.2. Social Situation

Pakistan's social situation is influenced by different socio-economic and cultural factors. Fiscal constraints as highlighted in the previous section are affecting the socio-economic indicators including spending on health and education. Similarly, sluggish economic growth results in low economic activities and lack of opportunities for individuals and businesses. Lack of employment opportunities is highly prevalent in rural regions, especially in Balochistan, Sindh, and some districts of Khyber Pakhtunkhwa (Ahmed, 2018). Balochistan has remained the most poverty-stricken province in the country, whereby most of the districts' population remains inadequately developed and deprived of basic needs (Rasul and Nepal, 2024).

Overall poverty, measured in income terms, is significantly higher in rural areas compared to urban regions. Moreover, when considering multidimensional poverty, which incorporates deprivations in health, education, standard of living, and other factors, the realities in rural region are even worse. This disparity is exacerbated by the rural economy's exposure to climate risks, particularly in the agricultural sector, which is highly sensitive and contributes greatly to poverty levels and vulnerability. In contrast, cities like Karachi, Lahore, and Islamabad have lower poverty rates, but still face issues such as slums, unemployment, and deteriorating civic facilities (OPHI and UNDP, 2016). Islam et al. (2022) emphasized that the gap between rich and poor has increased in Pakistan which is affecting the overall econmic growth and well-being.

Pakistan still lacks structures and mechanisms of microcredit, though its financial sector has improved in the last few years. The corresponding data shows that at the present stage, only 21% of adults in Pakistan have access to formal financial services, and the difference in access between men and women is contrasted (Khan, 2023). Socio-cultural practices, low financial literacy among women as well as restricted mobility due to socio-cultural beliefs are the major barriers to the provision of financial services to women (Javed and Javed, 2023). There is an evident increase in digitalisation such as the usage of mobile phones and digital banking services, though it is not well distributed in the country (Manzoor et al. 2021). Mobile phone ownership and take-up of other digital financial services are also higher in urban areas than in rural areas due to factors such as poor physical infrastructure, relatively low literacy levels among the rural population, and limited internet access (OPM, 2006).

Thus, women, elder citizens, youth, persons with disability, and other marginalized groups' situation in Pakistan is worse due to several 'V' factors like Violence against women, Victim mentality, Volunteerism, Volatility, and Vulnerabilities (UNICEF, 2017). Women have little or no access to quality education, employment opportunities, or health care services. Moreover, women's labour force participation rate is only around 20 percent (World Economic Forum, 2022).

The fragile state of support systems and insufficient social security provided by the state make the senior family members of the population of Pakistan weaker and more vulnerable. A large portion of the population consists of youth, who are experiencing problems such as unemployment and

underemployment, which leads to increased levels of social frustration and instability (Zahid, 2023). Persons with disabilities and minorities also continue to suffer from rights abuses; lack of service provisions; and discrimination which compounded their hardships.

Table 5. Social Situation in Pakistan

Indicator	Statistics
Educational Expenditure (as of GDP)	1.5 %
Literacy Rate	62.8%
Public Health Expenditure (as of GDP)	1%
Health Sector PSDP Allocation	PKR 25.3 billion
Unemployment Rate	11.5%
BISP Allocation	PKR 466 billion

Source: Economic Survey of Pakistan

The government is not spending enough on basic facilities such as health and education (Ahmed and Javed, 2017). Total health expenditure as percentage of GDP only accounts to 1%, which is not sufficient to protect the vulnerable population including women and children. Javed et al. (2021) pointed out that there is lack of basic health facilities in regions including Khyber Pakhtunkhwa and Balochistan. Education expenditures are merely 1.5% of GDP, which is not sufficient considering the size of the children and youth population in Pakistan. However, the role of the private sector in education has increased during recent years (ADB, 2022), as out of the total number of students, the private sector has a total enrolment of 46.5% of students (PIE, 2022).

Table 6. Monetary Poverty in Pakistan

Province	Poverty rates among all districts	Poverty rates among calamity-hit districts
Punjab	16.2	28.2
Sindh	24.1	29.3
Khyber Pakhtunkhwa	29.5	30.2
Balochistan	42.7	44.1

Source: PDNA (2022)

The table above indicates that poverty rates in calamity-hit districts are higher as compared to the poverty rate among all districts. The report by World Bank (2023a) also stated that poor households and vulnerable groups are at the forefront of facing the negative externalities of climate change. As the impacts of climate change are intensifying in Pakistan, millions of these vulnerable groups identified above will be facing disproportionate challenges in terms of extreme events, health crises, food insecurity and livelihood challenges. Higher incidences of poverty along with the sectors bearing the impacts of climate change are major constraints on economic growth of Pakistan. With the growing frequency of climate-induced disasters, Pakistan is likely to face further damages, requiring additional financial interventions. The inability of government to address the impacts of climate change may likely increase financial vulnerability and increase economic losses.

3. Risk Assessment

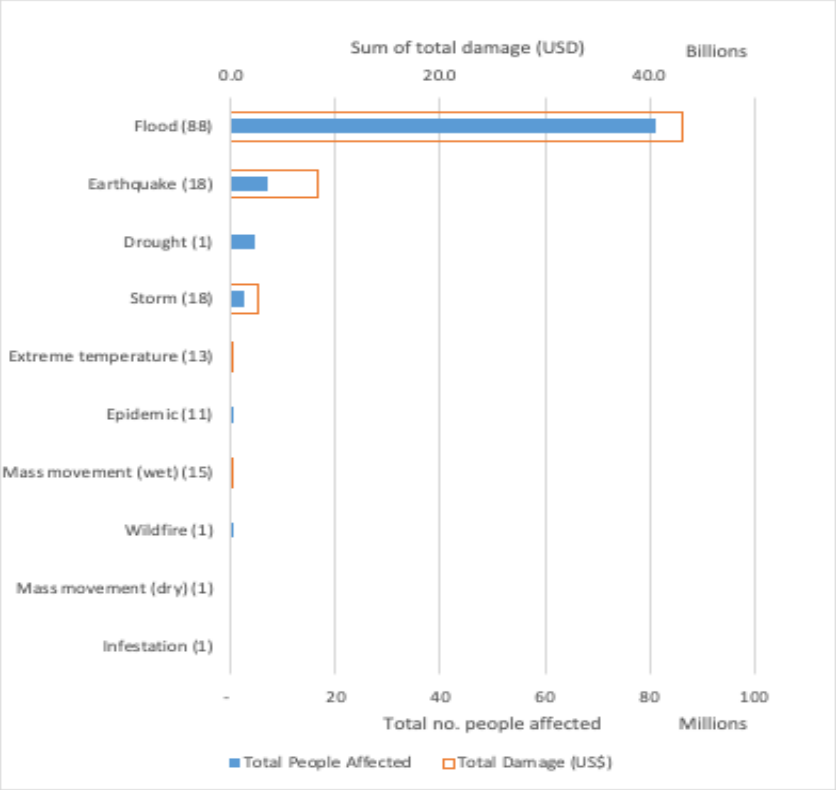
3.1. General Overview of Available Risk Information

Risk indexes such as INFORM (JRC, 2024) and the World Risk Report (Bündnis Entwicklung Hilft / IFHV, 2024) provide a high-level view of risk relative to a country's peers, and some information on the general drivers of risk. INFORM ranks Pakistan 20th, with 'high' overall risk. Vulnerability is considered to be 'high' and lack of coping capacity to be 'medium', compared to both being 'very high' in the World Risk Report. Pakistan is ranked as the 10th most at-risk country in the world by the World Risk Report, with 'very high' overall risk. EM-DAT (EM-DAT, 2024) data for 2000-2024 shows flood to be the dominant hazard in number of historical events, impact on population and economic loss (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

The above information is useful as a guide, but historical disaster catalogues tend to be incomplete due to short recording periods and incomplete or inconsistent recording of event impacts. This can influence the number of events and total impact presented. Global risk indexes are limited in their utility to understand risk at a granular level, and no subnational risk index is available for Pakistan from INFORM.

Risk analysis enables the use of statistics and simulation of events – both frequent and rare (but still plausible) events, to present a more complete representation of risk. Using information on (1) people and their vulnerability, and (2) built and natural assets' location, vulnerability and replacement cost, risk analytics can be used to quantify potential impacts, including estimates of the number of displaced people, fatalities, number and location of assets damaged and costs of reconstruction.

Figure 1. Impact of hazards on population and economic loss



Source: Impacts of historical disasters recorded between 2000-2024 in Pakistan by EM-DAT, CRED / UCLouvain, Brussels, Belgium – www.emdat.be).

Larsen et al (2014) summarised the state of risk information for Pakistan and themselves used UNEP-GRID hazard data overlaid with population estimates to give an overview of exposure to multiple hazards. The most significant analyses at that point were:

- The 2012 National Disaster Management Plan (NDMP; Government of Pakistan, 2012) analysed macro-level hazard and provided qualitative risk for flood, landslide, earthquake, tsunami, cyclone, drought, avalanche and glacial lake outburst flood (GLOF). District level risk classification was derived from historical hazard occurrence or physical environment, and from exposure (population density and crop yield).
- World Food Programme (WFP) funded probabilistic modelling and quantitative estimation of economic damages to infrastructure, building and crops, and exposure of population.
- Under a WB/GFDRR Innovation in Risk Assessment and Financing (2012–2015) project, data gathering, risk modelling and risk financing capacities were being developed. A National Working Group (NWG) on risk assessments was established to consolidate existing risk information and models, to then identify and fill gaps. This was led by NDMA and included Pakistan Meteorological Department (PMD), Geological Survey of Pakistan, the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) and others.
- WB/GFDRR also ran a programme for hazard and risk assessment in urban areas (2012–2013) which aimed to increase hazard and risk assessment capacity in Pakistan, focussing on two pilot cities but designed to create a replicable risk assessment framework for the country.

Larsen et al (2014) then highlighted strengths and weaknesses of risk information at that time. Strengths included the consolidation of hazard, exposure and vulnerability information – a 'considerable amount' of which was being generated – and data sharing / decision support systems. They noted the positive shift toward probabilistic analysis, albeit at the 'micro scale' – i.e. districts or urban areas – only. At the macro-scale (i.e. with national coverage) only qualitative assessments had been conducted, and there was a need to develop nationwide vulnerability assessment methods and integrate climate trends into analysis. The report recommendations centred around the need for nationwide probabilistic risk (catastrophe) modelling for multiple hazards that could support risk financing with quantitative estimates of loss.

Many academic studies on hazards have been conducted in Pakistan, and several have produced qualitative risk indexes, including at district level or for specific cities / regions. Most were conducted before 2014, summarised in Larsen et al (2014) as seismic microzonation studies, or hazard or vulnerability assessment for district risk management plans. Hussain, et al. (2023) provide a summary of hazards affecting Pakistan, including hazard maps for each, highlighting hazard hotspots. The subsequent sections describe some of the studies for each hazard.

Since 2014, relatively few academic risk assessments have produced quantitative or probabilistic estimates of risk (most studies focus on hazards or at most extend to risk indexes). To date, **the need for nationwide probabilistic risk modelling has been met by the following programmes** (results of these are further described in section 'Summarised quantitative risk estimates per major risks')**:**

- Since 2019 the Space and Upper Atmosphere Research Commission (**SUPARCO**) of Pakistan, has been developing a national catastrophe model ('**NatCat Model**') for the National Disaster Risk Management Fund (**NDRMF**). This will eventually include probabilistic risk assessment for flood,

drought, earthquake and cyclone with results – exceedance probability of loss curves and annual average loss (AAL) for each province – available via web portal and a spatial database.

- The **National Disaster Management Agency (NDMA)** has conducted province-level risk profiling and is now conducting district-level analyses[1]. These involve hazard analysis of flood, drought and earthquake, exposure assessment of population, settlements, sector assets and land use categories to those hazards. They include physical and social vulnerability, which is then used in creating a risk index for each hazard and flood, drought and earthquake combined, and respective risk maps.
- The **CAREC project** (ADB, 2021) quantified risk using regional / global models for flood, earthquake and pandemic, using Global Earthquake Model (GEM) Foundation regional seismic risk modelling, and JBA Risk Management global flood model.
- The **CDRI Global Infrastructure Resilience Index** (GIRI) in 2024 quantified risk based on global exposure and hazard models for flood, earthquake, landslide, tropical cyclone and tsunami (CDRI, 2023).

Other ongoing activities include GIZ's Strengthening Climate Adaptation and Resilience (SAR) project - sector-specific climate risk assessments to understand vulnerability of key sectors and develop gender-sensitive climate risk data at the national level and for Khyber Pakhtunkhwa and Punjab. Through the SAR project in collaboration with GCISC flood, heat, and drought (hydrological, meteorological, and agricultural) model tailored to Punjab and Khyber Pakhtunkhwa will become available. The 'Pakistan - Promoting Resilience against Natural Disaster Impacts (NADIR)' project was due to conclude in September 2024, conducting risk and exposure analysis to inform spatial planning (BGR, 2024).

The World Bank (2021) reported hazard level data for Pakistan in terms of number of people affected by each calamity.

Table 7. Key Natural Hazards and People being Affected

Time period	Flood	Storm	Landslide	Mass movement (dry)	Extreme temperature
1980-1985	76,300	600	100	-	-
1986-1990	1,142,400	250	-	-	-
1991-1995	15,796,179	20	514	250	-
1996-2000	2,352,427	536,351	3,000	-	-
2001-2005	9,197,475	3,069	12	-	-
2006-2010	20,740,171	1,654,000	30,415	-	100
2011-2015	16,057,264	82	0	-	80,000
2016-2020	1,634,861	1,000,543	113	-	-

Source: World Bank (2021)

Flood has been the major calamity affecting thousands of people over the years in Pakistan, consistently threatening lives and livelihoods with more than 20 million people being affected between 2006 and 2010.

[1] NDMA - Multi Hazard Vulnerability & Risk Assessment (MHVRA) http://www.ndma.gov.pk/publication_by_category/9

3.2. Climate studies

3.2.1. Climate modelling / projections

The current climate of Pakistan, including distinct regional climatic differences, is well described by GIZ (n.d.) based on data and analysis generated as part of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP; Frieler, et al., 2017). The analysis indicates that air temperature and number of hot days are expected to increase across the country this century, with the greatest increases in the northern areas. A similar trend is observed in potential evapo-transpiration. Salinisation and permanent inundation of land is already occurring in many coastal communities due to sea level rise, which is expected to increase by 30cm by 2080 compared to 2000, under RCP 2.6 scenario. Projections of rainfall (precipitation) in Pakistan do not agree on the direction and magnitude of change nationally. Projections vary from region to region, and regions may become drier / wetter at different times this century – there is not a consistent trend one way or the other. In some cases, modelled data (GIZ, n.d.) agrees with observed data (Ashraf and Routray, 2015) - in northern Balochistan, precipitation is projected by ISIMIP models to decrease by up to 15% this century. This regional variation is also reflected in increases in heavy precipitation events, with some regions seeing up to 3-4 days more with heavy precipitation by 2080 (GIZ, n.d.), and in soil moisture. Balochistan has strong model agreement of decrease in soil moisture, but models disagree in other regions, with large annual variability and model uncertainty (GIZ, n.d.).

Khan (2015) evaluated vulnerabilities / risks around climate change broadly. Amin et al. (2018) performed regional climate assessment in Southern Punjab (Pakistan) to project precipitation and temperature change over different time scales, while for the same region Aslam et al. (2018) created a climate change risk index based on intersection of population density, land use, food security and multidimensional poverty with project climate parameters.

Climate impact projections

Going further than projecting climate parameters, Joyo et al. (2018) assessed the impact of climate variability on rice productivity in Sindh Province, suggesting up to 13% decrease in productivity in the long-term, if temperature increases by 1°C and precipitation decreases by 10%. Khan and Salman (2012) look at human vulnerability, developing a Human Vulnerability Index (HVI) for Pakistan.

Aslam, et al. (2017) summarise research related to climate impact assessment in Pakistan as being focused on modelling extreme events or impact in limited sectors, and that integrated impact assessment of extreme events is not commonly practised – as it is limited by unavailable datasets.

The latest set of climate projected sector impacts comes from the WBG and ADB (2021) Climate Risk Country Profile (CRCP) for Pakistan. Impacts on water resources are uncertain in terms of changes in seasonality and annual rainfall, while increases in the severity of extreme flood and drought are likely. The projection of change to glacial environments is key to future flow conditions in the Indus basin. Increasing human demand for water in Pakistan may be a bigger concern than climate change, at least in the short-term. The profile states that decreases in labour productivity are already being experienced due to increasing heat, with further reductions expected, while reductions in crop of up to 10% could be expected in the Indus region with 2 degrees Celsius of warming (Dehlavi, et al., 2015).

3.3. Major Climate-Induced Hazards

3.3.1. Flood

Waseem and Rana (2023) published a bibliometric analysis of 601 articles, showing gradual increase in annual number of publications on the topic, driven by 2010 and 2022 floods, but only a minority (65)

including 'risk assessment' as a keyword. GRMA's review of a subset of recent literature on flood risk shows that an even smaller minority refers to quantification of frequency and severity of impacts. Waseem and Rana summarise that 'Studies related to flood hazard, risk, and/or vulnerability assessments generated results from limited communities or study areas that cannot be extrapolated to a large population of rural/urban areas', believed to be due to time and resource constraints. 'Gender, social capital, livelihood, food security, risk perception, risk and vulnerability assessment, socioeconomic impacts, and GIS and remote sensing' stood out as key research areas (Waseem and Rana, 2023). They also observed that vulnerability (so also risk) is studied for flood hazards in isolation, not in a multi-hazard context with heatwaves and sea level rise, etc. Studies were viewed as being limited in the vulnerability indicators used, and focussed on response and recovery rather than preparedness, mitigation, and adaptation (Waseem and Rana, 2023).

Historical events

Concerning research on previous flood events, Paulikas and Rahman (2015) reviewed historical floods to understand trends in flood fatalities, while Sayed and Gonzalez (2014) and Fleiss et al. (2011) reviewed the 2010 floods, the latter mapping the intersection of population and floodwater. Pal et al. (2023) also analysed the 2010 floods as well as the 2011 floods, and the flood management plan of the Lower Indus. Rahman and Shaw (2015) reviewed flash and river flood risks including analysis of the impacts of historic floods. Government of Pakistan (2022) estimated reconstruction and recovery needs following 2022 flooding at USD 16.3 billion – USD 7.9 billion in Sindh, USD 4.5 billion from cross-provincial assets, and USD 2.3 billion in Balochistan. In terms of sector impacts, those most affected were: transport and communications; agriculture, food, livestock and fisheries; housing; and social protection, livelihoods and jobs. Agriculture was also badly affected in 2010, when USD 5.1 billion of crops were lost (WBG and ADB, 2021).

Subnational hazard and exposure analysis

Subnational hazard assessment includes estimation of return periods of peak flows on the Indus River (Khan et al., 2011), while Mukthar et al. (2024) brings big data and multi-criteria decision-making into flood hazard assessment at district level only (Hunza-Nagar). Exposure analysis has been conducted, for example by Rafiq et al. (2010), who analysed vulnerability of critical infrastructure in hazard zones on the southwest coast of Pakistan, through satellite derived information.

Risk indexes

Several flood risk indexes have been developed. Rana and Routray (2017) conducted a survey of selected urban communities and categorised them into different risk levels, such as 'can manage risk', 'can survive and cope', and 'cannot cope'. Bibi et al. (2018) prepared risk index maps derived from flood extent, vulnerability of people, and exposure of critical assets for the River Kabul and Swat catchment area. Waseem et al. (2023) also developed a hazard index in the Swat catchment, using geospatial analysis.

Climate projection of flood hazard

Projecting flooding under future climate is clearly crucial to managing flood risk in Pakistan. Nauman et al. (2019) modelled future streamflows for the Haro River upstream of Khanpur Dam watershed and showed expected increases in maximum streamflows during summer, indicating that water scarcity at the dam is less likely. GIZ (n.d.) projects that the proportion of major roads inundated at least once per year by flood may remain at similar levels as today (2% of all roads), through this century under RCP 2.6 (with some variation through time and regionally). ISIMIP models agree a similar picture under RCP 6.0, but with larger uncertainty and potential for up to around 8% of roads to be flooded annually. Similar trends are projected for urban areas exposed to flooding annually, remaining under 0.5% through the century (GIZ, n.d.).

Focussing on coastal inundation, UK Met Office (2014) showed a massive increase in the number of people affected each year by coastal flood under higher sea levels – to almost 1 million (without adaptation). This review found no estimates of economic loss concerning sea level and associated coastal flooding.

Quantitative risk estimates

Studies providing quantitative risk estimates are rare. At the subnational level, Mahmood et al. (2019) estimated risk probabilistically for the Panjkora River Basin, and Aslam, et al. (2017) estimated flood and drought losses for South Punjab, also assessing costs and benefits of adaptation options. Nationwide, Khan et al. (2021) presented results of the WRI Aqueduct Risk Analyser including urban damage, impact on GDP under different climate and protection scenarios based on global flood modelling. The CAREC project (ADB, 2021) and NDRMF Nat Cat model present the most recent and nationally comprehensive quantifications of flood risk. JBA Risk Management performed the CAREC flood modelling based on their global flood model, which was also used by JBA Consulting to develop a flood risk model and flood forecasting system for population affected by flood in the Indus Basin as part of START Network's development of a Disaster Risk Financing system in Pakistan. Loss estimates for Pakistan are also now available from the Fathom global catastrophe model, but not available publicly for review here.

3.3.2. Droughts

Under RCP6.0, according to ISIMIP projections, around 11 more extremely dry months are expected in most regions of Pakistan – near constant drought (GIZ, n.d). By 2050, around 6 more extremely dry months are expected in western regions, defined by an 'extremely negative SPEI' (Standardized Precipitation Evapotranspiration Index). Water availability per capita is expected to decline in Pakistan (with high uncertainty), owing to population projection rather than decrease in precipitation (GIZ, n.d); though availability will vary regionally, due to regionally variable climatic change and resources. While mainly irrigated from meltwater, crops in Pakistan are at risk of flood damages during high flows, and drought during low flows – there is a high degree of variability and uncertainty in projections of cropland exposed to droughts this century, although models suggest an increase overall, and a decrease in wheat, maize and rice production – however, each crop shows distinct regional differences (GIZ, n.d). Knock-on effects may include higher food insecurity and malnutrition (GIZ, n.d.). Low flows are also expected to restrict hydropower generation at times, which is significant given that a third of national energy comes from hydropower.

Sub-nationally, drought hazard assessment using Standard Precipitation Index (SPI) analysis has been conducted for Punjab (Amin et al., 2019). Adnan and Ullah (2020) developed a drought hazard index for vulnerability assessment at district-level. UNDP (2016) assessed the meteorological, agricultural, hydrological and socio-economic risks from droughts in Balochistan and showed that 60-70% of the population are at risk from droughts – either directly or indirectly, i.e. through reduction in various fruit and cereal crops, as well as losses in livestock numbers. Return periods of droughts, without losses, were estimated for Punjab by Akram et al (2024). The Agricultural Model Intercomparison and Improvement Project (AgMIP) has applied crop models for rice, wheat, and cotton and estimated impacts of climate change on those crops, to develop site-specific production technologies and climate adaptation strategies.

3.3.3. Heatwave

Hussain, et al. (2023) give a good overview of heatwave hazard in Pakistan, including information on historical events. In terms of modelling climate impacts Nasim et al. (2018) combined historical heatwave trends and climate modelling to project heat accumulation under future climate scenarios. Potential impacts of extreme heat have been modelled in few studies. GIZ (n.d) projects that heatwaves will expose GDP-generating areas much more by 2080 – by over three times under RCP2.6 and over five times under

RCP6.0, from around 8% in 2000. Under RCP6.0, around 45% of the population could be affected by at least one heatwave per year (compared to 8% in 2000) (GIZ, n.d).Mortality is projected to increase by 3.5 times to over 8 deaths per 100,000 people per year nationally under RCP 6.0 and to around 4 deaths per year under RCP 2.6 (GIZ, n.d). The START Network developed a model that uses heat index information to assess whether aid funding can be triggered, but this model itself does not quantify risk (START Network, 2022).

3.3.4. Landslides

Landslides affect primarily the mountainous north. Quantitative assessment of landslides resulted in susceptibility and risk classification mapping ('low' to 'extremely high') for the China-Pakistan economic corridor (Chang, et al., 2021), in which hazard assessment, rainfall erosion intensity and traffic facilities, population density, and property factors are combined. Ahmad et al., (2022) mapped landslide hazard and susceptibility based on remote sensing and GIS for Muzaffarabad, Pakistan. These are typical of the studies found in this review, being local scale and not estimating frequency and severity of landslide impacts – although many more studies than this have been published describing the hazard or historical inventories. Landslide susceptibility data is available for Pakistan from the NASA global model. No quantification of risk has been found, beyond CDRI (2023).

3.3.5. Glacial Lake Outburst Floods (GLOFs)

Localised analyses are available for Glacial Lake Outburst Floods (GLOF), which affect only the northern mountainous districts in the Karakoram Himalayas (Hussain, et al. 2023) with focus on analysing individual or collections of lakes and their potential for GLOF events. Exposure to inundation from GLOF at the Shishper Glacier, Hassanabad Hunza, in North Pakistan has been mapped by Shah et al. (2019), while risk perceptions and some element of hazard description are provided by studies such as Ashraf, Naz and Roohi (2012) and Zaidi, Yasmeen and Siddiqui (2013). The MOCC project 'Glacial Lake Outburst Flood GLOF-II'[2] covers 10 districts to develop policies that include GLOF risk reduction, set up early warnings and develop sensor networks for collecting meteorological and discharge data. The project is not conducting risk analysis, but the data can inform future hazard analysis.

3.3.6. Others

Cyclones in the Arabian Sea pose risk to the coastlines of Sindh and Balochistan. There are few studies dedicated to assessing vulnerability or risk to cyclones in Pakistan. At least one commercial national-scale cyclone risk model is available to license, from Corelogic, developed for insurance risk modelling, plus several global cyclone models that can be applied in Pakistan. Cyclones are also a component of global analyses in GAR (2015) and CDRI GIRI (2023), with estimates of Average Annual Loss (AAL).

Tsunamis are similarly a risk to Pakistan's coast (medium level of hazard, according to GFDRR's ThinkHazard[3]). However, few tsunami hazard studies focus on the coast of Balochistan, and none quantifying risk have been found in this review.

Concerning natural assets, Siddique and Molinos (2024) conducted the first assessment of the risk from climate change to existing protected areas and non-protected lands across Pakistan by combining data on the local exposure and vulnerability of 409 species of birds, mammals, reptiles, and amphibians.

3.4. Exposure and vulnerability data

Aggregated exposure data containing residential commercial and industrial building typologies and replacement costs are available for Pakistan in the GEM Foundation Global Exposure Dataset (Yepes-Estrada, et al., 2023), which were applied in the CAREC project. GIRI developed an infrastructure exposure

[2] https://www.mocc.gov.pk/Detail/ZmI3OWZlMzYtMTdkYy00ZGU5LTgyZjAtMzIxODdkMTBmMTEy
[3] https://thinkhazard.org/en/report/188-pakistan/TS

and global building exposure model (Piller, Benvenuti and De Bono, 2023) for use in infrastructure modelling. Totals and breakdown of asset value are available on the GIRI dashboard[4]. The most recent exposure dataset developed by agencies in Pakistan authorities appears to be that from SUPARCO that underpins the NatCat Model, and this goes beyond built environment assets, including livestock and crop data. Analysis of these exposure datasets has not been conducted as part of this stocktake.

Key sources of vulnerability data are household surveys such as those included in the ICIMOD Poverty and Vulnerability Assessment (PVA) data collected under the Himalayan Climate Change Adaptation Programme (HICAP)[5]. Data from surveys conducted with households in the Upper Indus basin assesses livelihood vulnerability, its determinants, and climate change adaptive capacities.

3.4.1. GRMA process in Pakistan

The application of Pakistan for GRMA support was submitted by the Ministry of Climate Change & Environmental Coordination (MoCC&EC) in October 2022. It was assessed and approved by the GRMA Strategic Committee in the same month. The announcement of GRMA support was made at COP27.

The GRMA support programme was co-defined with and approved by MoCC&EC. The programme offers support regarding climate risk modelling and data on flood risks for vulnerable people and its effect on the social protection programme (Benazir Income Support Programme (BISP) and the risk of extreme heat for the agricultural sector. In order to select the most experienced implementation partner a competitive Call for Proposals was launched and the selected partner was approved by the Ministry. The implementation of the programme can kick-start any time after singing the contract between MoCC&EC and the service provider.

3.5. Summarized quantitative risk estimates per major risks

There are several studies and programmes quantifying risk in Pakistan. At national level, the NDRMF Nat Cat model provides EP curves and AAL for each province and multiple hazards, based on a nationally developed model, and includes sectors breakdown of losses from floods. The ADB (2021) CAREC project quantified risk using regional / global models for flood, earthquake and pandemic. The CDRI GIRI estimates risk for multiple infrastructure sectors from flood, earthquake, landslide, cyclone and tsunami.

Available risk models largely focus on estimating economic losses from direct damage of assets. The NDMA district level profiles provide estimates of population exposed for (so far) a limited number of districts, and only the CAREC study (ADB, 2021) currently provides national level estimates of population affected and fatalities (as annual average estimates by region). Additional modelling on human impacts of climate disasters is required.

Sector impacts are described for each hazard in the sections below, with focus on flood and earthquake – risk has been quantified as greatest for these main hazards. National level flood risk estimates are summarised in **Fehler! Verweisquelle konnte nicht gefunden werden.**. These estimates are each based o n different types and amounts of exposure, so monetary values and as relative to the total replacement cost, however, inconsistent publication of losses per sector hinders sector-level comparison of losses.

[4] https://giri.unepgrid.ch/facts-figures/building-infrastructures
[5] https://www.icimod.org/initiative/poverty-and-vulnerability-assessment-pva/

Figure 2. Comparison of national risk estimates - publicly available flood AAL and 100-yr return period losses

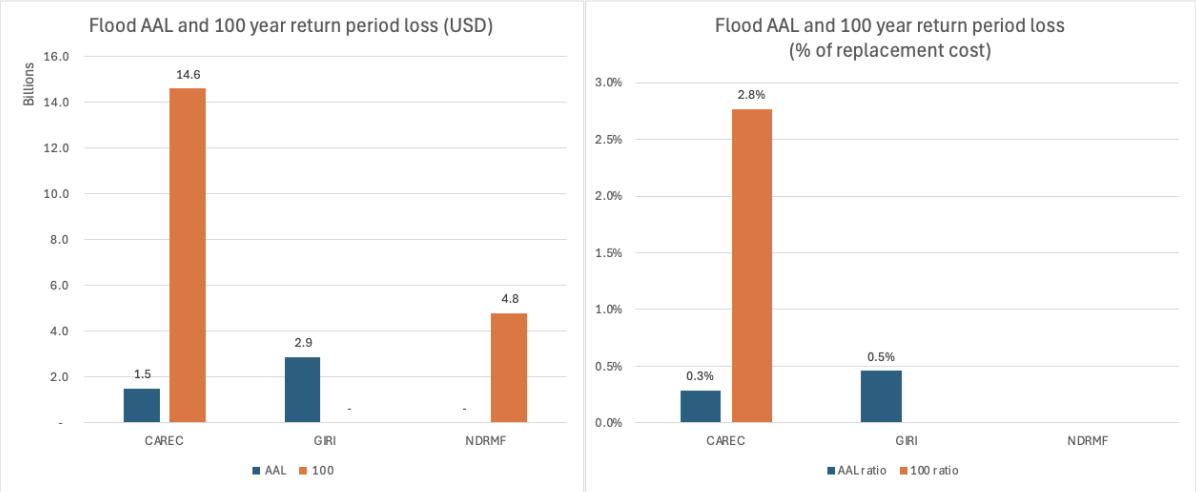


Figure 2 Comparison of national risk estimates - publicly available flood AAL and 100-yr return period losses. Missing bars indicates data gaps: CDRI GIRI does not provide 100-year losses and NDRMF does not provide AAL or replacement costs in the online dashboard, preventing full comparison. NDRMF 100-year loss estimate includes Punjab, KP, and Sindh provinces only.

Table 8 summarises the models available by hazard, including models for which risk estimates are available publicly and described in this report, as well as through commercial licences (not included in this report). Table 9 outlines the types of exposure included in the risk estimates available. Estimates of loss and direct impacts on to vulnerable people specifically were not found during this review of risk information.

Table 8. A summary of risk models capable of quantified risk estimates for Pakistan

Hazard	National models	Regional / Global models
River Flood	NDRMF NatCat model (SUPARCO)	JBA (used in CAREC program), CDRI
Surface/urban flood	NDRMF NatCat model (SUPARCO)	-
Drought	-	-
Extreme heat	NDRMF NatCat model (SUPARCO)	-
Tropical cyclone	Corelogic	CDRI GIRI
Storm Surge	NDRMF NatCat model (SUPARCO)	-
Earthquake	NDRMF NatCat model (SUPARCO), Corelogic, ERN, and Impact Forecasting, RMSI, Moody's RMS	GEM (used in CAREC program), CDRI GIRI
Tsunami	-	CDRI GIRI
Landslide	-	CDRI GIRI
GLOF	-	-
Pandemic	-	CAREC program

Table 9. Sector coverage of quantified risk estimates

Model	Buildings	Infrastructure	Agriculture	Population
NDRMF NatCat model (SUPARCO)	Yes	Yes – roads	Yes – livestock and crops	No
CAREC	Yes	No	No	Yes
GEM risk profile	Yes	No	No	No
CDRI GIRI	Yes	Yes – road, rail, water, power, communications, oil/gas, port/airport	No	No

3.5.1. Flood

NDRMF NatCat model dashboard[6] summarises losses from flood in Punjab, Khyber Pakhtunkhwa and Sindh in most detail including total loss and a sector breakdown per return period (5-1000-years). Sector breakdown includes crop loss from two seasons (Rabi crop and Kharif crop) and livestock – the only model to do so for Pakistan – as well as buildings and roads loss, summarised for the 1-100-year loss in Table 10. The dashboard also provides a ranking of Tehsils affected by riverine, flash, and urban flood as well as earthquake, storm surge and heatwave. A social vulnerability index is also intended to be shown on the dashboard but is not yet visible.

Table 10. 1-100-year return period flood loss estimates from NDRMF NatCat Model. KP denotes Khyber Pakhtunkhwa province.

Province	Total (billion PKR)	Livestock %	Rabicrop (winter crop) %	Kharifcrop (monsoon crop) %	Roads %	Buildings %
Punjab	3,256	46%	17%	2%	1%	34%
KP	145	30%	3%	2%	1%	63%
Sindh	1,195	68%	19%	1%	4%	8%
Province	**Total (billion USD)**	**Livestock (billion USD)**	**Rabicrop (billion USD)**	**Kharifcrop (billion USD)**	**Roads (billion USD)**	**Buildings (billion USD)**
Punjab	11.72	5.39	2.01	0.21	0.17	3.94
KP	0.52	0.16	0.02	0.01	0.01	0.33
Sindh	4.30	2.94	0.80	0.06	0.16	0.34

National flood risk analysis by ADB (2021) estimated AAL at USD 1.5 billion (0.5% of GDP), and the 1-in-100-year loss at USD 14.6 billion (5.2% of GDP). The study estimated that 2.3 million people are affected by flood each year, nationally. Indirect losses took the total 100-year loss to over USD 16 billion. The greatest flood losses are estimated in Punjab region, with AAL of USD 938.5 million, an estimated 158 fatalities per year, and over 1.5 million people affected each year. This is followed by Sindh (USD 455.9 million), Khyber Pakhtunkhwa (USD 72 million), Balochistan (<30 million), Northern Regions and finally Islamabad (ADB, 2021). Despite absolute Sindh loss estimate being half that of Punjab, AAL is 0.0037% of

[6] Risk Calculator tool at https://ndrmf.pk/nat-cat-model/

exposure replacement cost in Sindh, and lower (0.0031%) in Punjab, indicating higher hazard and/or vulnerability in Sindh compared to Punjab.

CDRI (2023) estimated the national AAL from all hazards to be USD 3.8 billion,2.8 billion or 74% of which derives from floods. Flood accounts for c. 80% of losses to buildings, education and healthcare infrastructure and c. 40% of losses to telecommunications and oil/gas infrastructure.

A direct comparison of AAL between NDRMF, GIRI and CAREC results is limited because of differing published results metrics. The higher exposure values in CDRI GIRI (USD 627.5 bn of buildings and infrastructure) contribute to absolute losses almost double those of the CAREC flood AAL estimate (see Figure), based on USD 528.3 billion of buildings only. A building-only comparison has not been possible based on published results.

The geographic breakdown published in CAREC results suggest that Punjab, KP and Sindh together account for 93% of the national (buildings only) flood AAL. Assuming this ratio also applies at the 100-year loss, CAREC's estimate of building loss is approximately 2.5 times higher than the NDRMF building loss in these provinces. Further investigation of the models has not been possible to confirm and understand the drivers of this difference at the time of writing.

3.5.2. Others

CDRI (2023) estimated the national AAL due to landslide at USD 96 million, and at 45 million for cyclones. Forty-five percent of road and railway AAL is due to landslide. Cyclone has most impact on telecommunications and oil/gas infrastructure, causing c. 20% of the total AAL in each.

3.6. Conclusions on available risk information

Floods and earthquake are priority hazards in Pakistan, and risk from these has been quantified using probabilistic modelling very recently in the NDRMF NatCat Model launched in 2024, the CAREC project (ADB, 2021) including modelling of flood earthquake and pandemic risks, and modelling focused on infrastructure by CDRI (2023). **It is positive that there is more than one 'view' of national flood and earthquake risk, and that risk to livestock and agriculture has been estimated, as well as the built environment.** The **risk hotspots are clear** from those studies, with Punjab, Khyber Pakhtunkhwa and Sindh contributing most to national absolute loss estimates in part because of large amounts of exposure in those large provinces. Further, the NDMA is undertaking a national programme of district-level risk indexing which is a valuable source of information and allows comparison and identification of risk hotspots nationally, using a consistent method (intended to be updated every five years at most). However, it will be several years until these are completed for the whole country. These aside, **the majority of natural hazard risk related studies are localised with focus on hazard mapping or creating risk indexes**, rather than estimates of loss and damage, which are necessary for the development of CDRFI solutions. The following points highlight recommendations to address gaps in the current coverage of risk estimates in Pakistan.

Understanding existing risk estimates

ii) **A deep dive into the methodologies and models employed in the NatCat Model by NDRMF** should be conducted. Risk estimates differ significantly between the models available for flood and earthquake. This is likely to become the government's preferred risk analysis model, by virtue of it being locally owned and developed. The NatCat Model is very likely to benefit from the expertise and local knowledge of Pakistan experts, and Global Shield should understand whether those benefits are applied in a suitable and comprehensive methodology and assumptions. In particular, **further investigation should**

assess whether the NatCat Model can potentially be used for CDRFI purposes, in international markets (this requires those markets to be confident in the modelled estimates of risk).

iii) **Investigate the differences in existing probabilistic model results and gain a better understanding of the uncertainties** in existing risk estimates – including ADB CAREC, CDRI GIRI, and NDRMF NatCat model. A more detailed comparison of loss estimates, including differences by sector, which was not possible with publicly available information so far, should be conducted.

Refining existing risk information

iv) **Refine risk modelling with detailed exposure data**. SUPARCO have been developing a geo-referenced exposure database for the NDRMF NatCat Model project. Further information should be gathered on this dataset to confirm whether there is value in assisting further development or applying this data in other analyses to support further detailed risk analysis. This data could be applied with other hazard models to develop multiple views of risk based on an improved level of detail in the exposure component compared to the global data used by ADB and CDRI.

v) **Conduct district-level estimation of losses (going beyond district-level risk indexes).** Province-level risk estimates are valuable, however, they should not be relied upon for local decision making because of the variation in risk within each province.

vi) **Develop sex-disaggregated estimates of loss.** Risk analyses undertaken in support of Global Shield should include sex-disaggregation of risk estimates, which have not been a focus of previous analyses, to support gender-responsive CDRFI. This could be achieved by integrating sex-disaggregated population data into existing models. The NatCat model should be extended to publishing estimates of sex-disaggregated population affected and fatalities as well as asset losses.

vii) **Estimate the impact of disasters on vulnerable people's assets and incomes.** Existing risk models could be extended to quantify impacts identified as recently, such as the 2022 floods, as being at high risk and incurring high damage and loss in floods, and considered important for understanding how to maintain social protection in the context of a changing climate.

viii) BISP is originally mandated to focus on poverty reduction but has collaborated with NDMA to create a system for post disaster cash transfer by integrating disaster data with its dynamic NSER data, but the setup is not continued and there is a need for regular BISP interoperability with NDMA NatCat model and a continuous climate risk assessment for vulnerable households.

ix) **Directly involve vulnerable communities and key stakeholders in development and review of risk estimates.** This review showed little evidence for the direct involvement of vulnerable communities and groups in assessing and understanding risk, via the use of participatory processes to understand impacts experienced by communities and livelihoods or to include traditional knowledge, for example. For district-level analysis in particular this should be encouraged to ensure risk analytics represents reality on the ground.

Developing new risk estimates for specific hazards or sectors

x) **Develop a quantitative assessment of heat mortality and associated costs of healthcare, morbidity and mortality**. Analysis and historical heatwaves and climate projections exist to support such quantification of heat risk, which could be extended to look at impact on labour production and associated loss of GDP and livelihood impacts.

xi) **Quantify the economic losses associated with future drought risk.** This would extend the work of the AgMIP project data and others who have investigated impact of drought on livestock and crops. Ideally this would use livestock and agriculture exposure data from NDRMF and due to the regional variability in projected drought impacts, this should be conducted at a district level, extending NDRMF and SAR activities where necessary to support CDRFI.

xii) **Estimate economic impacts of sea level rise scenarios across multiple sectors.** With significant increases in the number of people experiencing coastal flooding under likely sea level rise scenarios, it would be prudent to use up-to-date projections of sea level rise and exposure data to estimate the current and projected impacts of extreme sea levels and permanent inundation of land to inform climate adaptation.

3.7. Impacts on Vulnerable Groups

In Pakistan, climate-related hazards disproportionately affect vulnerable groups, exacerbating existing social inequalities. Women, people with disabilities, the elderly, children, youth, displaced individuals, indigenous communities, and other minorities bear the brunt of these risks due to their limited access to resources, mobility, financial services and social protection. Analysing the impacts on these groups offers a deeper understanding of how hazards intensify social vulnerabilities and the importance of social inclusion in disaster risk management.

3.7.1. Women

Climate change exacerbates gender inequalities, disproportionately affecting women and amplifying social injustice. The United Nations estimates that 80% of those displaced by climate-induced disasters are women, who face heightened vulnerability due to their economic roles, lower social status, and limited decision-making power (Waheed, 2023). In rural areas, where women are often responsible for subsistence farming, livestock care, and water collection, climate disasters such as floods and droughts severely disrupt their livelihoods. For instance, the devastating floods in Pakistan last year submerged over a third of the country, displacing nearly 8 million individuals, and claiming the lives of over 1,700 people - including women and children. Among the displaced were 650,000 pregnant women who lost access to healthcare, leaving many to give birth in dangerous, unsanitary conditions (Sohail, 2023). In September 2022 alone, around 73,000 women were expected to give birth, but with 1,460 health facilities damaged— 432 of them completely destroyed—access to vital maternal health services was severely compromised (Thakur, 2023).

The floods also deprived over eight million women and girls of basic menstrual hygiene products and sanitation, further intensifying their vulnerability. Beyond healthcare, women in these situations are more susceptible to sexual and gender-based violence, particularly in overcrowded temporary shelters where privacy and security are inadequate (Tufail et al. 2023). Displacement exacerbates their exposure to such violence, and relief camps often lack the protection needed to ensure women's safety. Additionally, the economic strain caused by these climate crises often drives an increase in harmful

practices like child marriage, as families trade young girls for food or financial security in the face of deepening poverty. Despite their crucial roles in managing household resources during crises, women remain largely excluded from decision-making processes regarding aid distribution and resource allocation, limiting their access to the support they desperately need (Lwamba et al. 2022). Addressing these gender-specific challenges is essential, as any climate action that overlooks the disproportionate impact on women fails to be comprehensive or effective. Incorporating gender perspectives into climate resilience and adaptation strategies is a matter of social justice and critical to achieving equitable and sustainable solutions.

3.7.2. Persons with Disabilities

Persons with disabilities in Pakistan face significant challenges related to livelihoods, accessibility, and the growing risks posed by climate change. Disability rates in the country are exceptionally high, mainly due to the prevalence of polio. The recent data reveals that over 115,000 individuals from flood-affected populations are disabled, including nearly 50,000 children and 26,000 women (Hamid, 2023). Globally, persons with disabilities are two to four times more likely to die during disasters and given Pakistan's vulnerability to natural hazards and climate-related disasters such as floods and earthquakes, individuals with disabilities are at even greater risk (IFRC, 2021). In emergencies, they often face limited access to evacuation routes, emergency services, and relief supplies due to inadequately designed infrastructure that fails to meet their mobility needs. Communication barriers also exacerbate this vulnerability, as those with hearing or visual impairments may miss critical early warnings. The absence of accessible, inclusive emergency response systems further exposes people with disabilities to disproportionate harm, underscoring the urgent need for climate resilience strategies that address their specific needs (Singhal, 2024).

3.7.3. Elderly Population

The elderly are particularly vulnerable to climate hazards due to their limited mobility, physical frailty, and often inadequate access to healthcare. In rural areas, where many elderly individuals rely on subsistence farming or live in isolated households, their ability to evacuate or seek assistance during disasters is significantly restricted (Shah, 2020). During events such as river flooding, which can displace entire villages, elderly individuals often struggle to relocate without support. Beyond physical limitations, they are also at risk of psychological distress, especially if they experience the loss of homes, land, or loved ones. Many older adults lack access to social protection programmes or pensions, leaving them financially vulnerable in the aftermath of disasters. The 2022 floods in Pakistan, which affected around 2.3 million older people, further highlighted these vulnerabilities, as many elderly individuals were unable to escape rising waters or protect themselves from the spread of diseases in flooded regions (UNICEF, 2023). These challenges underscore the need for targeted interventions to ensure the safety and well-being of the elderly in disaster preparedness and response efforts.

3.7.4. Children and Youth

The devastating floods in Pakistan underscore the profound threat that climate change and environmental degradation pose to children's health and well-being (Suleri and Iqbal, 2019). Children are particularly vulnerable to climate-related hazards, as rising temperatures increase their risk of heat stress due to their limited ability to regulate body temperature. Air pollution further exacerbates this vulnerability, with 12% of deaths among Pakistani children under five attributed to respiratory diseases caused by poor air quality (UNICEF, 2024). According to UNICEF, nearly ten million children in Pakistan

suffer from stunting (UNICEF, Nutrition). From birth, children in Pakistan are trapped in a cycle of environmental hazards such as droughts and floods, which not only harm their physical health by impairing the development of their lungs, brains, and immune systems but also jeopardize their long-term prospects.

The floods of 2022 serve as a stark example, as 500 children lost their lives and 9.6 million remained in need of humanitarian assistance by December 2023. These floods also caused extensive damage to infrastructure, destroying nearly 27,000 government schools and disrupting education for more than 3.5 million children, leaving many unable to return to school and forcing some into child labour to compensate for lost family income (UNICEF, 2023). This disruption of education, coupled with the psychological trauma of displacement, deepens existing inequities and limits children's opportunities for future recovery and resilience-building. In vulnerable rural and urban areas, these conditions create a bleak outlook for many young people, who lack access to essential services, education, and employment opportunities (Ahmad et al. 2020). Despite significant aid efforts, Pakistan's environmental degradation continues unchecked, with critical resources like the Indus River suffering from over-exploitation and pollution. Torrential and unseasonal rains continue to threaten children's lives, highlighting the urgent need for comprehensive climate action that prioritizes the health, safety, and education of Pakistan's most vulnerable population: its children.

3.7.5. Displaced People

Displaced populations face severe vulnerabilities due to flooding, drought, or other climate-related events. Many displaced individuals live in informal settlements or camps with inadequate sanitation, clean water, or healthcare (Shackelford et al., 2020). These conditions heighten their exposure to diseases, malnutrition, and further marginalisation. Displacement also separates people from their traditional livelihoods, making it difficult to rebuild their lives.

In Pakistan, internally displaced persons (IDPs) from disaster-prone areas often lack legal protections and struggle to access social services or employment (Baig et al., 2024). Women and children within displaced communities are particularly at risk of exploitation, trafficking, and violence.

Women are at the forefront of impacts caused by climate-induced events. Being the caretaker, they are expected to cater for the children, the elderly and members requiring medical attention, resulting in exacerbating their own vulnerability during climate-induced mobility. The disasters posed healthcare challenges for vulnerable groups including women, limiting the access to basic facilities including clean drinking water and nutritious food. The intensity of impact increases even more for women belong to low-income households and residing in underdeveloped regions.

3.8. Priority Risks and Future Outlook

Based on the information outlined above, Pakistan's most pressing climate-related risks are drought, urban flooding, river flooding, and heat waves. These hazards pose significant economic, social, and environmental challenges, particularly for the country's most vulnerable populations. While existing data provides valuable insights into the scale and frequency of these risks, developing more granular, localized information on vulnerabilities and risks is essential to enhance resilience planning (Adnan et al. 2024).

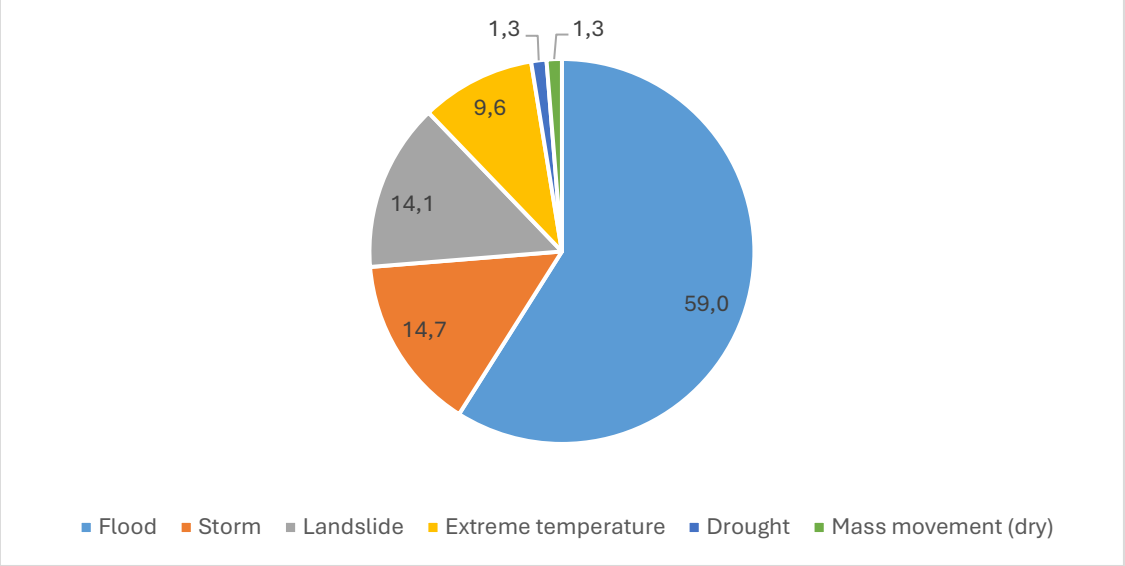
Table 11. Number of incidences during 1980-2020

Category	Incidents
Flood	92
Storm	23
Landslide	22
Extreme temperature	15
Drought	2
Mass movement (dry)	2

Source: World Bank (2021)

The table shows the number of incidences of each hazard in Pakistan during 1980-2020. It can be observed that flood is the most frequent hazard affecting communities and livelihoods in Pakistan.

Figure 3. Percentage of occurrence of natural hazards



Source: World Bank (2021)

Figure 3 demonstrates the percentage of each natural hazard during 1980-2020. Floods have the highest percentage of occurrence (59.0%) during this time period.

Table 12. Projected impact of extreme flood

Estimate	Population Exposed to Extreme Flood (1971–2004)	Population Exposed to Extreme Flood (2035–2044)	Increase in Affected Population
16.7 Percentile	4,158,091	9,220,336	5,062,245
Median	5,709,314	5,709,314	5,529,086
83.3 Percentile	7,929,955	13,378,717	5,448,762

Source: World Bank (2021)

Table 12 indicates the estimated number of people affected by an extreme river flood. It is projected that by 2035-2044, an additional 5 million people will be affected by extreme river flooding annually in Pakistan.

Urban flooding poses significant challenges for cities like Karachi and Lahore, where inadequate drainage systems, rapid urbanisation, and poor infrastructure amplify the impacts of heavy rainfall. Urban planning reforms, improved drainage systems, and climate-resilient infrastructure development are necessary to mitigate these risks (Khetran, 2023).

River flooding affects large agricultural areas along the Indus River, threatening food security and displacing vulnerable rural communities. Strengthening river embankments, enhancing early warning systems, and improving evacuation plans are critical to reducing the damage caused by these floods (Ashraf et al., 2023).

Similarly, heatwaves are likely to contribute to the vulnerabilities. The average temperature in Pakistan has increased by more than 1.6^0 C over the last century as compared to the global average of 1.1^0 C (Koons, 2024). There are predictions of 3^0 C temperature rise by 2040, which will result in wheat productivity loss of up to 50% in Asian countries, and the magnitude of this loss will be even more significant for Pakistan due to its geographical position (KP Metrological Department, 2018).

Pakistan must integrate social inclusion into its climate risk management strategies. Disaster risk reduction planning must prioritize vulnerable groups, including women, the elderly, people with disabilities, and displaced individuals. Improving access to education, healthcare, and financial services for these populations will enhance their resilience to future hazards.

Moreover, future efforts should focus on developing reliable, prospective data on climate risks. This includes improving data collection from remote areas, using satellite technologies, and incorporating community-based monitoring systems. These steps will allow Pakistan to better anticipate and manage the evolving impacts of climate change, reducing risks for its most vulnerable populations.

4. Country Priorities & Strategies

4.1. Overview of relevant country strategies/Policy frameworks

Multiple laws, regulations, and policies governing the interrelated disciplines of environmental protection, Disaster Risk Reduction, and Climate Change touch upon the financial aspect of climate and disasters. Financial protection has gained significant attention over the past decade with the increasing recognition of climate change as a critical public policy issue. This has led to the development of more detailed policies and strategies aimed at addressing its impacts. Following is a brief account of the legislation, regulations, and policies:

4.1.1. The National Disaster Management Act 2010

The act establishes a dedicated framework for federal and provincial planning, funding, and implementation related to disaster risk management, including disaster risk reduction (DRR) activities and post-disaster operations. It establishes a disaster risk management (DRM) structure at all government administrative levels and mechanisms for disaster management funds. On the disaster financing side, the Act provides for the National Disaster Management Fund to be financed from federal government grants, loans, and donations from national and international agencies, such as the Prime Minister's Disaster Relief Fund. Similarly, the Act establishes Provincial Disaster Management Funds to

be sourced from similar venues. The National Disaster Management (NDM) Act 2010 failed to include women and gender-related concerns in the Act. Therefore, in 2018, the Senate Standing Committee on Climate Change unanimously amended the act to make the law more comprehensive and gender-responsive, including women and allocating appropriate financial allocations.

4.1.2. Climate Change Act 2017

The act creates legislative backing for the established climate governance institutional arrangement. The Act also provides for the establishment of the Pakistan climate change fund, which will be utilized by Parents Stringer adaptation and mitigation projects and will be compared to the adverse effects of climate change through sustainable development of resources and research. The Act further mandates the establishment of the Climate Change Authority for adaptation, mitigation, and coordination. However, the Climate Change Authority was not operationalised in May 2024. The Act also tasks the Authority to develop appropriate projects to secure international climate funding and ensure adherence to obligations detailed in international conventions, treaties, and agreements. The Pakistan Climate Change Act of 2017 fails to mention women and gender-related concerns. The only mention of women is in relation to equal rights to employment in administration. Thus, it neglected women and their concerns when drafting policies.

4.1.3. The National Disaster Risk Reduction Policy 2013

The policy outlines priorities and directions for reducing risks, emphasising prevention, mitigation, and preparedness. It covers both natural and human-made hazards. The policy requires developing a sovereign disaster risk financing strategy with a risk layering approach among its preparedness actions. This approach includes a mix of insurance and non-insurance instruments to finance various layers of risk, enhancing the government's financial response capacity. The policy recognises the need to develop sovereign and private catastrophe insurance markets with the support of the insurance regulator, focusing mainly on homeowners, SMEs, the microfinance sector, smallholder farmers, and vulnerable communities. The National Disaster Risk Reduction Policy (2013) admitted the absence of data related to women, with their needs often overlooked in policymaking. The policy advocated for means to include women in forums and consider their needs, but these promises proved to be hollow, as women continued to be neglected in the years that followed.

4.1.4. National Climate Change Policy (updated 2021)

The policy aims to promote climate adaptation and mitigation. Its objectives include fostering the development of appropriate economic incentives to encourage public and private sector investment in adaptation and mitigation measures; to enhance the awareness, skill and institutional capacity of relevant stakeholders; to focus on pro-poor gender-sensitive adaptation; to minimize the risks arising from the increase in frequency and intensity of extreme weather events; and to develop climate-resilient agriculture and food systems for all agro-ecological zones.

The National Disaster Management Plan (NDMP) (2012–2022) aims to improve the country's ability to prepare for and respond to disasters by defining the measures needed for disaster management and by identifying the roles and responsibilities of stakeholders.

4.1.5. The Pakistan National Adaptation Plan 2023

The Pakistan National Adaptation Plan (NAP) is one of the most prominent documents that envisions a climate-resilient Pakistan, focusing on all aspects of the climate challenges faced by Pakistan (GoP,

2023a). About the climate financing gaps, the Plan suggests that a comprehensive financing strategy is required to address the following priority areas:

1) Pakistan has globally advocated the capitalisation of multilateral funds and finances that address the climate crisis faced by many developing countries that are fractional emitters. The current international financial architecture is complex and fragmented, and it is a major challenge for countries like Pakistan to access timely climate finance due to a lack of capacity in formulating bankable projects. Capacity must be strengthened to access and make effective use of grant-based financing and concessional loan instruments.

2) Domestic financing can be mobilised through innovative financing mechanisms such as monetising natural capital, green and blue bonds, debt for climate and nature swaps, equity financing, and results-based climate financing.

3) An enabling policy and regulatory environment for private sector investment in adaptation is needed to promote and accelerate private sector-led adaptation, such as innovations in products or services. There is also the potential to channel adaptation finance through public-private partnerships. Small and medium enterprises also need support in transitioning to sustainable practices.

4) Line ministries will need to prioritize and plan for climate-sensitive development projects. For climate change to gain traction and be mainstreamed through the government budget process, selection towards climate-positive projects will be required and supported by the Ministry of Finance and Ministry of Planning, Development & Special Initiatives. Line ministries will need to appreciate the climate-related risks within their sectors clearly and determine a level of priority for climate.

The National Adaptation Plan (2023) highlights the urgent need for capacity-building of vulnerable groups, including women, and to integrate gender-responsive and empowerment in their long-term goals. However, there has been little done to suggest that the NAP is on the road to fulfilling its goals on women and gender inclusivity.

4.1.6. National Climate Finance Strategy 2023 (NCFS)

The strategy, launched by the newly created Sustainable Finance Bureau (SFB), states that 20 per cent of the Public Sector Development Plan (PSDP) should be climate oriented.

4.1.7. Provincial Climate Change Policies and Action Plans

Khyber Pakhtunkhwa Provincial Climate Change Policy 2021 and the Climate Change Action Plan were developed. The policy mainly focuses on climate change adaptation and mitigation measures, with slight reference to CDRFI. It primarily focuses on climate change adaptation and mitigation measures in different sectors, notably agriculture, livestock, forestry, water resources, energy, health, etc. The policy and action plan do not specifically mention CDRFI. However, the government has recently started working on a Disaster Risk Financing Strategy.

In Punjab, the draft Punjab Climate Change Policy and Punjab Provincial Climate Change Action Plan (2021) were developed in 2017 and 2021, respectively. However, both drafts remained unapproved until recently, when the government developed and approved "The Climate Resilient Punjab Vision and Action Plan 2024," which focuses on integrating climate resilience into every facet of governance,

significantly strengthening infrastructure, advancing sustainable practices, and fostering community-wide engagement. The plan mentions climate financing in terms of adaptation and mitigation while indicating the creation of a Provincial Climate Finance Unit and establishing a climate fund to support research in climate-smart technology and solutions (EPD, 2024).

Sindh´s Climate Change Policy 2022 aims to mitigate the adverse effects of climate change by identifying its impacts and providing solutions. It focuses on improving environmental conditions, ensuring food and water security, and addressing air pollution. Sindh Private-sector Partnership Strategy for Disaster Risk Reduction 2018 focuses on disaster preparedness. It suggests that critical priority actions include climate advocacy and mass awareness campaigns, community engagement, fostering local leadership and public-private partnerships through corporate social responsibility, and, more specifically, creating a favourable environment for private insurers to make crop/livestock insurance.

Balochistan's Climate Change Policy 2024 is the latest among all provinces. Unlike other provinces, the policy has a complete chapter on climate finance. The policy identifies the following avenues for financing climate change in Balochistan:

- International and domestic financing through bilateral and multilateral climate finance windows.
- Public sector investments through revenue streams of the Government of Pakistan and the Government of Balochistan.
- Private sector investments in direct as well as public-private partnership models.

The AJ&K Climate Change Policy 2017 focuses on adaptation of climate change and mitigation in vulnerable sectors. The policy does not touch on the topic of CDRFI; it only mentions the need for resource mobilisation for adaptation and mitigation, mainly through Development Finance Institutes (DFIs) and donors.

Gilgit Baltistan Climate Change Strategy and Action Plan was devised in 2023, considering the unique geographical features, demographics, and environmental conditions. The broader objective of this strategy and action plan is to 'mainstream climate change mitigation and adaptation aspects into future development planning in Gilgit-Baltistan'. The aim is 'to take possible mitigation and adaptive measures, improve climate resilience among vulnerable population, undertake participatory action to enhance resource planning and strengthen the institutional mechanism to minimise the adverse impacts of climate change through the whole of society approach'. However, the policy kept its focus on climate change mitigation and adaptation aspects.

The provincial policies discussed above recognize that women are more vulnerable to climate change than men but remain limited in driving a targeted focus towards women's resilience. While on paper, there's a commitment towards women's empowerment and proposed policy recommendations to support them, the results do not reflect the promises of the government.

4.2. Conclusion

A review of the existing regulations and policies indicates sporadic coverage of disaster risk financing. Disaster Risk Reduction laws, regulations, policies, and action-plans mainly cover managing finances for risk retention by federal, provincial, and local agencies. In this context, the financial resources are primarily allocated for humanitarian response, relief, and rehabilitation efforts. Meanwhile, climate change policies and action plans, derived from environmental laws, specifically address financing for mitigation and adaptation measures to combat climate change-induced disasters. Here again, the indicative sources of funding are mostly from indigenous sources and humanitarian assistance from

national and international donors. The rules and policies generally focus on risk retention instruments like reserve funds, contingency budgets, etc. There is little emphasis on market-based instruments like catastrophic bonds, insurance, reinsurance risk pool, among others. In addition, prearranged humanitarian aid is also an admitting component of the disaster risk financing components of these policies.

However, government functionaries and policymakers recognise the need for risk transfer measures, which have recently become an important agenda of their discourse on disaster risks and climate change. Therefore, serious efforts to develop disaster risk financing strategies are visible at the federal and provincial levels. During the consultations, participants from the insurance and banking sectors also endorsed the idea of prearranged financing through market-based risk transfer instruments, which is gaining traction among the relevant government agencies.

5. Enabling Environment

5.1. Overview of Existing CDRFI-relevant Institutions

As explained in the previous chapter, multiple federal and provincial legal and regulatory frameworks primarily focus on disaster risk management, environmental protection, and climate change response. These legislations laid the foundations for the federal and provincial levels, which further developed the policies and strategies about DRM, environment protection, and climate change. The policies and strategies discuss the financing issues in a broader context for the specific policy/action plan. However, these institutions, irrespective of how they define climate and disaster financing, significantly contribute to developing an enabling environment for CDRFI. The following is a brief account of these institutions:

Ministry of Climate Change & Environmental Coordination (MoCC&EC)

The Ministry of Climate Change, established in 2011 at the federal government level, was renamed in 2023 the Ministry of Climate Change & Environmental Coordination (MoCC&EC). The ministry primarily works for mainstream climate change in the economy's economically and socially vulnerable sectors and to steer Pakistan towards climate resilient development. It also deals with national-level programmes and Pakistan’s international commitments. The climate finance wing of the ministry is a dedicated office that coordinates with relevant stakeholders and facilitates the ministry in looking after global climate finance opportunities. It focuses on project development, accreditation of national entities, and country readiness programmes by tapping global climate finance.

Ministry of Finance (MoF)

The Ministry of Finance in Pakistan plays a vital role in disaster risk financing by managing public finances and ensuring fiscal resilience in the face of natural disasters. It is responsible for allocating and managing funds for disaster risk reduction and response, which includes budgeting for emergency relief and recovery efforts. The Ministry works closely with national and provincial Disaster Management Authorities to coordinate these efforts.

Additionally, the Ministry contributes to developing policies and strategies to improve financial preparedness and resilience against natural disasters. Recently, it produced the Fiscal Risk Statement for the fiscal year 2024-2025, which analyses the fiscal implications of climate change-related events and their macroeconomic impacts under three different scenarios. The statement emphasises that by adopting a holistic approach that integrates climate change mitigation with disaster risk management,

the government can enhance fiscal resilience and protect the socioeconomic framework against future shocks, particularly those related to climate change.

The Ministry of Poverty Alleviation and Social Safety (PASS)

The Ministry of Poverty Alleviation and Social Safety plays a crucial role in disaster financing, particularly in supporting vulnerable populations affected by natural disasters. Through its affiliated organisations, primarily the Benazir Income Support Programme (BISP) and Pakistan Bait-ul-Mal (PBM), the Ministry provides immediate financial assistance to individuals and families impacted by disasters. In addition, it implements various regular social safety net programmes to help mitigate the effects of disasters on the poorest segments of society. The Ministry collaborates with other government bodies, non-governmental organisations, and international partners to ensure a coordinated disaster response. It is also involved in developing policies and frameworks that integrate disaster risk reduction into poverty alleviation strategies.

National Disaster Management Authority (NDMA)

The National Disaster Management Act 2010 establishes a comprehensive framework for federal and provincial disaster risk management, encompassing planning, funding, and implementing disaster risk reduction (DRR) activities and post-disaster operations. The Act sets up a three-tier institutional structure:

- National Disaster Management Authority (NDMA): At the federal level, responsible for overarching disaster management strategies.
- Provincial Disaster Management Authorities (PDMAs): These operate at provincial and regional levels and implement national policies locally.
- District Disaster Management Authorities (DDMAs): Managing disaster response at the district level.

National Disaster Risk Management Fund (NDRMF)

National Disaster Risk Management Fund (NDRMF) is the federal government fund mandated to strengthen the resilience capacity of the country against climate change and natural hazards and threats. The Fund, while extensively contributing towards physical risk reduction through its projects and programmes for flood protection, early warning systems, and a host of other measures, is also leading the work on reducing the socioeconomic and fiscal vulnerability of the country against natural hazards and disasters.

The Fund aims to enhance Pakistan's financial resilience to disasters. It includes Sovereign Disaster Risk finance and transfer, (mechanisms for transferring disaster risks to the financial markets), Financial Market Development (encouraging the development of insurance and reinsurance markets to cover disaster risks), and Risk Assessment: Comprehensive assessments to inform financing strategies and investment in DRF instruments. NDRMF has recently finalised the Disaster Risk Financing Strategy, which provides a comprehensive approach for strengthening the financing framework with support from international organisations; the NDRFS.

Benazir Income Support Programme (BISP)

BISP is Pakistan's flagship anti-poverty initiative. The organisation was established in 2008 as a national CTP to support ultra-poor families across Pakistan. The programme aims to minimise the impact of adverse economic shocks and inflation on the ultra-poor. The BISP covers around 5 million families belonging to marginalised and excluded segments of society (Iqbal and Nawaz, 2019). In 2019, BISP rolled

out a new payment mechanism known as the Biometric Verification System (BVS). This system requires beneficiaries to verify their thumb impressions biometrically before receiving payments from a network of POS agents and ATMs operated by BISP partner banks nationwide. This system plays a significant role in transferring cash to the poor during disasters. During the 2022 floods, BISP distributed cash transfers to 2.7 million beneficiaries (NDMA, 2022).

Securities and Exchange Commission of Pakistan (SECP)

SECP was created in 1997 and is the primary regulatory and supervisory body for the insurance industry in Pakistan, as well as for capital markets, the non-banking and private pensions sectors. In recent years, SECP has undertaken measures to promote digitalisation and innovation within registered institutions, to increase financial inclusion. Examples include the launch of its flagship registration platform, Leading Efficiency through Automation Prowess (LEAP), aimed at promoting transparency and enabling efficient transactions for consumers; the SECP Regulatory Sandbox Guidelines for live tests of innovative products; the creation of the Centralized Information Sharing Solution for Life Insurance Industry (CISSI) to assist with policy underwriting, pricing and claims processing; and the introduction of Taktech (Takaful Technology) to extend takaful coverage to unserved population segments. At the end of 2023, SECP unveiled a five-year road map, Journey to an Insured Pakistan, to increase insurance penetration in the country.

Insurance Companies under the Ministry of Commerce (MOC)

In addition to SECP, all state-owned insurance entities (SOIEs) fall under the administrative control of the MoC. However, this has led to weak oversight and has caused numerous regulatory challenges for SECP. SOIEs include state-owned insurers State Life Insurance Corporation (SLIC), Postal Life Insurance Company (PLIC), National Insurance Company Limited (NICL), Sindh Insurance Company Limited and Alpha Insurance (a subsidiary of SLIC), as well as the national reinsurer Pakistan Reinsurance Company Limited (GoP, 2023).

State Bank of Pakistan (SBP)

SBP was established in 1956 and functions as Pakistan's central bank, regulating the monetary and credit systems. It is also involved in developing national policies and strategies that promote financial inclusion, particularly the National Financial Inclusion Strategy and the Banking on Equality Policy, which aims to improve women's access to financial services (State Bank of Pakistan. (n.d.). Bills of exchange).

Pakistan Insurance Institute (PII)

PII is the country's primary organisation for insurance training, education and knowledge-sharing. PII offers courses for those wanting to enter or already working in the insurance industry (Professional Insurance Institute. (n.d.). E-learning) and plans to offer basic online courses to enhance insurance awareness (CII, 2018). PII has hosted conferences on microinsurance (Pakistan Insurance Institute. (n.d.). International insurance conference) and could play a bigger role in inclusive insurance training and awareness raising.

Insurance Association of Pakistan (IAP)

Established in 1948, IAP is a voluntary body representing the Pakistani insurance industry. Its objectives are to promote, support, and protect the mandate of its member companies. It does not have any legal

authority. IAP has various committees, including the Technology Committee, the Takaful Committee and the Insurance Development and Promotional Activities Committee. Pakistan does not have a multi-stakeholder platform for microinsurance growth, and the IAP could facilitate its creation by involving non-insurer stakeholders such as distribution channels (PMN, 2018). SECP plans to build capacity within the IAP to enable it to play a meaningful role.

5.2. Overview of Legal and Regulatory Frameworks

The Insurance Ordinance 2000 is Pakistan's primary insurance law, regulating all insurance activities. SECP is aware of its limitations and has developed a draft **Insurance Ordinance (Amendment) Bill 2020** (SECP, 2020). While the legislation has not yet been passed, the new ordinance has been highlighted as a critical milestone in SECP's five-year insurance roadmap to bring the country in line with international regulatory standards to encourage foreign stakeholders to enter the market. As such, the draft bill aims to capture policy reforms and new initiatives undertaken in recent years to strengthen Pakistan's insurance regulatory framework and enhance market development. These reforms and initiatives emphasise digitisation and innovation, including disaster risk finance and microinsurance, enabling legal provisions (SECP, 2022).

The Insurance Rules 2017: SECP periodically promulgates rules and formulates guidelines for the insurance sector (SECP). (n.d.). Draft laws: Rules for discussion). The Insurance Rules 2017 are the most recent rules and guidelines for the insurance sector. Others include the Takaful Rules 2012 and Regulatory Sandbox Guidelines 2019.

The Microinsurance Rules 2014: Established a dedicated regulatory framework for microinsurance in Pakistan, in which microinsurance is defined as insurance products and services for low-income persons that meet their needs for risk protection and relief against distress, misfortune or contingent events for modest and defined benefit levels. The rules include a specialised code of conduct for microinsurance businesses with low-income customers. However, it is reported that insurers see the microinsurance rules and the clauses of the code of conduct as too restrictive for implementation. As a result, products are underwritten under other business classes rather than offered as microinsurance (PMN, 2018).

SECP's recent emphasis on digitisation and innovation is driving a paradigm shift in inclusive insurance regulation, evident in crucial policy reforms and new initiatives, including the amendment of the Insurance Rules to allow registration of digital-only insurers and dedicated micro insurers to lower the barriers to entry and serve vulnerable markets (SECP, 2023).

National Financial Inclusion Strategy (NFIS): Introduced in 2015, Pakistan's NFIS aims to enhance financial inclusion. The NFIS includes recommendations for further developing the Crop Loan Insurance Scheme (CLIS), but no other insurance initiatives are included.

By 2023, the NFIS aims to enhance the usage of digital payments, increase the deposit base, promote small and medium-sized enterprise (SME) finance, increase agricultural finance and improve the share of Islamic banking. It places significant emphasis on enhancing financial inclusion for women, recognising its pivotal role in societal progress (World Bank, 2018).

The legal and regulatory frameworks mentioned above do not specifically refer to disaster risk financing but are aimed at facilitating the insurance sector's operations in Pakistan.

5.3. Capabilities of the Domestic Private Sector for Insurance and Banking

National insurance schemes in Pakistan include several targeted programmes aimed at supporting specific sectors and vulnerable populations. The Crop Loan Insurance Scheme (CLIS), launched in 2008, provides federal crop-credit insurance to farmers with seasonal production loans from commercial and microfinance banks, covering catastrophic losses for crops such as wheat, rice, sugar cane, maize, and cotton. The scheme fully subsidizes premiums for loanee farmers with up to 25 acres of land but leaves around 7.1 million non-loanee smallholder farmers without coverage.

The Livestock Insurance Scheme for Borrowers (LISB), introduced in 2013, insures livestock loans up to PKR 5 million for smallholder farmers, with the government subsidising 100% of the premium for up to 10 cattle.

The Prime Minister's National Health Programme (PMNHP), or Sehat Sahulat Program, launched in 2015 to improve access to healthcare for low-income families, has enrolled over 42 million families, but its status is uncertain after reportedly being suspended in 2023.

The Government's Mark-up Subsidy Programme (G-MSP), known as the Mera Pakistan Mera Ghar scheme, was initiated in 2020 to promote affordable housing through financing subsidies for low- to middle-income groups. The scheme, which includes an insurance component, was temporarily suspended in 2022 but has since been modified and restarted to improve targeting, although its current impact is unclear (UNDP, 2024).

With an insurance penetration of just 0.8% of GDP and a premium density of only 12 USD, private insurance in Pakistan plays a minimal role in supporting the country's resilience against climate and related shocks.

Yet, the social and economic conditions present vast potential for private insurance growth, with particular opportunities for inclusive insurance. The country has a working-age population of 159 million and over 5.2 million SMEs. 73 million young people (32.8% of total population) boost the country's digital connectivity, with a population of 191 million mobile subscribers, 1.6 million e-wallet accounts, and 15.3 million mobile banking users.

Pakistan's insurance sector includes 42 companies: 28 non-life insurers, 2 general Takaful operators, 8 life insurers, 3 family Takaful operators, and 1 reinsurer. Although a microinsurance regulatory framework has been in place since 2014, no formally registered microinsurance products are currently available.

The SECP rules define microinsurance as insurance products or services for low-income individuals, offering protection against risks and unforeseen events. Low-income individuals are those earning less than the minimum taxable income set by the Government of Pakistan or as specified by the Commission. Insurers must submit microinsurance products for approval following the defined criteria and obtain Commission approval before launch. Marketing materials must also be submitted to the Commission at least 30 days prior to launch.

Microinsurance agents must complete at least 20 hours of training by the insurer or an approved organisation. The rules prioritize consumer protection by requiring policy documents and the code of conduct to be in simple Urdu and clearly communicated to the insured. Claims must be processed within 30 days of receiving all necessary documents, and policyholders can receive a full premium refund if they cancel during the initial period. These measures aim to make microinsurance accessible, transparent, and effective for low-income individuals.

Despite the lack of products formally registered, the Securities and Exchange Commission of Pakistan (SECP) recognizes the offer of microinsurance as products distributed through partnerships with Microfinance Banks and Institutions. In contrast "small-ticket insurance products" are offered via collaborations with InsurTech companies, brokers, MNOs, and mobile apps.

As of December 2022, there were 12.6 million microinsurance policies covering 11.5 million lives, along with an additional 3.8 million small-ticket policies providing coverage for 6.1 million lives as of August 2023. Altogether, the combined number of inclusive insurance policies—both microinsurance and small-ticket products—reached 16.4 million, covering 17.5 million lives. This means that approximately 6.94% of Pakistan's population is currently covered by inclusive insurance.

The table below summarises the key indicators of existing products that fit the definition of microinsurance reported to the SECP:

Table 13. Key indicators of existing products

Category	Total Number of Policies	Total Premium (PKR in Million)	No of Persons/Lives Covered
Health	1,232,756	1,096	2,982,892
Agriculture/Live stocks	117,266	303	123,039
Credit Life	11,210,394	1,249	8,361,263
Property	1,362	1,217	867
Others	6	5	50
Total	**12,561,784**	**3,870**	**11,468,111**

Source: SECP (Consolidated Data as of Dec-2022)

Credit-life protection constitutes a significant portion of the products distributed through partnerships with Microfinance Banks and Institutions, primarily covering the disbursed loan amounts. This ensures that the microfinance banks or institutions are protected in the event of the borrower's death. Similarly, agriculture/livestock and property insurance safeguard the loans under the same model. Health insurance, on the other hand, is unique in this context as it is offered as a complementary protection, providing additional coverage beyond the borrower's financial obligations.

Turning to small-ticket insurance, the majority of these products are distributed digitally through mobile network operators (MNOs). Data shows that small-ticket health and small-ticket term life insurance are the two primary products sold through these channels.

Table 14. Small Ticket Insurance

Category	No of Policies	No of Lives Covered	Total Premium (PKR in Millions)
Health	3,418,576	3,780,047	248
Personal Accident	390,113	530,461	17
Mobile Phone Insurance	731	731	0.2
Life	5,023	1,758,193	181
Total	**3,814,443**	**6,069,432**	**447**

Source: SECP (Consolidated Data as of Aug-2023)

Despite 20 insurers offering inclusive insurance, only four companies are actively engaged in the digital distribution of small-ticket insurance products. The dominant players in this segment are not the insurance companies themselves but rather InsurTech firms and distribution channels that collaborate with MNOs and mobile apps to distribute these products.

5.4. Capabilities of Mobile Network Operators and Mobile Money

Digital wallets and instant payments are the key drivers of digital transactions in Pakistan. Digital wallets are issued by Electronic Money Institutions (EMIs), and Branchless Banking (BBs) pointed out the consumer preference for digital account-based payments. Mobile banking transactions are increasing significantly, having a share of 43% in digital transactions during the first quarter of 2024 (State Bank of Pakistan, 2024). Around 11.4 million internet banking users and 17 million mobile phone banking users. 3.2 million people use e-wallets provided by electronic money institutions.

Table 15. Payment system infrastructure in Pakistan

Description	Number
Banks	33
Microfinance Banks (MFBs)	12
Payment System Operators (PSOs) / Payment System Providers (PSPs)	5
Electronic Money Mnstitutions (EMIs)	5
Branchless banking service providers (BBs)	16
Payment network	
Branches of Banks & MFBs	18,193
ATMs	18,655
Point of Sale Machines	120,641
Digital payment channel users and instruments	
Internet Banking Users	11,438,001
Mobile Phone Banking Users	17,035,266
e-Wallets by EMIs	3,196,285

Source: State Bank of Pakistan (Mars 2024)

However, consumers need help accessing mobile money networks. Internet security and data privacy are significant concerns affecting confidence in digital financial services (ProPakistani, 2024). Lack of awareness of digital channels or technologies is an important challenge for low-income households, especially women (Zulfiqar et al. 2016). ZTBL (2019) examined the lack of IT infrastructure, relevant human resources, and a framework for partnership with FinTechs, which are key challenges affecting the adoption of digital technology in financial market institutes in Pakistan. Manzoor et al. (2021) found that limited internet connectivity in rural areas restricts their accessibility towards mobile money networks. Amin and Maqbool (2021) cited that families avoid providing women digital devices due to socioeconomic conditions. Without personal mobile phone devices, it becomes challenging to access mobile money services.

5.5. Capabilities of Sub-national Authorities to Access Financial Protection Instruments

Sub-national/provincial governments are responsible for managing climate risks and protecting communities from devastating outcomes. Provincial governments generally lack the resources to

implement measures to mitigate climate-induced impacts and rely on the federal government to transfer funds to tackle climate change challenges.

Provincial disaster management authorities are the lead agencies for disaster risk management and disaster risk reduction efforts. Disaster risk management was devolved after the 18th constitutional amendment; the provincial governments allocated a budget for contingency measures to the PDMA and district institutions. Since exercising market-based risk transfer measures are rare, subnational governments and municipalities have explored few options beyond the government's risk retention measures.

At the local level, non-government and civil society organisations are also working on disaster and climate change, primarily through grants from international donors and development agencies. These civil society organisations contribute to relief and recovery activities during disasters, indirectly contributing to disaster response funding.

Provinces lack climate-aligned revenue generation (UNDP, 2022). This limited revenue-generation capacity restricts provincial governments' ability to finance climate-related measures in their respective regions independently.

5.6. Capabilities of MSMEs to Access Financial Protection Instruments

Climate change has become an essential factor for businesses in today's world. Climate events, from droughts to floods, pose severe challenges for small businesses in a developing country like Pakistan. The adverse effects of climate disasters may include trade interruptions and a drop in supplies for which their capacity to access financial protection is important (WTO, 2023)

Micro, Small, and Medium Enterprises (MSMEs), the backbone of inclusive growth and development, can contribute to half a dozen Sustainable Development Goals (SDGs), particularly poverty reduction, job creation, competitiveness enhancement, and productivity of industry and trade.

According to Karandaz Pakistan7, access to finance is a significant constraint in Pakistan. As a proportion of private sector lending, bank lending for SMEs steadily declined to 7.3% in 2023 from 15% in 2008. As of May 2023, commercial banks' SME lending was PKR 519 billion, much lower than the demand estimated to be around PKR 3.20 – 4.05 trillion—barely about 13-16% of the potential demand.

On the other hand, there are some enablers for the SMEs, including:

- National Financial Inclusion Strategy (NFIS) has increased the number of borrowers from under 200,000 to over 700,000 and increased credit penetration from under 10% to 18%.
- The Small and Medium Enterprises Development Authority (SMEDA) is working aggressively to strengthen the SME sector in Pakistan. SMEDA defines SMEs based on firms' annual sales turnover; firms up to PKR 150 million are categorised as small enterprises, and those above PKR 150 million to PKR 800 million falls under medium enterprises (SMEDA,2023).
- Facilitating platforms like these are available as special-purpose investment vehicles and are unravelling SMEs' problems with access to finance.
- Pakistan's fully interoperable micro-payment gateway, RAAST, is crucial to a cash-lite future. It creates linkages between various segments and players in the financial sector and pushes a shift from siloed operations to an interconnected industry.

7 https://portal.karandaaz.com.pk/category/small-medium-enterprise-sme-financing/2003

However, despite this facilitation, MSMEs in Pakistan face challenges such as limited access to funding and credit guarantees. This, in turn, reduces their capacity to purchase financial protection instruments.

5.7. Capabilities of the microfinance sector

Pakistan's microfinance sector is at the heart of the financial inclusion agenda in the country. Despite being a relatively smaller feature of the financial sector in the country, it accounts for the majority of all the borrowers. This is reflected in the fact that as of June 2024, the sector accounted for approximately 70 percent of all the borrowers in the financial sector (i.e. 9.3 million out of the total 13.7 million). The sector also caters to the needs of a larger number of savers, serving approximately 98 million savers in comparison to 85 million by commercial banks. The sector has also contributed significantly to financial awareness and literacy, which has been a foundational enabler of agent banking and digital payments in the country.

With an average loan size of PKR 85,899 and an average saving balance of PKR 4,969, the sector is in the business of catering to the financing needs of those at the bottom of the economic pyramid in terms of annual income, in addition to underserved segments, overcoming barriers and constraints that other financial institutions have historically failed to unlock. When compared to the banking sector, the microfinance sector serves three times more female borrowers, five times more borrowers within the agriculture and livestock sectors, and about twice as many MSMEs. This is also the case in relative terms as the portfolio of the sector remains significantly skewed towards underserved segments. Women account for 45 percent of all borrowers in the microfinance sector, while 42 percent of all the borrowers are based in rural areas.

While the sector has grown significantly over the past decade, growing at a compounded annual growth rate of over 15 percent, and reaching over 9.3 million active borrowers by March 2024, this growth has slowed significantly over the past three years, an outcome of repeated climatic/exogenous and economic shocks, including the locust attacks in 2019, the COVID-19 pandemic starting 2020, and, more recently, the 2022 floods which that inundated a third of the country while causing an estimated USD 30 billion in damages and losses. The impact of these shocks was exacerbated by the on-going macroeconomic crisis. The exogenous risks and structural challenges faced by the microfinance sector, coupled with its central role in financial inclusion, in promoting adaptation, resilience, mitigation, and transition of livelihoods affected by climate change in Pakistan provide a strong rationale for supporting the microfinance sector. There is a need to support sectoral growth for financing the real economy anchored in access, efficiency, and affordability. The World Bank, therefore, has designed the Climate Risk Facility (CRF) with the objective of supporting the resilience of the sector and its borrowers by providing pre and post climate event support products.

5.8. Capabilities of cooperatives, associations and CSOs

Cooperative associations and CSOs in Pakistan generally rely heavily on short-term, project-based donor funding from international organisations such as the United Nations, World Bank, USAID, and DFID (Malik and Ahsan 2020). Local funding sources are relatively scarce. These organisations frequently encounter obstacles, which may include:

- Onboarding difficulties: CSOs frequently encounter obstacles when opening bank accounts.
- Financial institutions sometimes restrict business relationships with CSOs to avoid perceived risks. This can severely limit CSOs' ability to operate effectively.

- The regulatory environment can be complex and stringent, often requiring CSOs to navigate numerous compliance requirements.

However, many well-established cooperatives and CSOs have overcome such difficulties and positively contributed to development, mainly at the regional and local levels. During regional and provincial consultations, specific proactive organised private organisations have shown a keen interest in developing partnerships for climate action and CDRFI instruments based on their strong knowledge of local development realities and decade-long experience of managing projects in climate-vulnerable regions, particularly in AJ&K and Gilgit Baltistan. In addition, the rural support network is very well established. CSOs have a history of successful partnerships with government development agencies and a good record of mobilising resources through available banking and financial challenge channels.

5.9. Conclusion

The analysis above indicates that there are specific gaps in the enabling environment ranging from regulatory and policy framework, institutions implementing the government's policies related to climate and disaster, financial and insurance institutions, and the capacities of potential partners in CDRFI instruments. However, many positive developments can help to balance these gaps. These include planned under-process disaster risk financing strategies, continuous updating of climate change policies (Example of Punjab and Balochistan), the focus of different regulatory bodies like SECP and State Bank on financial inclusion, the growing interest of international development agencies in helping Pakistan overcome the climate change related challenges, and continuous technological developments and ICT adoption by business organisations and government agencies.

6. Financial Protection Solutions and Linkages

6.1. Overview of CDRFI and related projects and solutions currently in place or under development

The initial stocktaking carried out as part of the In-Country Process in Pakistan reveals that the costs of most large natural disasters are retained on government books, and only negligible disaster risk insurance or non-insurance instruments have yet been set up at the sovereign level by the federal and provincial governments. As such, the Government relies primarily on supplementary and contingent budgeting and reallocating resources from development projects to meet its post-disaster needs. The protection gap in the country, exacerbated by substantial funding gaps, has historically led to severe fiscal challenges. Also, in case of “low frequency – high severity” disasters, the governments first resort is to the same risk retention approach paired with ex-post non-market risk transfer instruments, which include international grants and private business / individual contributions (through the establishment of relief funds). Only negligible market-based insurance or non-insurance risk transfer instruments exist at the federal and provincial government levels. However, there are several CDRFI-related programmes focusing on:

- Disaster Risk Management and Reduction (all areas, including early warning systems anticipatory actions)
- Climate change adaptation (all relevant sectors/departments affected by the climate change and covered in the respective climate change strategy/ roadmap)
- Social protection/safety nets, livelihood assistance, and
- Projects about financial inclusion of affected people, especially the vulnerable segments, including women and children.

Table 16. Overview of CDRFI Projects

Overview of CDRFI Projects				
Project Title & Duration	**Implementing organisation**	**Objective**	**Instrument Type**	**Perils covered**
AYII Pakistan-MKPL 2022 – 2024	PULA Advisors	Growth of the agriculture sector	Microinsurance Households	Drought, Extreme Cold, Extreme Heat, Flood, Windstorm
Climate Insurance Products Bundled with Loans (under-development)	Pakistan Microfinance Network	Livestock & Crop loans and insurance	Microinsurance	Flooding, Excessive Rains, Droughts, etc.
Insurance for Disaster Response Emergency Fund (DREF) (under-development)	IFRC, ISF	Insurance support to the DREF Fund.	Meso-insurance	Flood, earthquake, wildfire, droughts and hurricanes
Climate insurance for women in Pakistan 2018 – 2024 (Kashf Foundation)	InsuResilience Investment Fund	Livestock Loan and Insurance	Microinsurance Households	Drought, Flood
Strengthening Markets for Agriculture and Rural Transformation (SMART) project 2018 - 2023	Global Index Insurance Facility	Catastrophic risk transfer solutions and agriculture index-based insurance	Microinsurance Households	Extreme Cold, Extreme Heat, Flood, Tsunami

Table 17. Overview of CDRFI- Related Projects

Overview of CDRFI-Related Projects			
Project Title & Duration	**Implementing organisation**	**Objective**	**Perils covered**
Anticipation and Humanitarian Disaster Risk Reduction (AHDRR) in Pakistan	Disaster Management Authorities, Pakistan Metrological Department, Federal Flood Commission	Supporting flood prone communities in 13 districts when specific trigger is reached	Floods
Scaling up of Glacial Lake Outburst Flood (GLOF) Risk Reduction in Northern Pakistan	Provincial Disaster Management Authorities in Khyber Pakhtunkhwa and Gilgit Baltistan	GLOF related risk management, strengthen public services, community preparedness and disaster response	GLOF
Pilot Programmatic Partnership	Food and Agriculture Organisation	Support vulnerable population ahead of forecast shocks	Social protection
Disaster Risk Financing	National and Provincial Disaster Management Authorities, Action Against Hunger (ACF) and HANDS	Protection against heatwaves	Heatwaves
START Ready Risk Pool 1	Care International & Bright Star Development Society Balochistan (BSDSB) in Sibi, Help Foundation in Multan, and Help Age & Civil Society Support Programme (CSSP) in Nawab Shah	Anticipatory response to heatwaves	Heatwaves
Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of Pakistan	UNDP implementing with the national and provincial partners including NDMA, PDMAs and DDMAs, Pakistan Red Crecent Society and NED University	Capacity enhancement of relevant government entities and communities on earthquake and tsunami preparedness, mitigation, and response	Tsunami and earthquake

Overview of CDRFI-Related Projects			
Disaster Risk Reduction in Humanitarian Action	Government of Pakistan	Strengthening coordinated response to disasters at local, provincial, and national levels	Disaster Risk Reduction
Pakistan Hydromet and Climate Services Project (PHCSP)	National Disaster Risk Management Fund, Ministry of Climate Change	Strengthening public sector delivery	Climate Resilience
Sindh Flood Emergency Housing Reconstruction Project	Government of Sindh	Institutional strengthening and technical assistance in damage assessment	Flood
Sindh Flood Emergency Rehabilitation Project	Planning and Development Department, Irrigation Department	Rehabilitate damaged infrastructure and provide short-term livelihood prospects	Flood
Sindh Water and Agriculture Transformation (SWAT)	Government of Sindh	Support for Institutional development, technical assistance, integrated development of farmers' organisation, and targeted agricultural incentives and investments	Flood
Integrated Flood Resilience and Adaptation Project	Ministry of Planning, Development and Special Initiatives, Irrigation Department Balochistan, Planning and Development Department Balochistan	Capacity building, technical support, livelihood support	Flood
Climate Resilience Through Horticultural Interventions in Khyber Pakhtunkhwa	Agriculture Department, Forest Wildlife & Livestock Department of Khyber Pakhtunkhwa	Contribute to climate resilience by establishing model orchards	Climate smart agriculture
Promoting Integrated Mountain Safety in Northern Pakistan	Agha Khan Foundation and Agha Khan Planning and Building Services	Disaster risk resilience	Disaster Risk Resilience

Overview of CDRFI-Related Projects			
Punjab Green Development Program	Government of the Punjab (Environment Department, Industries Department, Energy Department, Transport Department, Finance Department, and Planning and Development Department)	Strengthening environmental governance and promoting green investments	Climate Resilience
Flood Recovery Programme	Government of Pakistan	Provide support in flood-affected areas in an integrated manner	Flood
Flood Protection Sector Project-III	Government of Punjab (Environment Department, Industries Department, Energy Department, Transport Department, Finance Department, and Planning and Development Department)	Construction of flood related infrastructure Flood forecasting & early warning systems, and installation of flood telemetry network & watershed management interventions	Flood
Benazir Income Support Programme	Government of Pakistan	Social protection and empowerment of women	Poverty
Building Resilience and Addressing Vulnerability to Emergencies in Pakistan Programme (BRAVE)	National Disaster Management Authority	Capacity building of the public sector for climate resilience, adaptive social protection	Climate Resilience
Social Protection for Health and Climate Resilience	Benazir Income Support Programme	Health and climate resilience	Health, floods
Adaptive Social Protection Project	Ministry of Economic Affairs is collaborating with German Federal Ministry for Economic Cooperation and Development (BMZ)	Adaptive social protection, integrating social protection into disaster management practices	Social protection
Sehat Sahulat Program	Government of Khyber Pakhtunkhwa	Social health insurance	Health

Overview of CDRFI-Related Projects			
Crisis Resilient Social Protection (CRISP) Program	Benazir Income Support Programme	Social registry, beneficiary-centric biometric payment systems, and safeguarding human capital in the early and primary school years	Social Protection
Sindh Livestock and Aquaculture Sectors Transformation Project	Livestock and Fisheries Department of Sindh	Inclusive, climate-resilient, and sustainable livestock and aquaculture sector	Climate Resilience
Introduction of innovative climate risk financing solutions in Pakistan	Ministry of Planning, Development & Special Initiatives	Promote climate resilience of Micro, Small and Medium Enterprises (MSMEs) in the agriculture value chain	Climate Resilience
Pakistan Resilient and Accessible Microfinance Project	Ministry of Finance	Micro finance sector and its borrowers; one Pre-Climate Event Support product and two Post-Climate Event Support products to support microfinance providers (MFPs) in the event of qualifying climate-related shock(s).	Climate resilience
UNDP Insurance and Risk Finance Project	Economic Affairs Division; Securities and Exchange Commission of Pakistan	Sovereign Risk financing, Inclusive insurance	Climate Resilience
SDG Investments and Climate Financing Facility	Government of Pakistan	Identify, cultivate, and harness high-impact SDG-aligned and climate financing prospects	Climate Resilience

Overview of CDRFI-Related Projects			
Climate Promise-II	Government of Pakistan	Enhance the cooperation and resilience of local and regional stakeholders	Community Resilience
Climate Resilient Infrastructure Fund	Planning and Development Department		Floods
Pakistan - Integrated Disaster Preparedness (DP) for Resilience Building (2024-2026	Food and Agriculture Organisation, WFP, PDMA's of Balochistan and Sindh, PMD, District Govts.	DRR and Anticipatory Action	Climate Resilience
Technical support to GoP on Disaster Preparedness and Anticipatory Action for selected districts of Sindh, Balochistan and KP	NDMA, NIDM, PDMAs, DDMAs, PMD, RMC, Irrigation	Disaster Preparedness and Anticipatory Action	Climate Resilience
Building long-term resilience of flood-affected communities Food Security Intervention in Sindh province	Human Appeal, Qatar Charity District Administration, PDMA, NDMA, Rescue 1122, Directorate of Agriculture, Directorate of Livestock	Community Resilience	Community Resilience
Weather Station Deployment and Dissemination of Accurate Hyperlocal Weather Information, Pakistan	GSMA-IF BaKhabar Kissan Pvt Ltd WeatherWalay Pvt Ltd	Increase small and medium-term farmers resilience through Automated Weather Stations (AWS) to deliver precise, localized weather forecasts to farmers, helping them make informed decisions, reduce crop losses, and increase profitability.	Climate Action, Adaptation, Resilience
Empowering Communities Through Weather Intelligence: A Financially Inclusive and Sustainable Planning Instrument for Climate Adaptation and Disaster Resilience	Jazz	Provide accurate, hyperlocal weather forecasts as early warning systems; weather intelligence services; Community Resilience	Climate Action, Adaptation, Early Warning System, Resilience
Empowering Communities Through Weather Intelligence:	Ufone	Provide accurate, hyperlocal weather	Climate Action,

Overview of CDRFI-Related Projects			
A Financially Inclusive and Sustainable Planning Instrument for Climate Adaptation and Disaster Resilience		forecasts as early warning systems; weather intelligence services; Community Resilience	Adaptation, Early Warning System, Resilience
Early Warning System for CESVI Pakistan (Loreal Fund)	CESVI Pakistan; Provincial Disaster Management Authority (PDMA), Pakistan Meteorological Department	Establish community-based early warning system; Strengthen disaster preparedness and response	Disaster Risk Management, Early Warning Systems, Community Resilience, Climate Change Adaptation, and Vulnerability Reduction.
Air Quality Index (AQI) Monitoring and Forecasting System - Comsats Department of Meteorology	Government of Pakistan, Environmental Protection Agency (EPA) Comsats Department of Meteorology Ministry of Climate Change, Pakistan Environmental Protection Agency (Pak-EPA), Local Environmental Agencies	Monitor and forecast air quality across Pakistan using real-time AQI	Climate Change Mitigation
Crop Parametric Insurance for Small and Medium Holder Farmers in Pakistan	Karandaaz	Installation of weather monitoring and IoT based sensors; Providing subsidies to the small and medium holder farmers for crop parametric insurance products	Climate Resilience, Community Resilience, Climate Change Adaptation, Risk Mitigation
Climate and Disaster Resilience Enhancement Program (Subprogram 1) 2024-2027	Asian Development Bank	Enhancement of Pakistan's resilience to disasters triggered by natural hazards and the impacts of climate change	Climate and Disaster Resilience

Overview of CDRFI-Related Projects			
		though Policy-based loan and technical assistance	

6.2. Description of ongoing CDRFI Related Initiatives

Area Yield Index Insurance (AYII) scheme

Focus region: *Punjab*
Target beneficiaries: *Small farmers*
Implementing organisation: *Pakistan Agricultural Coalition*
Timeline: *2022-2023*
Further details: The Area Yield Index Insurance (AYII) scheme is proposed by the Pakistan Agricultural Coalition (PAC). Farmers are entitled to insurance payouts if the average area yield decreases below 70% of the historical yield in an area. The insurance scheme better covers the yield losses caused by various climatic calamities. Its pilot was conducted in the Sheikhupura district, with wheat farmers who were affected by heat waves in 2022, which caused yield loss for wheat crops. This initiative helps protect the growth of the agricultural sector. In 2023, TPL made crop claim payouts to the Bank of Punjab's farmers in Pakpattan for their crop loss yield.

Climate Insurance Products Bundled with Loans

Focus region: *Sindh*
Target beneficiaries: *Poor and vulnerable households*
Timeline: *October 2023 to May 2025*
Implementing organisation: *Pakistan Microfinance Network*
Further details: The project focuses on disaster resilience, insurance, and financial product development. Pakistan Microfinance Network collaborated with public and private sector stakeholders and intended to evaluate the impact of disasters and climate risks on communities and, in partnership with experts, developed innovative insurance-bundled financial products and a disaster risk reduction framework tailored to the microfinance sector.

Climate insurance for women in Pakistan

Focus region: *No specific regional focus*
Target beneficiaries: *Poor and vulnerable households in rural areas, women*
Implementing organisation: *Kashf Foundation*
Timeline: *2021*
Further details: Kashf Foundation, with the financial support of InsuResilience Investment Fund, implemented the project on Climate insurance for women in Pakistan. The project objective was to enhance the resilience of the livelihoods of poor and vulnerable households in rural areas and increase gender equality. Loans were disbursed under this project, which provided beneficiaries, including women, access to climate-linked insurance. Climate shock risks are covered under this project, where products/solutions include livestock loans bundled with livestock insurance.

Strengthening Markets for Agriculture and Rural Transformation (SMART) project

Focus region: *Punjab*
Target beneficiaries: *Small farmers*
Implementing organisations: *Government of Pakistan, Government of the Punjab (Planning and Development Department along with Agriculture, Food, Irrigation, Livestock and Dairy and Industries Department)*
Timeline: *2018-2024*
Further details: Strengthening Markets for Agriculture and Rural Transformation (SMART) project was implemented by the Government of Pakistan, specifically the Government of Punjab, with the support of the World Bank during 2018-2024. The project is focused on reforming Punjab's agriculture sector, including measures related to produce markets, irrigation and water conservation, and wheat marketing. The SMART project emphasised agriculture and rural transformation, enhancing the competitiveness of agriculture marketing and trade and increasing resilience. Planning and Development Department and Agriculture, Food, Irrigation, Livestock and Dairy and Industries Department are implementing this program.

Anticipation and Humanitarian Disaster Risk Reduction (AHDRR) in Pakistan

Focus region: *No specific region*
Target beneficiaries: *Vulnerable populations*
Implementation organisations: *Disaster Management Authorities, Pakistan Meteorological Department, Federal Flood Commission*
Timeline: *2021 onwards*
Furter details: The Pakistan Red Crescent Society is implementing Anticipatory Action programme with the support of the German Red Cross. The German Federal Foreign Office funds the programme. Early Action Protocol has already been developed for Kabul River through a Forecast-based Financing approach connected with a dedicated IFRC pool funding Disaster Response Emergency Fund. These interventions will help support flood-prone communities in 13 districts when specific triggers are reached.

Scaling up of Glacial Lake Outburst Flood (GLOF) Risk Reduction in Northern Pakistan

Focus region: *Northern regions*
Target beneficiaries: *Vulnerable communities*
Implementing organisation: *Provincial Disaster Management Authorities in Khyber Pakhtunkhwa and Gilgit Baltistan*
Timeline: *2017-2025*
Further details: The Scaling up of Glacial Lake Outburst Flood (GLOF) Risk Reduction in Northern Pakistan is a flagship programme on GLOF risk being implemented by UNDP Pakistan's Resilience, Environment, and Climate Change Unit. The programme has been implemented at the sub-national level in Khyber Pakhtunkhwa and Gilgit Baltistan since 2017 and is scheduled to be completed in 2025. The programme management works closely with provincial-level agencies, mainly with PDMAs. The project aims to empower communities to identify and manage risks associated with GLOFs and related impacts of climate change, strengthen public services to lower the risk of disasters related to GLOF, and improve community preparedness and disaster response. The project will also support the development of sustainable livelihood options in project areas, with a particular focus on the participation of women in ensuring food security and livelihoods.

Pilot Programmatic Partnership

Focus region: *Sindh (Tharparkar, Umerkot, Dadu)*
Target beneficiaries: *Vulnerable communities*

Implementing organisation: *Food and Agriculture Organisation*
Timeline: *2024*
Further details: 'Pilot Programmatic Partnership' is a three-year programme implemented by the Food and Agriculture Organisation and funded by European Civil Protection and Humanitarian Aid Operations. The programme linked anticipatory action to social protection for effective use of existing infrastructure to reach and proactively support vulnerable populations ahead of forecast shocks. The programme aimed to enhance the capacities for and scale of Anticipatory Actions by integrating them into the government's Disaster Risk Management planning and through social protection systems. The program's focus areas are the disaster-prone districts of Tharparkar, Umerkot, and Dadu in Sindh.

Disaster Risk Financing

Focus region: *Sindh (Karachi)*
Target beneficiaries: *Vulnerable communities*
Implementing organisations: *National and Provincial Disaster Management Authorities, (ACF) and HANDS*
Timeline: *2020*
Further details: Welthungerhilfe (WHH), with the collaboration of National and Provincial Disaster Management Authorities, initiated the Disaster Risk Financing project in Pakistan. The project covered four vulnerable regions of Karachi in 2020, during which minimum and maximum temperatures were recorded. The heatwave model predicted a heatwave in the Port Qasim area, which triggered the release of funding to Action Against Hunger (ACF) and HANDS. Both organisations had been pre-selected to roll out preventative, mitigating, and response activities in Karachi. Awareness campaigns regarding heatwaves were carried out to engage communities in safeguarding measures.

Start Ready Risk Pool 1

Focus region: *Balochistan (Sibi), Punjab (Multan), Sindh (Nawabshah)*
Target beneficiaries: *Vulnerable communities*
Implementing organisations: *Care International & Bright Star Development Society Balochistan (BSDSB) in Sibi, Help Foundation in Multan, and Help Age & Civil Society Support Programme (CSSP) in Nawabshah*
Timeline: *2022*
Further details: Start Ready Risk Pool 1 funded project in Balochistan (Sibi), Punjab (Multan), and Sindh (Nawabshah) during 2022. Start Ready is a financing mechanism safeguarding communities from climate risks. It provided prearranged funding to NGOs to anticipate and respond to heat waves in Pakistan. Care International, along with Bright Star Development Society Balochistan (BSDSB) in Sibi, Help Foundation in Multan, and Help Age, along with the Civil Society Support Programme (CSSP) in Nawabshah, implemented the project.

Strengthening Tsunami and Earthquake Preparedness in Coastal Areas of Pakistan

Focus region: *Sindh and Balochistan, i.e., Malir, West/Keamari Karachi, and Gwadar*
Target beneficiaries: *Coastal communities*
Implementing organisation: *Government of Pakistan*
Timeline: *January 2019 to December 2022*
Further details: The Project implemented by UNDP in cooperation with the Government of Japan focused on curbing natural disasters in Pakistan and enhanced the capability of government authorities mandated to deal with natural disasters as well as developed means of mitigation, vigilance, and mobility for at-risk communities. The project has effectively addressed a critical developmental challenge by focusing on reducing tsunami risks and their potential impact on the lives and assets of coastal communities in Pakistan. In 2019, significant strides were made to foster institutional coordination and understanding necessary for advancing tsunami preparedness.

Disaster Risk Reduction in Humanitarian Action

Focus region: *No specific region*
Target beneficiaries: *Vulnerable communities*
Implementing organisation: *Government of Pakistan*
Timeline: *2021*
Further details: Disaster Risk Reduction in Humanitarian Action was supported by the United Nations Office for Disaster Risk Reduction (UNDRR) and integrated the DRR into the Humanitarian Needs Overview while linking with other development plans for the country. Anticipatory Action aims to save lives by strengthening the coordinated response to disasters at local, provincial, and national levels while decreasing the impact of frequent disasters through disaster risk management and the use of early or anticipatory measures.

Pakistan Hydromet and Climate Services Project (PHCSP)

Focus region: *No specific region*
Target beneficiaries: *Public sector*
Implementation organisations: *National Disaster Risk Management Fund, Ministry of Climate Change*
Timeline: *2018-2024*
Further details: The World Bank-funded project focuses on strengthening Pakistan's public sector delivery of reliable and timely hydrometeorological and disaster risk management services. The major components include hydrometeorological and climate services, disaster risk management, and contingent emergency response.

Sindh Flood Emergency Housing Reconstruction Project

Focus region: *Sindh*
Target beneficiaries: *Vulnerable communities*
Implementing organisation: *Government of Sindh*
Timeline: *2023-2027*
Further details: This World Bank-supported project is a beneficiary-drive, multi-hazard resilient reconstruction of core housing units that were affected by floods in 2022 in selected districts of Sindh. Institutional strengthening and technical assistance in damage assessment and eligibility verification, technical assistance in project implementation entity reconstruction program, and support through implementation partners are major components of this project. Besides, housing reconstruction grants and support in the management and implementation of the project are also among the major provisions.

Sindh Flood Emergency Rehabilitation Project

Focus region: *Sindh*
Target beneficiaries: *Public sector*
Implementation organisation: *Planning and Development Department, Irrigation Department*
Timeline: *2023-2027*
Further details: The key objective of the project funded by the World Bank is to rehabilitate damaged infrastructure and provide short-term livelihood prospects in selected regions of Sindh caused by floods in 2022. The project also intended to enhance capacity of the government to respond to the impacts of climate change and natural hazards.

Sindh Water and Agriculture Transformation (SWAT)

Focus region: *Sindh*
Target beneficiaries: *Small and medium-sized farmers*
Implementation organisation: *Government of Sindh*

Timeline: *2023-2028*
Further details: The World Bank-assisted project targets to enhance agricultural water productivity in selected farmers' organisation command areas, improve water resources management, and contribute to restring crop production by small and medium-sized farmers who were affected from floods in 2022. Support for Institutional development, technical assistance, integrated development of farmers' organisation, and targeted agricultural incentives and investments is provided. Besides, the project also assisted in agricultural flood emergency rehabilitation, implementation support in cash transfer mechanisms, and continent emergency response.

Integrated Flood Resilience and Adaptation Project

Focus region: *Balochistan*
Target beneficiaries: *Vulnerable communities*
Implementation organisation: *Ministry of Planning, Development and Special Initiatives, Irrigation Department Balochistan, Planning and Development Department Balochistan*
Timeline: *2023-2028*
Further details: The project intended to improve livelihoods and essential services and increase flood risk protection in selected communities that were affected by floods in 2022. Rehabilitation of priority community infrastructure damaged by floods, community facilities located in calamity-declared districts of Balochistan were major interventions under the project. Improving capability of the Pakistan Metrological Department, resilient housing reconstruction and restoration, livelihood support and watershed management, and technical assistance were also provided from the World Bank.

Climate Resilience Through Horticultural Interventions in Khyber Pakhtunkhwa

Focus region: *Khyber Pakhtunkhwa*
Target beneficiaries: *Small farmers*
Implementing organisation: *Agriculture Department, Forest Wildlife & Livestock Department of Khyber Pakhtunkhwa*
Timeline: *2022-2024*
Further details: 'Climate Resilience Through Horticultural Interventions in Khyber Pakhtunkhwa' project is initiated by National Disaster Risk Management Fund (NDRMF) in Khyber Pakhtunkhwa where the implementing partners included Agriculture Department, Forest Wildlife & Livestock Department. The project was started in July 2022 and will be completed in December 2024. The project aimed to contribute to climate resilience by establishing model orchards across the province. These orchards will include a variety of fruits such as apple, stone fruits, pear, citrus, persimmon, mango, litchi, avocado, hazelnut, cherry, walnuts, pecan nut, olive, and dates. The focus is to restore degraded lands and shift toward climate smart horticulture production.

Promoting Integrated Mountain Safety in Northern Pakistan

Focus region: *Khyber Pakhtunkhwa and Gilgit Baltistan*
Target beneficiaries: *Vulnerable communities*
Implementing organisation: *Agha Khan Foundation and Agha Khan Planning and Building Services*
Timeline: *2019-2022*
Further details: 'Promoting Integrated Mountain Safety in Northern Pakistan' project was started by National Disaster Risk Management Fund in Khyber Pakhtunkhwa and Gilgit Baltistan regions. The project was implemented through a joint venture of Agha Khan Foundation and Agha Khan Planning and Building Services. The project was implemented during 2019-2022. The project was focused on disaster risk resilience and its objective was to ensure that communities in vulnerable regions are protected from risks

caused by natural hazards. Besides the objective was to better prepare the communities to respond and cope with disaster situations.

Punjab Green Development Program

Focus region: *Punjab*
Target beneficiaries: *Small farmers*
Implementing organisation: *Government of the Punjab (*Environment Department, Industries Department, Energy Department, Transport Department, Finance Department, and Planning and Development Department)
Timeline: *2018 onwards*
Further details: Punjab Green Development Programme was funded by World Bank and Government of the Punjab. The key objectives of the programme included strengthening environmental governance and promoting green investments. Environment Department, Industries Department, Energy Department, Transport Department, Finance Department, and Planning and Development Department implemented the programme.

Flood Recovery Programme

Focus region: *No specific region*
Target beneficiaries: Vulnerable communities
Implementing organisation: *Government of Pakistan*
Timeline: *2022 onwards*
Further details: The objective of this programme is to provide support in flood-affected areas in an integrated manner. The programme has four pillars including housing and community, livelihoods, government services, disaster resilience and ensuring environmental protection.

Flood Protection Sector Project-III

Focus region: *No specific region*
Target beneficiaries:
Implementing organisations: *Government of Punjab (Environment Department, Industries Department, Energy Department, Transport Department, Finance Department, and Planning and Development Department)*
Timeline: *2023-2028*
Further details: Flood Protection Sector Project-III was started by the Government of Pakistan, Ministry of Water Resources. Flood Protection project is a five-year plan while its Annual Work Plan (2023-24) was finalized in September 2023.The structural interventions under the project included construction of flood related infrastructure. These interventions are implemented mainly through Irrigation Departments of the four provinces, Federal Line Departments (Gilgit Baltistan, Azad Jammu & Kashmir, and Merged Areas). Non-structural interventions including flood forecasting & early warning systems, and installation of flood telemetry network & watershed management interventions are implemented by WAPDA whereas construction of ecosystem-based interventions is implemented by the Ministry of Climate Change and Environmental Coordination. Asian Development Bank provided the financial support for the project.

Benazir Income Support Programme

Focus region: *No specific region*
Target beneficiaries: *Vulnerable and poor women and their households*
Implementing organisation: *Government of Pakistan*
Timeline: *2008 onwards*

Further details: Benazir Income Support Programme is a social protection programme launched by the Government of Pakistan in 2008 aiming to eradicate poverty and improving the status of marginalized and under privileged sections of society, particularly women. The programme included cash transfers to vulnerable and poor women and their households across Pakistan. The long-term goal of the programme is to accomplish the Sustainable Development Goals (SDGs) related to eliminating extreme and chronic poverty and empowering women in Pakistan.

Building Resilience and Addressing Vulnerability to Emergencies (BRAVE)

Focus region: *Gilgit Baltistan, Sindh*
Target beneficiaries: *Vulnerable communities*
Implementing organisation: *National Disaster Management Authority*
Timeline: *2021-2026*
Further details: Building Resilience and Addressing Vulnerability to Emergencies (BRAVE) is an FCDO-funded project that spanned five years (2021-2026). The key objective of the BRAVE programme is to enhance community resilience to climate change and the capacity of relevant public organisations responsible for delivering climate resilience, including systems for adaptive and shock-responsive social protection. The initial phase was started in Gilgit Baltistan because of the extreme manifestation of many hazards and risks caused by climate change, poor socio-economic situation, and lack of capacity among public and private institutions and communities to address climate-induced challenges. The institutional capacity programme was completed in the provinces of Sindh and Gilgit Baltistan.

Social Protection for Health and Climate Resilience

Focus region: *No specific regions*
Target beneficiaries: *Poor households*
Implementing organisation: *Benazir Income Support Programme*
Timeline: *2023*
Further details: German Federal Ministry for Economic Cooperation and Development (BMZ) is providing support for the 'Social Protection for Health and Climate Resilience' project in Pakistan. The implementing partner for the project is Benazir Income Support Programme, which is providing targeted support to mothers and young girls, specifically focusing on reducing malnourished mothers giving birth to malnourished children. The project has supported families to deal with the devastating effects of floods and contributed to the adaption of climate change.

Adaptive Social Protection in Pakistan

Focus region: *No specific region*
Target beneficiaries: *Poor households*
Implementing organisations: *Ministry of Economic Affairs in collaboration with German Federal Ministry for Economic Cooperation and Development (BMZ)*
Timeline: *2023-2026*
Further details: Adaptive Social Protection in Pakistan is supported by GIZ having the time duration of 2023 to 2026. The project is focused on enhancing institutional, financial, and technical conditions for implementation of adaptive and gender-transformative social protection in Pakistan. The Ministry of Economic Affairs is collaborating with the German Federal Ministry for Economic Cooperation and Development (BMZ) in this regard. The five operation areas of the project include strengthening the institutional and financial foundations of the adaptive social protection system, improved access to social protection programmes specifically for women, better technical and institutional conditions for regular data exchange on planning and implementing adaptive social protection programmes, integrating social

protection into disaster management practices, and promoting social protection programmes for climate change adaption.

Sehat Sahulat Program

Focus region: *Khyber Pakhtunkhwa*
Target beneficiaries: *Poor households*
Implementing organisation: *Government of Khyber Pakhtunkhwa*
Timeline: *2015 onwards*
Further details: The Sehat Sahulat Programme is the flagship social health insurance initiative launched by the GoKP in 2015 to ensure that all underprivileged citizens get access to hospitalisation treatment swiftly and dignifiedly without incurring any financial cost. This cashless scheme is based on the hospital reimbursement model; no exclusions exist, and all pre-existing conditions are covered. This programme has remained uninterrupted in KP despite numerous hiccups caused during the last two years by political volatility in the country. The KP government has recently announced the full revival of this programme and that all citizens of this province, irrespective of their income levels, are eligible under this scheme.

Crisis Resilient Social Protection (CRISP) Program

Focus region: *No specific region*
Target beneficiaries: *Poor households*
Implementing organisation: *Benazir Income Support Programme*
Timeline: *2021-2027*
Further details: The World Bank provided financing for 'The Crisis Resilient Social Protection (CRISP) Program, intended to strengthen Pakistan's social protection system and promote shock resilience among poor and vulnerable households. The programme was started in 2021 and will end in 2027. The programme has three areas of result, including innovations to the social registry, beneficiary-centric biometric payment systems, and safeguarding human capital in the early and primary school years. Benazir Income Support Programme is the implementation partner.

Sindh Livestock and Aquaculture Sectors Transformation Project

Focus region: *Sindh*
Target beneficiaries: *Small farmers*
Implementing organisation: *Livestock and Fisheries Department of Sindh*
Timeline: *2024-2029*
Further details: The World Bank supported the Sindh Livestock and Aquaculture Sectors Transformation Project, which aimed to support climate-smart and competitive small and medium producers in the livestock and aquaculture sectors in Sindh. The project was approved in June 2024 and will end in December 2029. Livestock and Fisheries Department of Sindh is the implementing partners of this project. The project targeted to promote inclusive, climate-resilient, and sustainable livestock and aquaculture sector. Climate-smart production, value addition, and inclusive access to markets is also the major focus of this project.

Introduction of innovative climate risk financing solutions in Pakistan

Focus region: *No specific region*
Target beneficiaries: *Women-led MSMEs or women having key positions within MSMEs*
Implementing organisation: *Ministry of Planning, Development & Special Initiatives*
Timeline: *2024-2026*
Further details: 'Introduction of innovative climate risk financing solutions in Pakistan' was initiated by GIZ to promote climate resilience for Micro, Small and Medium Enterprises (MSMEs) in the agriculture

value chain in Pakistan. The project focuses explicitly on women-led MSMEs or those with key positions within MSMEs. The project is being implemented by the Ministry of Planning, Development & Special Initiatives (MoPDSI) while the project timeline is planned for 2024-2026. The project also intends to develop partnerships with private-sector lead buyers involved in establishing or increasing their supply chain with MSMEs in the agriculture value chain.

Pakistan Resilient and Accessible Microfinance Project by the World Bank

Focus region: *No specific region*
Target beneficiaries: *Microfinance sector and its borrowers*
Implementing organisation: *Ministry of Finance and State Bank of Pakistan*
Timeline: *Operationalisation within FY 2025. World Bank project of 5 years*
Further details: The Climate Risk Facility (CRF) will be established with the objective of supporting resilience of the sector and its borrowers. It will achieve this objective by giving funding to the microfinance sector for two types of products, namely a Pre-Climate Event Support product ("Product 1") and a Post-Climate Event Support product ("Product 2"). Through these products, the CRF will meet multifold objectives. First, through Product 1, the CRF will pilot an initiative leveraging technology and liquidity to promote climate adaptive agriculture for small farmers to build resilience at both the portfolio and borrower levels. Second, through Product 2, the CRF will help reverse the disintermediation away from locations and sectors which are deemed more prone to climate shocks by providing support to MFPs in the event of qualifying climate-related shock(s) to help mitigate the risks to asset quality. In the initial phase of the operationalisation of the CRF, support will only be provided in the event of 'qualifying' floods.

Pakistan UNDP Insurance and Risk Finance Project and Tripartite Agreement

Focus region: *No specific region*
Target beneficiaries: *Government, Insurance Sector and vulnerable communities*
Implementing organisation: *Economic Affairs Division; Securities and Exchange Commission of Pakistan; Provincial Governments and private sector*
Timeline: *2024-2025*
Further details: The project is designed to support the government to build country and community resilience by strengthening its capacity in public finance management and integrating risk financing into climate resilience agendas in the face of worsening climate and disaster risks. It works with the insurance regulator and local insurance industry to develop the market through incubation of inclusive insurance solutions. The project aims to develop capacity and understanding for insurance and risk financing; promote demand for risk protection and support the creation of an enabling regulatory environment, evidence-based research and advocacy. The project also leverages the expertise of global insurers and reinsurers to develop prearranged sovereign risk transfer solutions that will aid government fiscal stability and promote long-term development.

SDG Investments and Climate Financing Facility

Focus region: *No specific regional focus*
Target beneficiaries: *Vulnerable populations*
Implementing organisation: *Government of Pakistan*
Timeline: *2022-2027*
Further details: The SDG Investments and Climate Financing Facility is funded by the UNDP, which provides policy advisory and technical assistance on financing for development and natural capital solutions to the government of Pakistan. The project was started in 2022 and will end in 2027. UNDP has set up an SDG Investment and Climate Financing Facility to identify, cultivate, and harness high-impact

SDG-aligned and climate financing prospects. The project also intended to attract investments from domestic and international investors, including financial markets.

Climate Promise-II

Focus region: *No specific region*
Target beneficiaries: *Public sector*
Implementation organisation: *Government of Pakistan*
Timeline: *2022-2024*
Further details: This project is funded by UNDP and intends to enhance the cooperation and resilience of local and regional stakeholders to the threats and risks of climate change. The project provides technical support to government and related stakeholders to effectively implement climate change policies, Nationally Determined Contributions, and compliance with international conventions. Besides, the project also supports improving the resilience of institutions and communities by implementing various measures.

Climate Resilient Infrastructure Fund

Focus region: *Khyber Pakhtunkhwa*
Target beneficiaries: *Vulnerable communities, small farmers*
Implementing organisation: *Planning and Development Department*
Timeline: *2022 onwards*
Further details: To support the transformation to a climate-resilient infrastructure, the Government of Khyber Pakhtunkhwa is establishing the Climate-Resilient Infrastructure Fund (CRIF), channelling investment towards developing public infrastructure. Learning from international experiences, such as the UKAID-funded Climate Resilient Infrastructure Fund in Africa & Australian Infrastructure Financing Facility for the Pacific Island countries, CRIF will be tailored to meet local market nuances. The Fund will be a private non-banking financial institution with an independent legal structure. The GoKP will contribute a one-time portion of the initial capital, and a significant chunk of required capital will be raised through concessional borrowings, grants from international finance organisations, options evolving from COP27, international damage & loss funds, and mitigation & adaptation instruments. The CRIF will be self-sustained and provide for its administrative expenses through earnings from investments and generated fee income from its advisory and funding services.

Pakistan - Integrated Disaster Preparedness (DP) for Resilience Building

Focus region: *Province (Balochistan & Sindh), District (Nushki and Khairpur)*
Target beneficiaries: *Government authorities and communities*
Implementing organisation: *FAO, WFP, PDMA's of Balochistan and Sindh, PMD, District Govts.*
Timeline: *2024-2026*
Further details: Government authorities at provincial and district levels and communities are better able to plan for and respond to natural disasters through strengthened systems and capacities. Government systems, the UN, and other stakeholders are better equipped for early action to natural disasters. Using the Anticipatory Action Plan and CWG tools and SOPs, partner with DDMA and PDMA to register vulnerable households in response to an impending crisis.

Technical support to GoP on Disaster Preparedness and Anticipatory Action for selected districts of Sindh, Balochistan and KP

Focus regions: *Balochistan (Nushki), Sindh (Dadu, Khairpur), Khyber Pakhtunkhwa (D I Kha)*
Target beneficiaries: *Vulnerable communities, NDMA, PDMAs, DDMAs other government line departments and stakeholders*

Implementing organisations: *NDMA, NIDM, PDMAs, DDMAs, PMD, RMC, Irrigation*
Timeline: *2024-2025*
Further details: The project is in its inception phase. Project is very inclusive and focusing on multi-levels and multi- hazards.

Building long-term Resilience of Flood-affected Communities' Food Security Intervention in Sindh Province

Focus regions: *Sindh (Qambar Shahdadkot, Shaheed Benazir Abad and district Jacobabad)*
Target beneficiaries: *Farmers and poor populations earning less than PKR 25,000*
Implementing organisations: *Human Appeal, Qatar Charity*
Government contact department/agency: District Administration, PDMA, NDMA, Rescue 1122, Directorate of Agriculture, Directorate of Livestock
Timeline: *2024-2026*
Further details: The project intends to strengthen the resilience of targeted communities against shocks and ensure the food security and livelihood recovery of the population affected by floods.

Weather Station Deployment and Dissemination of Accurate Hyperlocal Weather Information, Pakistan

Focus regions: *Across Pakistan*
Target beneficiaries: *Small and medium holder farmers across Pakistan.*
Implementing organisations: *BaKhabar Kissan Pvt Ltd with funding from GSMA-IF; and Weatherwalay Pvt Limited as downstream partners*
Timeline: *November 2022 to April 2024*
Further details: This initiative deployed 155 Automated Weather Stations (AWS) to deliver precise, localized weather forecasts to farmers, helping them make informed decisions, reduce crop losses, and increase profitability. The project also developed a proactive pest and disease alert system, leveraging environmental data to predict outbreaks in specific areas, further safeguarding farmers' livelihoods. To complement these efforts, educational training sessions and a climate change awareness docu-series were produced to empower farmers with the knowledge needed to better prepare for and adapt to the growing risks posed by climate change.

Empowering Communities Through Weather Intelligence: A Financially Inclusive and Sustainable Planning Instrument for Climate Adaptation and Disaster Resilience

Focus regions: *Across Pakistan*
Target beneficiaries: *2.23 million subscribers to the service across Pakistan.*
Implementing organisations: *Jazz*
Timeline: *July 2023- ongoing*
Further details: Provide accurate, hyperlocal weather forecasts as early warning systems to help communities adapt to climate change and prepare for potential disasters; promote accessible and financially sustainable weather intelligence services, ensuring equitable reach across diverse socio-economic groups; strengthen community resilience by integrating weather forecasts into disaster preparedness and response strategies; and deliver alerts on smog, fog, dengue, and pollen to help individuals and authorities mitigate health risks.

Empowering Communities Through Weather Intelligence: A Financially Inclusive and Sustainable Planning Instrument for Climate Adaptation and Disaster Resilience

Focus regions: *Across Pakistan*
Target beneficiaries: *1.19 million subscribers to the service across Pakistan.*
Implementing organisations: *Ufone*

Timeline: *August 2022- ongoing*
Further details: Provide accurate, hyperlocal weather forecasts as early warning systems to help communities adapt to climate change and prepare for potential disasters; promote accessible and financially sustainable weather intelligence services, ensuring equitable reach across diverse socio-economic groups; strengthen community resilience by integrating weather forecasts into disaster preparedness and response strategies; and deliver alerts on smog, fog, dengue, and pollen to help individuals and authorities mitigate health risks.

Early Warning System for CESVI Pakistan (Loreal Fund)

Focus regions: *Rural Sindh and Balochistan, Thatta, Gwadarwith specific focus in Rural Sindh****Target beneficiaries:*** *Coastal and rural populations in Sindh and Balochistan, vulnerable groups including women, children, and the elderly in high-risk areas and local authorities and first responders.*
Implementing organisations: *CESVI Pakistan*
Timeline: *Mar 2025- Dec 2026*
Further details: Establish a community-based early warning system to reduce disaster risk in vulnerable areas; strengthen disaster preparedness and response capabilities in coastal and rural communities; utilize Multi Numeric Model (MNM) and weather data as early warning tools to provide timely alerts; enhance resilience to climate change impacts through accurate weather forecasts and early warning systems; foster collaboration between communities, local authorities, and disaster management agencies.

Air Quality Index (AQI) Monitoring and Forecasting System - Comsats Department of Meteorology

Focus regions: *Islamabad, Lahore, Karachi, Peshawar, Quetta, and other major urban and industrial areas*
Target beneficiaries: *Urban populations in major cities across Pakistan, vulnerable groups including children, the elderly, and individuals with respiratory conditions and environmental agencies and public health institutions*
Implementing organisations: *Comsats Department of Meteorology*
Timeline: *Jun 2025- Apr 2026*
Further details: Monitor and forecast air quality across Pakistan using real-time AQI data, provide early warnings for hazardous air quality levels to protect public health, utilize the Air Quality Index (AQI) and meteorological data for predictive modelling, foster public awareness and government action on pollution control measures and climate change mitigation.

Crop Parametric Insurance for Small and Medium Holder Farmers in Pakistan

Focus regions: *Punjab*
Target beneficiaries: *Small and medium holder farmers in selected areas of Punjab*
Implementing organisations: *Karandaaz*
Timeline: *Feb 2025- Jan 2026*
Further details: The primary objective of this first of its kind, large-scale and scalable pilot, spanning 10,000 acres, is to strengthen the resilience of Pakistani farmers against climate-related risks by offering timely financial protection and promoting financial inclusion. The project aims to develop and validate insurance products based on measurable weather indices by utilising IoT, weather stations, radar, and satellite-based data. The project aims to foster sustainable agricultural practices and strengthen climate adaptation. This initiative seeks to break the cycles of poverty and vulnerability, contributing significantly to the achievement of Sustainable Development Goals, particularly poverty reduction (SDG 1) and climate action (SDG 13).

Climate and Disaster Resilience Enhancement Program (Subprogram 1)
Focus Regions: *All of Pakistan*
Target Beneficiaries: *Federal Government (Policy-based loan and Technical Assistance)*
Implementing Organisations: *Asian Development Bank*
Timeline: *2024-2027*
Further Details: $500 million loan to support (i) strengthened institutional capacity for strategy, planning, and response; (ii) increased investment in disaster risk reduction (DRR) and climate resilience; and (iii) enhanced disaster risk financing (DRF) using a risk-layered approach. A policy-based loan (PBL) is appropriate given the need for evidence-based policy dialogue, effective stakeholder consultation, and well-coordinated development partner support (loan agreement dated 18 November 2024).

The abovementioned current and planned CDRFI interventions indirectly contribute to risk financing. However, these programmes are inadequate to fulfil Pakistan's vast and intricate climate and disaster financing requirements. In Pakistan, various initiatives operational across different regions are generally aligned with national and regional climate change adaptation policies and disaster risk reduction strategies. However, these efforts are not functioning within a cohesive and integrated framework, which limits their overall effectiveness and impact.

A significant portion of these interventions is funded by international development and humanitarian agencies, which are often designed on pilot bases in accordance with their organisational mandates. Most of these projects aim to enhance climate resilience, promote anticipatory action, support the socio-economic upliftment of at-risk communities, and improve governance related to climate and disaster risk. Despite these essential focuses, only a handful of programmes directly address the critical facets of financing and insurance tailored explicitly for disaster risks. Moreover, the geographic coverage of these initiatives is often limited, concentrating primarily on the needs of specific communities rather than adopting a more comprehensive approach that could benefit a larger population.

On the positive side, these interventions are developing the grounds for mainstream risk financing into policies and strategies. The programmes, through collaboration with the national and provincial institutions, are developing are encouraging the public sector organisations to adopt market-based risk transfer measures and support local insurance and microfinance institutions. This improved readiness of government agencies and the private financial and insurance sector is likely to work for the market based CDRFI instruments through Global Shield support in Pakistan.

6.3. Themes Linking to Financial Protection[8]

6.3.1. Adaptive Social Protection System

Adaptive Social Protection (ASP) is essential to build long-term climate resilience of poor and vulnerable households. ASP develops integrated approaches among critical stakeholders engaged in social protection (SP), Climate Change Adaptation (CCA), and Disaster Risk Reduction (DRR). Advancing the ASP agenda necessitates government ownership and high levels of accountability to facilitate the transition from reliance on ad hoc, ex-post disaster relief responses to government-led, ex-ante shock responses embedded in government-owned systems (Johnson et al. 2023). Financial instruments are an integral

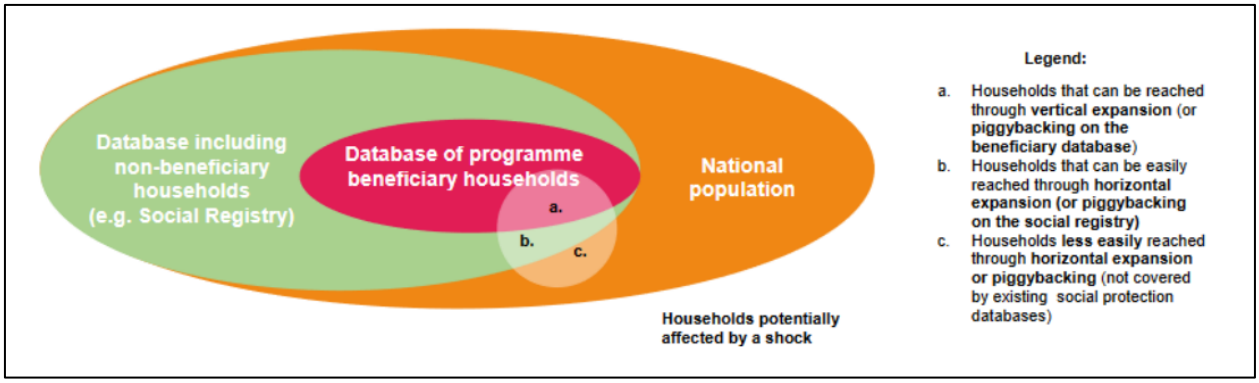
[8] ***Contributors:*** *Oxford Policy Management, GIZ, World Food Programme*

part of ASP, as they are key to mobilising the resources required to initiate shock responses and building necessary systems.

6.3.2. Status of Social Protection System in Pakistan

Scalable social protection programmes: Pakistan's flagship social assistance programmes have the potential to increase resilience and can scale up in anticipation of and response to shocks. At the national level, the Benazir Income Support Programme (BISP) provides cash transfers to 9.3 million households to respond to economic shocks (Seyfert and Ahmad, 2020). In response to the 2022 floods, BISP distributed cash transfers to 2.7 million beneficiaries (NDMA, 2022). To identify beneficiaries, BISP used both NSER and big data analysis. By triangulating NSER data with other sources—for example, using GPS data from the NSER in combination with flood exposure data from the United Nations Institute for Training and Research (UNITAR—BISP) was able to effectively target those areas where families were most vulnerable to floods. In addition, BISP has been successful in mitigating the negative impact of poverty on households as well as protecting them against shocks. BISP has had significant positive impacts on consumption expenditure, food consumption, child nutrition security, asset retention, the mobility of women, investments in health and education, and savings through Waseela Taaleem and Nashonuma Programmes. According to World Bank report (2024), to date, BISP has provided USD 1 billion in regular and reliable support. In response to the 2010 floods, the Government of Pakistan relied on pre-paid Visa debit cards in the Watan card programme to disburse funds. This helped to facilitate the rapid response to the flood disaster. The government partnered with a private bank, United Bank Limited (UBL), to implement the delivery of cash to beneficiaries via the debit cards, which proved more effective than manual approaches (Smith et al., 2012). However, evidence (Johnson et al. 2023) has shown that cash transfers cannot take the lead on crisis preparedness and cushion citizens from shocks sustainably due to weak coordination across social protection agencies and disaster risk management (DRM) counterparts.

Figure 4. Households potentially affected by a shock



Source: Seyfert, K, Ahmed, M (2020) Options for making Pakistan's flagship national cash transfer programme shock responsive. Oxford Policy Management

BISP is piloting a Hybrid Social Protection Scheme (HSPS) that combines social assistance with risk mitigation for informal sector workers. The scheme's objective is to encourage savings for emergencies and help the government provide additional support during times of crisis. HSPS will offer contributory savings with matching incentives based on successful models worldwide (GoP, 2024). At the sub-national level, the Sindh Public Housing Foundation (SPHF) focuses on rebuilding 2.1 million houses damaged in the 2022 floods to benefit approximately 800,000 female beneficiaries. Other conditional cash transfer

programmes, such as the Mother and Child Support Programme (MCSP) (Sindh Social Protection Authority, 2024) being implemented by the Sindh Social Protection Authority (SSPA), offer opportunities to integrate climate resilience into maternal and child healthcare services, ensuring the well-being of vulnerable populations. The Strengthening Markets for Agriculture and Rural Transformation (SMART) Punjab Programme has piloted innovative agriculture insurance schemes, and the Government has successfully built resilience, especially of small farmers, against shocks and disasters, specifically during COVID-19 and the 2022 floods. Approximately 800,000 policies have already been issued under the project (World Bank, 2023b). There are gaps in the social protection programmes in Pakistan as they are not (fully) designed to be responsive to sudden shocks, limiting their effectiveness in providing timely support to vulnerable populations.

Finance: Pakistan heavily invests in social protection programmes for the poor and vulnerable, and in emergencies, government provide additional funds through special approvals. During COVID-19, the Ehsaas Emergency Cash (EEC) Programme provided PKR 203 billion (£0.9 billion) cash transfers to support 16.9 million vulnerable families. During the 2022 floods, PKR 68 trillion was transferred to affected populations through BISP. However, there is no mechanism to use social protection for long-term climate risk resilience and reduction (GoP, 2024). This requires streamlining climate and disaster risk financing strategies and developing appropriate risk financing instruments linked to responsive safety net programmes (Bowne et al. 2020). Relying solely on ex-post and ad hoc financing is unsustainable in Pakistan's context of increased climate-driven risks. Disaster spending is a small percentage (World Bank, 2020). Disaster response in Pakistan relies on supplementary resources. Financial fund flow includes single-line transfers to provinces through Annual Development Plans. Provincial governments allocate funds to PDMAs, activated only during disasters. The NDM Act (2010) calls for provincial and federal disaster management funds, but these are not yet constituted. There are ongoing efforts to create financial investments for climate-induced events and DRR. The DRF strategy aims to create fiscal space for disaster response without affecting development plans. There is an opportunity to consider the costs of expanding existing cash-based social safety net programmes, which have a proven track record in shock response. Climate Budget Tagging efforts are underway in Punjab and KP, supported by international development agencies. For example, the Strengthening National Governance (SNG) II Project by FCDO helped inform the government's annual fiscal risk statement, resulting in contingency funds for social protection (PKR 100 billion/£408 million) and disaster management (PKR 12 billion/£49 million) (SNG, 2023). These funds were appropriated in Pakistan to respond to shocks caused by floods (2022).

Social protection instruments like livelihood diversification, weather-indexed crop insurance, and social insurance have proven effective in building resilience against climate risks. The Pakistan Resilient and Accessible Microfinance Project aims to improve access to microcredit and support the microfinance sector's and its borrowers' resilience. It will establish a Climate Risk Facility (CRF) offering various support products. The CRF will use international risk transfer to provide a backstop, de-risking the government and introducing risk-sharing with the private sector. This approach will help Pakistan manage climate risks more effectively (World Bank, 2023c). Currently, the insurance penetration rate is less than 1% in Pakistan (Khan, 2023). Adopting a proactive approach to quantifying financial needs to cover future disasters is imperative. Previous instances of scaling up social protection during COVID-19 and 2022 floods can indicate the additional cost, which can be factored into a regular budgetary stream. There is also a demand for technical assistance from international development agencies and private sector insurance companies in scaling innovative shock-responsive social protection financing instruments like microinsurance (indemnity and parametric) for climate and disaster risk reduction in the agriculture, livestock, and health sectors. Pilots (Villanueva et al. 2024) have shown the success of these instruments

in building transformative adaptive capacities through livelihood diversification and resilience to withstand climate-related shocks. However, there is a lack of a formal framework and financing mechanism for Adaptive Social Protection (ASP) and the climate risk financing instruments for the poor.

Institutional arrangements and partnerships: In Pakistan, social protection responses to shocks are reactive and are not guided by a holistic Adaptive Social Protection (ASP) roadmap and political ownership. At the federal level, the Ministry of Poverty Alleviation and Social Safety (MoPASS) is mandated to coordinate social protection response to shocks under constituent agencies, which include BISP to deliver cash transfers; Pakistan Bait-ul-Maal (PBM) to run care services; Pakistan Poverty Alleviation Fund (PPAF) for poverty graduation initiatives, and Trust for Voluntary Organisations (TVO) to coordinate the role of civil society in social protection provision. Social protection is a devolved subject after the 18th Constitutional Amendment of 2010. Consequently, provincial governments have strengthened their social protection policy framework and constituted Social Protection Authorities. However, these authorities do not have a well-defined ASP framework that complements the Disaster Risk Management (DRM) strategy. The National Disaster Management (NDM) Act of 2010 (NDMA, 2010) established Pakistan's disaster management system. The Act created institutional structures at provincial and district levels, including Provincial Disaster Management Authorities. The National Disaster Management Commission, chaired by the Prime Minister, brings together political leadership to set policies, plans, and guidelines for disaster management. The National Disaster Risk Management Fund (NDRMF) as a non-banking financial intermediary, provides grant financing for DRR and DRF interventions. However, there is a lack of coordination between social safety net systems and the DRM system, leading to missed opportunities for shock-responsive social protection (Watson et al. 2017). Therefore, there is no unified or holistic institutional framework for Adaptive Social Protection and a lack of synergies between DRM authorities and Social Protection Institutions for coordinated and anticipatory responses to climate-induced disasters and shocks.

6.3.3. Potential as a Distribution Channel for the Payouts of Financial Protection Instruments

BISP has an articulate cash transfer mechanism to its beneficiaries throughout the country. In disasters, provincial governments generally use the BISP payment channel for cash disbursement to the affected households. During COVID-19, the Ehsaas Emergency Cash (EEC) Programme provided PKR 203 billion in cash transfers to support 16.9 million vulnerable families. Similarly, During the 2022 floods, PKR 68 trillion was transferred to affected populations through BISP. However, the system is primarily designed for beneficiaries of the BISP programmes; there is difficulty in accessing the population outside of the more comprehensive view and database of BISP. Therefore, provincial authorities are considering developing their own provincial-level G2C payment mechanism that should meet the provincial social protection needs with 100% coverage for the deplorable populations in provinces.

6.4. Anticipatory Action / Early Warning Systems

Anticipatory action is a comparatively weaker part of Pakistan's Disaster Risk Reduction environment. Though disaster risk-relevant laws and policies emphasize the anticipated reaction as a set of actions to prevent or mitigate potential disaster impacts before shock or acute impacts are felt, practically, the focus is more on humanitarian action and relief after the disaster strikes. Disaster preparedness and readiness of the vulnerable communities through an articulate anticipatory action plan is unavailable on the ground. However, multi-hazard early warning systems exist and are practiced to varying extents. The Disaster Management Plan 2012 discusses the multi-hazard early warning system plan that aimed at reducing vulnerability through strengthening EWS capacity at national, provincial, and district

governments. The plan provides the institutional framework for hazard forecasting and dissemination of warnings at the federal, provincial, and local levels.

6.4.1. Key institutions

The Pakistan Meteorological Department (PMD) is crucial in monitoring weather patterns and forecasting potential hazards such as floods, cyclones, and earthquakes. Advanced technologies like satellite imagery and weather radars gather data. The collected data is analysed to assess the risk levels. This involves understanding the potential impact of the hazard on different regions and communities. The analysis helps determine the severity and likelihood of the disaster. Based on the risk assessment, warnings are issued to relevant authorities and the public.

The National Disaster Management Authority (NDMA) and Provincial Disaster Management Authorities (PDMAs) remain in continuous contact with PMD and disseminate the warnings to the relevant government offices at district and local levels for communicating to the general public in the risk area through various channels, including television, radio, SMS alerts, and social media. The goal is to ensure the information reaches as many people as possible, especially those in vulnerable areas.

6.4.2. Potential Linkages/Collaboration Areas with Financial Protection Mechanisms

Robust early warning systems are competitive for sound financial protection mechanisms based on the forecast. However, the current scenario of early warning systems and anticipatory action prevailing in the public sector, when examined from the perspective of linking to financial instruments, indicates specific challenges regarding the quality and accuracy of the forecasts.

6.5. Conclusion

This stocktake exercise has been conducted with due diligence without leaving any source unexplored. It transpires that the government is hardly availing any market-based risk transfer instrument; it generally operates in two extremes, either retaining the risk (using the contingency budgets, reappropriation from other vital sectors, and enhancing the revenues) or opting for international humanitarian assistance/grants, etc. It also implies that the government's indifference to market-based risk transfer measures contributed to the slow growth of insurance and relevant financial institutions for macro-level disaster-related programmes. This makes space for interventions supported by a GS platform. However, the wide gap in CDRFI may also invite a large number of requests for financing instruments and technical support.

7. Gap Analysis

7.1. Critical gaps and needs in terms of hazards and perils where CDRFI instruments are missing/insufficient

Generally, contingency funds and disaster budgets are utilised for emergency assistance, which includes providing food, shelter, and medical supplies after a disaster, as well as managing camps. They also cover compensation for deaths and injuries, along with emergency social assistance. The National Disaster Management Authority (NDMA) and Provincial Disaster Management Authorities (PDMAs) have established minimum compensation standards for the affected populations. However, the compensation provided for loss of life and property is often insufficient for rehabilitating affected families. From 2014 to 2017, the Government of Pakistan allocated approximately 0.9% to 1.9% of its budget to post-disaster

operations. Due to inadequate budgetary allocations, the government has historically encountered significant funding gaps for post-disaster operations. For instance, the funding gap for post-disaster operations following the 2022 floods is estimated to be around 99% (UNDP, 2022).

It is important to note that the National and Provincial Disaster Management Funds (NDMFs), established under the NDM Act of 2010, were intended to build sufficient reserves to address post-disaster needs. However, limited allocations and legacy issues related to the existing system have hindered their full operationalisation. The annual amounts allocated under these federal and provincial funds are often inadequate to meet post-disaster needs.

In this scenario, many sectors suffering significant losses have to wait a long time for resources to become available. This includes damage to public infrastructure such as communication networks, roads, bridges, and government buildings—particularly schools and health facilities. Additionally, agriculture and livestock have been affected, along with damage to housing, which has severely impacted the livelihoods of the poor population, leading to substantial social protection investments. The gaps identified across various regions and provinces are generally similar, although the order of priority may differ. Following is a brief description of these identified gaps:

Public Infrastructure: CDRFI instruments are currently unavailable to provide the government with immediate liquidity to restore public infrastructure damaged by climate-induced disasters, mainly from floods and torrential rains. The assessments conducted after the flood in 2022 in different districts recorded damage to the critical infrastructure of the public and private sectors. The priority infrastructure includes the road network, bridges, schools' buildings, health facilities, and government offices. The damaged private infrastructure mainly includes houses and businesses (shops, industries, and hotels).

Governments are generally mindful that these damages cannot be managed through routine risk retention measures. Therefore, greater emphasis exists on developing climate-resistant infrastructures besides capitalising on the infrastructure fund similar to the one initiated by the government of KP after the 2022 floods. This is generally considered sustained and medium-to-long term efforts to restore the damaged infrastructure. However, in some cases, the infrastructure needs immediate financing. This point was mainly highlighted by the participants in the stocktake consultation in Gilgit Baltistan, where during the UNDP teams' visit, the whole city suffered a power crisis due to damage to the power plant caused by a landslide. This highlighted the need for insurance of such a vital infrastructure.

Damage to School Buildings: Financing for restoring damaged public-school buildings also emerged as a priority area. During Floods 2022 the schools for more than two million children in Pakistan remained completely inaccessible. A participant in the consultative sessions referred to the UNICEF's reports which show that at least 25,187 schools were damaged or destroyed in the 2022 floods. Recognising the seriousness of the situation, the government generally prioritizes the work on repairing and maintaining schools. Still, it sometimes takes over two years to completely restore the infrastructure, enabling the children to return to school. This is because of the lack of immediate availability of resources, and the governments have to wait until the next annual development program. This critical aspect needs market-based risk transfer solutions like infrastructure insurance.

Agriculture Damages: Currently there are no market-based risk transfer measures to protect the vulnerability of the agriculture sector against climate-induced disasters, mainly riverine floods and droughts. In Punjab and Sindh crops are frequently affected by the floods in river Indus. In the context of

Flood 2022, FAO assesses that some 9.4 million acres of crop area in Pakistan were potentially inundated in August, of which 4.8 million acres are in Sindh, 2.7 million acres in Punjab, 1.2 million acres in Balochistan and 714,000 acres in Khyber Pakhtunkhwa (Entcheva, 2023)

Droughts and heat waves in certain parts of the country also affect the yields. The agriculture experts in the provincial consultations highlighted the sheer absence of financial protection for the farming communities since the government generally offers subsidized seeds and fertiliser to help them recover. They also highlighted that the damage caused to farming due to slow-onset climate change, like reducing the yield of the orchards in Balochistan areas, often goes unregistered. Insurance, reinsurance, and capital market solutions could significantly mitigate the adverse impact of natural reinsurance and capital markets.

Livestock Losses: Closely linked to the agriculture sector, livestock also emerged deficient of the CDRFI instruments. During the recent floods, more than 1.1 million livestock have reportedly been killed, including some 500,000 livestock in Balochistan, over 428,000 livestock in Sindh and over 205,100 livestock in Punjab. As well as being a food source, many households rely on livestock for their livelihoods, with livestock often also serving as collateral for loans, including to finance the purchase of seeds for sowing crops. The loss of animals thus presents significant economic and food security repercussions.

Adaptive Social Protection also requires prearranged financing. The discussion during consultations revealed that social protection through forecast-based cash transfers could be an option for poor populations, particularly those settled in mountainous areas and thinly populated deserts. Discussing the possible CDRFI instruments for this population in Balochistan, it transpired that since most of the poor population have no proper settlements and generally live in mud houses and makeshift structures, the insurance-related financial instruments are not viable. Therefore, comprehensive social protection programmes for these vulnerable segments is the only suitable option.

7.2. Gaps and needs in terms of relevant national strategies & policies for risk financing

Risk Financing is not well represented in the strategies and policies Disaster risk financing is treated as a secondary topic in almost all the policies and strategies related to disaster management. Only recently did risk financing get traction from government policymakers, after huge losses during the flood of 2022. The flood recovery plans, particularly in KP and Sindh, discuss the financing in more practical terms as compared to the regular disaster management plans at the provincial level. This growing interest in disaster risk financing is evident from the fact that the national disaster risk management fund has accelerated the development of the disaster risk financing strategy, which has recently been launched. Similarly, provincial governments have similar priorities; the governments of KP and Punjab for example, have already initiated the process of developing its disaster risk financing strategy.

Emphasis on Financing for Climate Adaptation and Mitigation: Policies and strategies about climate change focus on the funds required for adaptation and mitigation against climate threats. These funds are utilised on initiatives like strengthening the water channels and other irrigation-related projects. The national disaster management fund sponsors three areas with most funding going to rehabilitate under their petition for water-related infrastructure. Therefore, there is a limited understanding and mention of CDRFI in the policies and strategies. These policies understand CDRFI as prearranged financial mechanisms that protect individuals, businesses, and governments from the economic impacts of specific risks from climate-related disasters that can also help drive improvements in disaster risk reduction, early warning systems, preparedness and response. While definitions of CDRFI can vary, they generally

highlight its essential elements: prearranged finance tailored explicitly to shocks and using objective triggers for releasing financial resources.

Disintegrated Policies: there is a significant structural flaw in the policy landscape in terms of climate financing. The policies and strategies focus on climate mitigation and adaptation measures and indicate the financing requirements for these initiatives to be taken by the relevant line departments. However, these line departments are the course subjects of climate change and respond to such issues as the ministries and departments concerning agriculture, life stroke, education, health infrastructure, etc (Suleri, 2024; Suleri 2024a). They plan their specific sectoral strategy with different outlooks and objectives, often ignoring the policy lines tested for these sectors in climate change policies and strategies formulated by the lead federal court and provincial agencies. Therefore, there are usually conflicting priorities for allocating funds in these sectors. For example, provincial climate change policies list several interventions for mitigation and adaptation of climate change effects on the agriculture sector, and these interventions are not necessarily part of provincial agricultural policy.

Absence of market-based risk transfer options: The policies and strategies mention limited financial sources, often relying on grants from international community public-private partnership interventions or developing endowment funds, which hardly address the financing issue. Most of the strategies and action plans are deficient on this front.

7.3. Gaps and needs in the enabling environment

As explained in Chapter 5 above, certain gaps exist in the enabling environment, ranging from policy and institutional frameworks to the capacities of the insurance sector, mobile network operators, MSMEs, CSOs, and subnational authorities. These are briefly reiterated as follows:

- There is a lack of coherence in the institutional framework related to CDRFI.
- Climate-related policies and strategies mainly focus on financing adaptation and mitigation measures, with less focus on CDRFI as a prearranged financing instrument and a disconnect between climate change policies and sector policies.
- Mobile money networks are expanding slowly at the grassroots level. They also face internet security and data privacy issues, as well as a lack of awareness and digital channels among consumers in rural areas.
- CSOs and cooperatives generally work on a relatively small scale, mostly with donor funding, and the sector faces a complex regulatory environment, particularly with financial institutions.

7.4. Insurance Sector Gaps

Based on these discussions and a thorough analysis of the inclusive insurance landscape, the following gaps have been identified by the SECP[9]:

a. **Regulatory Barriers:** The current microinsurance framework is restrictive, with rigid requirements for capital, solvency, and product approval. Products must be explicitly categorised as microinsurance and sold exclusively to low-income individuals, limiting broader coverage and flexibility for insurers. Additionally, there are no provisions to accommodate digital distribution, which hinders the potential for innovation and scalability.
b. **Product Development and Distribution Challenges:** The lack of standardised product definitions and underdeveloped distribution channels, especially in rural areas, restricts the

[9] Securities and Exchange Commission of Pakistan (SECP). Unlocking the Potential of Micro-Inclusive Insurance in Pakistan. Islamabad, 2023. Available at: https://www.secp.gov.pk/document/unlocking-the-potential-of-micro-inclusive-insurance-in-pakistan/?wpdmdl=51279&refresh=66ed295b452af1726818651

innovation and scalability of microinsurance products. Limited, tailored products exist for underserved segments, such as small-scale farmers, self-employed individuals, and those at risk from natural disasters.

c. **Consumer Awareness and Trust Issues:** Low levels of consumer education and awareness, coupled with religious concerns, deter many from purchasing conventional insurance products. A significant portion of the population views insurance with scepticism, impacting uptake and demand.
d. **Data and Market Intelligence Deficiency:** There is a lack of specific data reporting requirements for microinsurance products, leading to a gap in understanding the insurance needs of low-income segments. Small-ticket insurance products sold through MFIs, MFBs, and mobile platforms are not reported separately, and disaggregated data based on geography and gender is missing, making it difficult to accurately assess and address market needs.
e. **Limited Support for Innovation:** The existing regulations do not encourage innovation in product development or digital channels for distribution and claims processing. The framework lacks adaptability to digital-only models, which could lower costs and expand reach.
f. **Taxation and Cost Barriers:** Multiple layers of taxation, such as stamp duties, Federal Insurance Fees (FIF), and General Sales Tax (GST) on telecom services, increase the cost of insurance products, making them less affordable, especially for low-income individuals. These taxes and withholding taxes on agent commissions disproportionately burden those least able to afford them, hindering financial inclusion.
g. **Challenges in Claim Experience**: Many inclusive insurance claims are linked to the lending portfolios of MFIs and MFBs, where payouts are made directly to lenders rather than policyholders. This setup hinders the customer's perception of insurance value and tangible benefits.
h. **Intermediation Costs:** Multiple intermediaries in the distribution process increase the cost of insurance products, making them more expensive for end-users. This is particularly problematic for low-income segments, the primary targets for microinsurance.
i. **Limited Focus and Collaboration:** Pakistan's insurance market is predominantly corporate-driven, with a limited focus on retail and inclusive insurance. There is also a lack of collaboration among stakeholders, such as insurtechs, Micro Finance Institutions (MFIs), and MNOs, which restricts the distribution and diversification of inclusive insurance products.
j. **Absence of Mass-Scale Insurance Schemes**: A lack of nationwide, mass-scale insurance schemes for agriculture and disaster risks leaves many of the population vulnerable to financial losses from natural disasters. The current offerings are often tied to loans and not widely available to non-loanee farmers or those in disaster-prone areas.

7.5. Gender and Social Inclusion Gap

The major gaps in current policies regarding Gender Equality and Social Inclusion (GESI) within the Climate Disaster Risk Financing and Insurance (CDRFI) landscape in Pakistan can be categorized into the following key areas:

There is a limited focus on vulnerable groups in CDRFI-relevant policies. While national policies such as the National Climate Change Policy (NCCP) and the National Disaster Management Plan (NDMP) recognise the vulnerability of marginalized groups (i.e. women, people with disabilities, and Indigenous communities), these policies do not go far enough in detailing how CDRFI programmes will specifically target and address the needs of these populations.

There is a lack of targeted financial tools as very few disaster financing or insurance products are designed specifically for women, children, the elderly, or people with disabilities. With women making up to nearly 50% of the country's population, Pakistan still ranks 153rd out of 156 countries on Global Gender Gap Index (GGI) as of 2021, indicating a significant gender disparity which affects women's resilience to climate disasters. Yet, the existing policies tend to be generic and do not account for these groups' specific socio-economic barriers. Most policies do not utilize gender-disaggregated or vulnerable group-specific data to inform programme design, making it difficult to tailor CDRFI initiatives to the specific needs of these groups.

While some policies have integrated GESI at a strategic level, the actual implementation of these policies is often lacking. The National Gender Policy and the National Climate Change Gender Action Plan (NCC-GAP) highlight the importance of gender integration in climate risk management. However, these remain high-level policy goals without detailed implementation plans to ensure that women or other vulnerable groups benefit from disaster risk financing mechanisms. Pakistan is a signatory country to several international frameworks that emphasize GESI, including the UN Sendai Framework for Disaster Risk Reduction. Despite this, there is insufficient action to align local CDRFI programmes with these frameworks to provide tangible benefits to vulnerable populations.

One of the most significant gaps is the lack of inclusion of vulnerable groups in decision-making processes. With only 20% of Pakistan's member of parliaments (MPs) being women and only 11% of government ministers being women (WFID, 2022), low representation of women and marginalized groups in key decision-making roles related to disaster risk management and climate financing is evident. When it comes to inclusion of these groups; policies, and programmes are often designed without fully considering their unique challenges and needs. In some areas, cultural norms and institutional practices prevent women and other marginalized communities from accessing the financial tools (such as microinsurance or disaster risk financing) that could help them recover from disasters.

According to National Gender Policy Framework 2022, the gender gap in Pakistan is estimated to cost the economy approximately PKR 500 billion annually and closing this gap could enhance the economy by 30% and thereby strengthen the resilience of women, yet there is limited access to the availability of financial products for marginalized groups. Vulnerable populations, particularly women in rural areas, face significant challenges in accessing formal financial services, including insurance. Some of these barriers include a lack of awareness, a complicated documentation process, and physical inaccessibility to financial institutions. Current disaster risk insurance products, like the Area Yield Index Insurance (AYII) offered by TPL or microfinance programmes, only cater to the general population, with no deliberate emphasis on reaching marginalized communities such as women, displaced persons, or the elderly.

Low levels of financial literacy among vulnerable groups prevent them from fully benefiting from the available insurance or disaster risk financing options. This gap is especially pronounced for women, who often have lower financial education and face cultural barriers. Only about 13.5% of women in Pakistan have access to formal financial institutions (World Bank 2021) which limits their ability to engage with disaster risk financing tools. There is a gap in outreach programmes aimed at educating vulnerable populations about available financial products and services. Without targeted campaigns, many marginalized groups remain unaware of CDRFI options or are not fully cognizant of how to access them.

Geographical disparities and urban-rural divide create an imbalanced targeting. CDRFI policies often focus on urban areas, leaving rural and remote communities where marginalized populations are most concentrated and underserved. For instance, insurance products are rarely available in rural areas where the need for such products is often the highest due to higher vulnerability to climate disasters.

There is a lack of robust monitoring mechanisms to assess whether CDRFI programmes are benefiting vulnerable groups. Many policies need clearer indicators or targets to measure progress in terms of GESI integration, making it difficult to hold stakeholders accountable for the inclusion of marginalized communities. Although gender mainstreaming is included in national policies, there is no comprehensive evaluation or data to track the impact of these initiatives on women in disaster scenarios.

It is also important to recognise that post Pakistan's 18th constitutional amendment, the decentralized approach to disaster risk financing complicates the development of a comprehensive gender responsive. Each province is responsible for making its own disaster risk policies making it challenging to implement uniform gender considerations across the country.

Addressing these gaps will be critical to ensuring that CDRFI programmes are truly inclusive and meet the needs of Pakistan's most vulnerable populations.

7.6. Identified key gaps and needs in risk analytics and modelling

Accurate disaster risk analytics information is crucial to reducing the impacts of disasters and guiding climate adaptation investments. National Disaster Reduction Policy (NDRRP, 2013), recognizes vulnerability and risk Assessment Indicators as the core tools and processes for identifying, diagnosing, and prioritising risk. The policy emphasises that plans and initiatives need to be based upon assessments that determine the nature and degree of vulnerability or risk (including the identification of particularly vulnerable groups), that allow prioritising problems or geographical areas on a rational basis and that inform the design of appropriate and technically sound DRR interventions.

However, The Global Risk Modelling Alliance (GRMA) sees the following deficiencies in the risk analytics arena in Pakistan (GRMA, 2023):

- There are a limited number of Multi-Hazard Vulnerability & Risk Assessment (MHVRA) analyses (twelve in number and eight more planned) conducted at the district level. Risk analyses at lower resolution (e.g., national level) are inadequate for local adaptation planning or structuring local risk transfer mechanisms.
- There is a lack of digitisation and decentralised responsibilities in climate and disaster risk management (CDRM), leading to irregular, non-standardised data. PDMAs have access to a lot of data but cannot make it accessible.
- Data in northern disputed provinces is politically sensitive and inaccessible.
- Coordination between ministries seems to be a barrier, and the responsibilities of various parties are sometimes ambiguous.
- Almost no reference is made to the resources the private sector (global or local) could potentially bring to risk understanding through public-private collaboration.
- There is generally a need for a more enabling policy environment.

In addition, there are some deficiencies in integrating data on climate vulnerability and early warning triggers with the National Socio-Economic Registry (NSER) to enable accurate targeting of climate-vulnerable populations. Strong coordination and robust mechanisms are required to integrate social protection with risk profiling, risk layering, and risk forecasting data.

7.7. Summary of the stocktake and gaps for CDRFI Request for Proposals

Based on the stocktake and the preliminary reading of the capacity of government institutions, willingness of institutional leadership, capacity of private sector insurance companies, and interest of

private sector potential partners, the following areas have been identified for potential CDRFI proposals. These are only the indicative areas for financial instruments and technical assistance to inform the inclusive CDRFI request for support:

7.7.1. Khyber Pakhtunkhwa

The northwestern province of Pakistan has a diverse topography with disaster-prone mountainous areas. The first proposal identified by Khyber Pakhtunkhwa is about **insurance for public school buildings in disaster-prone areas.** Due to multiple climate disasters, mainly the floods in the hilly region of the province, the public and private infrastructure is often severely damaged. After the floods of 2022, the government of KP decided to create a fund for resilient infrastructure. Therefore, the proposal for a financial shield for public schools is quite relevant. The provincial School Education Department may act as the lead agency and develop the proposal. Secondly, the idea of **grants and other instruments to address adaptive social protection needs** emerged during consultations. The exact design of the proposed interventions has yet to be discussed by the stakeholders, and there is a consensus that adaptive social protection is almost entirely missing from the disaster financing approach in the province. The Provincial Disaster Management Authority (PDMA) and Social Protection Reforms Unit (P&DD) may jointly develop the proposal. Finally, **technical assistance in risk modelling and analytics** has been identified, which is necessary to better plan climate risk financing instruments. The PDMA may also develop this proposal.

7.7.2. Punjab

The largest province of Pakistan in terms of population, depends on agriculture as the major contributor to the economy. **Crops insurance through parametric Takaful solutions for small landholders is one of the potential areas** for Global Shield support. Some poorer districts in the south of the province are badly affected by floods in the Indus, affecting small landholders. Provincial entities, namely the Agriculture Department, PDMA, Finance Department, Planning & Development Department, and private sector Takaful companies, could become potential partners in the proposal. Secondly, there is an appetite for **grants to capitalise the Provincial Disaster Management Fund**. This may provide flexibility to utilise the amount in areas where other market-based solutions are not feasible. In addition, **Insurance of public sector schools in disaster / flood-prone districts** also emerged as a potential proposal. The three potential areas for GS support are relatively simple, and data on vulnerable farmers and schools is reportedly available from the relevant government agencies.

7.7.3. Sindh

Sindh has had multiple climate-related disasters. The province has comparatively better-developed private financial and insurance institutions. The provincial consultations indicate that the agencies dealing with climate and disasters require **technical assistance in risk modelling and analytics**. Secondly, the lack of **credit loan guarantees and subsidised loans to small-scale farmers** is another market-based instrument in which JS Bank showed keen interest as a partner to the government departments. Similarly, **technical assistance is needed to develop agriculture insurance solutions and capacity building** for the Agriculture Department. The demand for capacity enhancement and disaster awareness campaigns has also been suggested. However, these components may be clubbed with a major proposal suitable to the GS mandate. The ideas in Sindh are practical and aligned with the financial needs of the province as experienced during the recent major disasters. Insurance will help to decrease the vulnerability of farmers and communities, including women who depend on this sector for their livelihoods. Besides, insurance will help reduce the financial risk and uncertainties for farmers and help

promote sustainable livelihoods. It is encouraging that private financial institutions are willing to partner in CDRFI proposals for GS. TPL Insurance and PULA could be the potential actors in this regard.

7.7.4. Balochistan

Balochistan, the least developed region in Pakistan, requires special attention. Medium-to-long-term interventions are needed to support vulnerable communities facing the brunt of climate-induced events. Disasters have intensified the level of poverty, pushing the non-poor into poverty, and resulting in an increasing burden on the social safety net. Due to financial constraints and geographical barriers, risk financing solutions on a medium-to-long-term basis are required through the support of the Finance Department and Planning and Development Department. Representatives of multiple agencies have proposed **capitalising on the Provincial Disaster Management Fund** because of the unique socioeconomic conditions of poor populations settled in thinly populated climate-hit areas with minimal housing and livelihood. Here, the insurance-based instrument could not be found suitable, firstly because of the non-existence of well-organised insurance companies and secondly due to the very flimsy nature of the assets of the poor populations. In the same context, **social assistance for marginalised communities in flood/drought-affected areas** has also been suggested. In addition, **technical assistance in developing risk modelling and analytics** and capacity enhancement of provincial agencies are appropriate areas for GS support. Overall, the identified areas appeared appropriate and implementable in the short to medium term. However, some risks may be involved related to the fragile law and order situation in some areas affected by the climate in the province.

7.7.5. AJK

AJK is among the most hazard-prone regions in Pakistan, and it faces frequent climate change-induced extreme weather events. The disasters considerably affected the infrastructure in AJK, and financial resources are required to reconstruct the damaged infrastructure immediately. Therefore, the State Disaster Management Authority suggested **public infrastructure insurance through a sovereign disaster risk finance solution.** Secondly, the state requires technical assistance for data analytics and risk assessment for buildings, roads, bridges, and **hydropower projects**. The proposals are quite viable, considering also the willingness from private organisations / NGOs like Islamic Relief and Muslim Hands to partner with the government, offering their existing climate-related interventions as a complementarity.

7.7.6. Gilgit Baltistan

Gilgit Baltistan is being affected by climate-induced disasters due to its geographical features. The communities here rely more on natural resources for their livelihood, which must be protected. Hence, immediate interventions based on **Multi-Hazard Vulnerability Risk Assessment** are required through the Gilgit-Baltistan Disaster Management Authority platform. Due to the area's unique topography, suggestions regarding **technical assistance for developing nature-based solutions** were also discussed in the consultations in Gilgit. As the hospitality industry is among the primary sectors that provide livelihood prospects to individuals in the region, the Planning and Development Department can develop proposals to offer specialised **insurance solutions for hotels and restaurants against property damage by climate-induced disasters and unforeseen events** that could disrupt their operations. These suggestions for potential support from Global Shield appeared feasible because the government agencies and the private NGO sector already working in the region are quite welcoming to the development-related ideas focusing on climate change and disasters. Organisations like Agha Khan

Foundations and Rural Support Networks are well-established community-based entities with substantive data about the different vulnerabilities, even at the grassroots level. The willingness of such organisations to partner with the government can help materialise the proposal for GS support.

7.7.7. Federal

The federal government can implement nationwide solutions in disaster-prone districts. The National Disaster Risk Management Authority can develop multiple proposals for nationwide implementation with the collaboration of concerned departments. The suggestions received during the federal consultation include the **Meso-level Climate Risk Fund (contingent lines of credit for international financial institutions), Insurance of School infrastructure (solution development, capacity development, risk assessment and analytics, reassessment study), and Nation-wide parametric insurance of crops in disaster-prone areas. The idea of financing National Emergencies Operations Centres and technical assistance for risk analytics/climate finance and risk transfer solutions** was also discussed**.** The potential areas identified for Global Shield´s support appear difficult to plan and implement because they are nationwide interventions involving provincial and regional authorities that may take time. On the other hand, a solid institutional base of National Disaster Management Authority, willingness and support by multiple International Development organisations make the proposal an attractive opportunity for Pakistan.

8. Conclusion

The stocktake and gap analysis clearly illustrate the CDRFI scenario in Pakistan, emphasising the need for well-structured and sustained climate and disaster risk financing arrangements. The rise in climate-induced disasters is further destabilising an already fragile economic and social situation, heightening the vulnerabilities of impoverished and marginalised populations across all regions.

Compared to the various CDRFI instruments used globally, the authorities in Pakistan tend to operate at two extremes. They either retain risk through contingency budgets, reserve funds, and supplementary budgets or transfer risk through calls for humanitarian aid and grants from international and local donors after disasters cause significant damage. They rarely use market-based and non-market-based risk transfer and risk layering instruments such as insurance, prearranged loans, and catastrophe bonds. This approach limits the involvement of market actors like insurance companies and financial institutions in disaster-related businesses such as crop and livestock risk insurance.

There are only a few CDRFI programmes in the country, and they are small in scale. However, there are numerous interventions in disaster risk reduction, climate change adaptation, social protection, and financial inclusion that can be considered CDRFI-related. Additionally, there are small-scale programmes, mainly managed by international development agencies, aimed at promoting an environment conducive to market-based risk-transfer practices.

The analysis reveals significant shortcomings in the support system for CDRFI. There is a lack of coordination in policies, with inadequate coverage of risk financing. Institutions operate independently, with some focusing on disaster risk management and others on environmental and climate change mitigation. Almost no integrated social protection system exists, and a disconnect exists between social protection agencies and disaster management organisations. Financial and insurance institutions, crucial for CDRFI, offer limited programmes for addressing disaster vulnerabilities. Similarly, early warning systems have numerous deficiencies in forecast accuracy and quality. Additionally, there are

shortcomings in available disaster risk analytics, which are essential for developing insurance-based risk transfer instruments.

However, there are some positive developments that can support potential CDRFI programmes in Pakistan. These include ongoing disaster risk financing strategies, regular updates of climate change policies, regulatory bodies like SECP and State Bank promoting financial inclusion, the willingness of financial and insurance institutions to develop disaster finance instruments, support from international development agencies for government and private CDRFI actors, and continuous technological advancements and ICT adoption by businesses and government agencies.

The gaps and the enabling factors mentioned above have been drawn from provincial and federal consultations. The consultations also discussed the damage caused by climate disasters that remain unattended or partially recovered due to the non-availability of financial resources. This led to the suggestions for developed proposals for Global Shield's financial support. These include insurance of public infrastructure (particularly schools), insurance for the losses of crops and livestock, and solutions for Adaptive Social Protection. Moreover, developing risk modelling and analytics has emerged as a potential area for technical assistance by Global Shield. It is encouraging that recent research reports on the topic by the UNDP, ADB, and WB also identify these areas for CDRFI interventions.

The stocktake and gap analysis are significant milestones in the ICP that have enhanced the stakeholders' understanding of CDRFI and Global Shield's support. The extended discussions about the diverse options for disaster risk transfer and risk layering are likely to have a positive effect on the development of disaster risk financing strategies at the provincial level, especially in Punjab and Khyber Pakhtunkhwa, where the strategies are already in the development phase.

Now, provincial and federal entities are required to develop proposals for Global Shield support. Therefore, some general observations recorded during stakeholder interactions may help develop the right proposal.

First, it has been noted that some government agencies are more inclined to fund climate change adaptation and mitigation measures than CDRFI. Although the participants were sensitised and aware of the importance of developing market-based risk transfer instruments, the provincial authorities may still require handholding in developing funding proposals strictly aligned with the Global Shield´s mandate.

Secondly, potential proposal topics from provincial consultations are broad ideas with hardly any evidence-based priority order. The provincial authorities, particularly the senior administrative and political leadership, may find some more relevant and specific priorities for developing the proposal. Besides the diversity of options, this may create difficulties in the final selection of the proposals within some assumed financial space. Therefore, provinces may be asked to develop proposals with solid arguments, listed in order of priority.

In addition, there should be medium, short, and long-term CDRFI proposals, and more specifically, at all three (macro, meso, and micro) levels as required by the Global Shield.

Annexes

Annex-A: Pakistan's Global Shield In-Country Process – Provincial Consultations

As part of the Global Shield In-Country Process, consultations were arranged with diverse stakeholders in the capitals of four provinces and two regions of Pakistan, namely Khyber Pakhtunkhwa, Punjab, Sindh, Balochistan, Azad Jammu & Kashmir (AJK) and Gilgit-Baltistan during the period from 29th August to 27th September 2024.

The Ministry of Climate Change encouraged UNDP (GS In-Country Support Structure) to conduct inclusive and participatory consultations across Pakistan to take stock of existing and planned climate, disaster risk finance and insurance (CDRFI) projects and identify priority gaps. The consultative sessions were jointly designed by MOCC&EC, UNDP Pakistan, with the support of SDPI under the guidance of the Global Shield Secretariat.

The potential stakeholders of CDRFI in each province/ region were mapped, focusing on (1) government agencies/ departments either directly dealing with disaster risk management/reduction, climate change adaptation, planning & financing of the CDR-related programmes, or affected by climate-induced disasters, (2) private financial institutions and insurance companies (3) private sector organisations/NGOs and academia engaged in climate change and disaster risk related interventions. The MOCC & EC facilitated stakeholder engagement and proactive participation in the sessions. Participants were also requested to share their ongoing and planned CDRFI interventions/projects/programmes in a prescribed format to inform the stocktaking exercise.

The senior leadership of MOCC & EC inaugurated all the sessions. Experts from UNDP (Ms. Sana Ehsan) and SDPI (Mr. Shahid Farooq) made a detailed presentation starting from the CDRFI needs of the provinces/regions ascertained from recent climate-induced disasters and the governments' key documents, including assessing losses and financial needs. The presentations, vetted by experts from the Global Shield Secretariat, focused on introducing the scope of the Global Shield and the different stages of its in-country process. Furthermore, participants were provided with information on the importance of prearranged financing and, more specifically, the financial instruments and technical assistance offered under the Global Shield. Experts from the Global Shield Secretariat (Ms. Hannah Grant and Mr. Sohan Vaidya) joined virtually all the sessions, observing the complete sessions, and responding to participants' questions.

After the presentation and question-answer session, the participants were divided into groups to discuss the following points and consolidate their input into the form of a presentation:

- The participants will briefly list the programmes of their departments/agencies:
    - Directly focusing on Climate & Disaster Risk Finance and Insurance (CDRFI)
    - CDRFI-linked projects/programmes
- Major climate change-related disasters and which hazards have insufficient financial protection?
- Who are the most vulnerable groups in respective sectors affected by climate disasters?
- What prearranged financial protections exist for these groups against future climate disasters?
- How are the existing climate change & DRM programmes/initiatives financed?
- What new financial instruments can significantly contribute towards developing resilience among vulnerable people and communities to better face the shocks?

- What are the disaster recovery interventions that could not be planned and executed because of the non-availability of finances?
- Is the available information on vulnerability and hazard sufficient to design effective financial instruments/products? Is the information reliable?
- What capacity gaps may hinder the development or implementation of risk management and finance strategies?
- Potential CDRFI proposals?

Each group presented its input on the above points. And for further deliberations, the participants and Global Shield representatives provided feedback. The key findings of consultative sessions are summarised below:

1. Khyber Pakhtunkhwa: Peshawar (29-08-2024)

1.1. Climate Vulnerabilities

Major climate disasters in the province are river floods due to excessive monsoon rains, cloud bursts, and glacial lake outburst floods. High quality disaster risk analytics are not available; however, based on the experience of the Floods in 2022, the vulnerabilities include:

- Almost half of the province's area (seventeen districts declared as calamity-hit areas by the government) is vulnerable to climate disasters, with six districts, namely Swat, Dir-Upper, Charsadda, Nowshehra, Tank and D.I Khan, which faced severe losses in the Flood in 2022, may be rated as the most vulnerable.
- Major losses to private houses, private businesses (especially hotels and shops), public infrastructure (roads, bridges, schools, health facilities, etc.), livestock, farming (crops, vegetables, fruits, and horticulture)
- Agriculture and livestock are the most affected and vulnerable livelihood sources. In addition, the people associated with the tourist industry, mainly in the Swat district, and daily wagers have a livelihood vulnerability.

1.2. CDR Regulations, Policies, and Institutions

- The Provincial Disaster Management Khyber Pakhtunkhwa NDMKP (Amendment) Act, 2012, governs the DRM framework in the province.
- The Relief, Rehabilitation & Settlement Department is the principal government department for all disaster-related subjects, with the Provincial Disaster Management Authority (PDMA), established under NDMKP, as its attached body. District Disaster Management Units (DDMUs) exist in the districts.
- The Provincial Emergency Operations Centre (PEOC) at PDMA coordinates between the provincial line departments and district administration units during emergencies and calamities.
- Climate Change is a comparatively new subject. In 2022, the Environment Protection Agency developed the Provincial Climate Change Policy and Action Plan. The Policy mainly focuses on climate change adaptation and mitigation measures covering the sectors, with limited reference to CDRFI.
- The Social Protection System is also nascent in the province. Historically, it remained mainly focused on institutional care programmes by the Social Welfare Department. Adaptive social

protection programmes are practically non-existent; however, during disasters, the government disburses financial assistance, piggybacking the BISP of the federal government.

- Recently, the government started working on a Disaster Risk Financing Strategy with the technical assistance of FCDO

1.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- The government retains the disaster risk through traditional instruments such as district contingency funds and provincial budget reserves for disaster response. In low-frequency / high-intensity events, the government opts for international grants and humanitarian assistance, in addition to reappropriating internal budgets or supplementary budgets and donations from the public through the CM Disaster Relief Fund. The Provincial Disaster Management Fund (PDMF) was set up with the primary objective of accumulating sufficient funds to meet the post-disaster needs of the province.
- No significant risk transfer instrument, like parametric insurance, has ever been exercised, mainly because of the province's weak existence of private insurance companies.
- To support the transformation to a climate-resilient infrastructure, the Government of KP is establishing the Climate-Resilient Infrastructure Fund (CRIF), through which investment will be channelled towards developing public infrastructure.
- In the aftermath of Flood 2022, the government is aware that the absence of flood insurance created severe fiscal pressure and budget volatility. The Flood Recovery Plan considers catastrophe insurance options and public infrastructure insurance through grants from international governmental and non-governmental agencies.
- The provincial government is also considering introducing legislation to make it mandatory for businesses and owners of property worth more than Rs 2 million in high-risk geographical areas to obtain disaster risk insurance **Related Programmes:** Scaling-up of Glacial Lake Outburst Flood (GLOF-II) risk reduction in Northern Pakistan (UNDP Assisted) Adaptive Social Protection (institutional strengthening; Multi-Hazard Vulnerability Risk Assessment)eNational Flood Protection Plan-IV (NFPP-IV): KP Component
- Installation of a Telemetry System for real-time flood monitoring

1.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- Capacity for developing accurate climate disaster risk analytics
- Institutional Strengthening for Adaptive Social Protection
- Insurance of Public Infrastructure
- Premium support for assets insurance of the vulnerable poor households in disaster-prone Districts

1.5. General Observations: Strengths Weaknesses, Opportunities, Threat (SWOT)

Strengths:

- Government institutions are interested in Global Shield Instruments and Technical Support.
- Authorities are already aware of the need for CDRFI since the Disaster Risk Financing strategy is already on paper

- DRM and Social Protection Institutions are already working on adaptive social protection, and the complementarity for GS initiatives may be available

Weaknesses:

- Non-existent insurance sector
- Overemphasis on climate change mitigation and adaptation has led some officials to believe in adaptation and mitigation as the only viable solution to disasters, resisting the investment in Ex-ante financial solutions
- Limited role of the private sector in partnership with the government
  Government's resistance to credit-based instruments

Opportunities:

- International development agencies like GIZ, FCDO, and UNDP are already working on climate change, DRR and Social Protection in the province and may partner in Global Shield projects

Threats:

- Political economy / changing political situation and frequent reshuffling in the top bureaucracy may delay the proposal formulation from the province

2. Azad Jamu & Kashmir: Muzaffarabad (29-08-2024)

2.1. Climate Vulnerabilities

Major climate disasters in the state are river floods, flash floods, cloudbursts, and Glacial Lake Outburst Floods. Muzaffarabad, Hattain, Neelum, Bagh, Poonch, Sudhnuti, Haveli, Kotli and Bhimber are highly susceptible to flash floods and catchment bursts. Accurate disaster risk analytics information is not available; however, based on the experience of the Floods in 2022, the vulnerabilities include:

- Life, livelihood, and property risks to communities settled on mountain tops, slopes and around river channels
- Residents of makeshift shelters with CGS sheets as rooftops suffer in case of storms
- Small landholders/livestock base with no alternate means of subsistence

2.2. CDR Regulations, Policies, and Institutions

- The AJ&K Climate Change Policy 2017 focuses on climate change adaptation and mitigation in vulnerable sectors. The policy does not touch on the CDRFI topic; it only mentions the need for resource mobilisation for adaptation and mitigation, mainly through DFIs and donors.
- The State Disaster Risk Management Plan 2017 is another key document that envisages the development of a catastrophe risk financing strategy that should aim at risk layering, contingent credit facilities, emergency loans, parametric insurance for crop damage, and catastrophe bonds to finance rare but high-impact events.
- The State Disaster Management Authority (SDMA) is the primary agency responsible for disaster management, mitigation, and preparedness. The Authority handles on-the-ground management of climate disasters, while the Climate Change Centre at the Planning & Development Department serves as the policymaking and coordinating body for all climate-related issues. The unit has developed the AJ & K Climate Change Policy 2017. Additionally, the Environmental Protection Agency is also working on mitigation measures.

2.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- The government retains the disaster risk through traditional instruments such as district contingency funds and provincial budget reserves for disaster response. In low-frequency / high-intensity events, the government opts for international grants and humanitarian assistance, in addition to reappropriating internal budgets or supplementary budgets and donations from the public through the CM Disaster Relief Fund.
- No significant risk transfer instrument, like parametric insurance, has ever been exercised, mainly because of the province's weak existence of private insurance companies.
- Through the climate change policy, the government intended to collaborate with the financial sector to develop appropriate risk management measures to address climate change vulnerabilities.
- As per the policy, the Finance Department will be responsible for providing finances for the activities planned in the region.

Related Programmes:

- Upscaling of the Green Pakistan Programme (GPP)
- Support for natural regeneration in demarcated forests

2.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- Capacity building to carry out climate disaster risk analysis.
- Support in developing institutional measures to protect vulnerable communities.
- Key financial instruments supporting the region include crop insurance for forests, soft loans, grants for sustenance farming, and carbon credits, which compensate forest communities, similar to the KP government's ecosystem services payments program.

2.5. General Observations: SWOT

Strengths

- Climate change policy already mentions the significance of collaboration between the government and financial sector in developing risk management strategies.
- SDMA is keen on developing the prearranged finances, and the director general ensured the agencies would be supported for the proactive working of the CDRFI
- Comparatively small territory having clear identification of the vulnerabilities
- Comparatively well aware and organised communities that can facilitate the implementation of financial instruments

Weaknesses

- Limited presence of insurance sector other than life insurance
- Non-availability of reliable data analytics for planning/designing the financial instruments

Opportunities

- International development organisations such as the Asian Development Bank and Islamic Relief have supported communities considerably during previous disasters and are aware of their vulnerabilities and risks.

Threats

- Changing socio-political conditions and the status of the territory may affect the working of potential partners, i.e. financial institutions/insurance companies
- Sometimes, rivers flowing from across the border are flooded due to the sudden release of water by the neighbouring country, causing significant damage. This may not strictly fit the definition of climate-induced disasters and could create challenges for designing financial instruments.

3. Balochistan: Quetta (10-09-2024)

3.1. Climate Vulnerabilities

- Flash floods, heatwaves, droughts, cyclones, and soil erosion are identified as key climate-related disasters in Balochistan.
- Children, women, farmers, people engaged with livestock for earning, persons with disabilities, elderly, and marginalized rural populations are the most vulnerable groups
- Floods in 2010 and 2022 badly affected Balochistan. During this time period, the region also faced other climate-related challenges, such as drought and locust attacks, which damaged agriculture production and livestock.

3.2. CDR Regulations, Policies, and Institutions

- The National Disaster Management Act 2010 provides administratively autonomous institutional arrangements at all governance tiers, namely, the federal, provincial, and district levels.
- The Provincial Disaster Management Authority (PDMA), established under the National Disaster Management Act in 2010, is the lead agency for mitigation, preparedness, and an organised response to a disaster.
- Balochistan Environment Protection Agency focuses on climate change-related issues.
  Balochistan's Climate Change Policy for 2024 is the latest among all provinces. Unlike other provinces, this document contains a complete chapter on climate finance opportunities. It suggests measures for innovative climate financing, including carbon pricing, climate venture capital, and risk insurance mechanisms.

3.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- There are no prearranged financial protections. The government retains the disaster risk through traditional instruments such as district contingency funds and provincial budget reserves for disaster response. In low-frequency / high-intensity events, the government mainly depends upon federal government assistance.

Related Programmes:

- ADB-funded Emergency Flood Assistance Project
- Forest Department's Green Pakistan Program
- Integrated Water Resource Management
- Go Green Initiative
- Disaster Risk Fund by START Network

3.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- A GIS system is required for better management during disasters; however, these services are expensive. Technology has evolved recently, and there are tools and equipment to monitor the areas affected by any calamity in real time.
- The available social protection instruments of BISP are not sufficient for the rehabilitation of poor communities
- There are requirements for vulnerability assessments to develop CDRFI instruments
- Premium support for crop/orchids insurance
- Technical assistance to develop institutional capacity for managing CDRFI instruments
- The role of insurance companies in Balochistan is limited, and it needs to be increased to combat climate vulnerabilities
- Balochistan Disaster Risk Management only has PKR 7 billion, which is insufficient to provide a financial shield during disasters.
- Social protection mechanisms such as BISP can be developed to ensure long-term resilience and social security in the face of future climate risks

3.5. General Observations: SWOT

Strengths

- Readiness of the organisations, especially PDMA and Environmental Protection Department for CDRFI

Weaknesses

- The population in disaster-prone areas of Balochistan is thinly spread across vast areas, mostly in makeshift mud houses. This results in the non-availability of accurate data on vulnerable households.
- Poor population that is generally affected by the disasters are living in poorly constructed houses, and a significant portion live semi-nomadic life that may cause complications in designing prearranged financing instruments

Opportunities

- Being geographically the largest and least developed province of Pakistan, Balochistan is already high on the development agenda

Threats

- Law and order situation in far-flung areas may hamper the mobilisation of financial institutions and private organisations for CDRFI
- The communities are comparatively less organised to facilitate the CDRFI instruments

4. Punjab: Lahore (18-09-2024)

4.1. Climate Vulnerabilities

- Major climate-related disasters affect the region, including droughts, floods (flash, cloud outbursts, riverine, and torrential), locust invasions, heatwaves, extreme winters, heavy rainfall, and pest-related diseases.

- Among the most vulnerable groups are livestock owners, particularly women-headed households with a limited number of cattle, small landholders, the textile and cottage industries, and persons with disabilities.
- In the education sector, female students are particularly vulnerable, while small industries are at risk due to cotton crops' sensitivity to climate impacts.
  Health, education, agriculture, livestock, and infrastructure are major vulnerable sectors, and South and Central Punjab areas have been severely affected by floods.

4.2. CDR Regulations, Policies and Institutions

- The National Disaster Management Act 2010 provides administratively autonomous institutional arrangements at all governance tiers, namely, the federal, provincial, and district levels.
- The Provincial Disaster Management Authority (PDMA), established under the National Disaster Management Act in 2010, is the lead agency for mitigation, preparedness, and an organised response to a disaster. The authority also provides a platform for all provincial departments to come together and strategize management and response to disasters and calamities.
- The Environment Protection and Climate Change Department focuses on climate change-related issues. The department mainly works for the implementation of The Punjab Environmental Protection Act of 1997. However, the department has drafted the Punjab Climate Change Policy and Punjab Climate Change Action Plan.
- The Punjab Social Protection Authority and Social Welfare Department deal with social protection. However, linkage with disaster management is not formalised, and in case of disaster, PSPA assists in the disbursement of the funds/cash transfer to the affected population.

4.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- The government retains the disaster risk through traditional instruments such as district contingency funds and provincial budget reserves for disaster response. In low-frequency / high-intensity events, the government opts for international grants and humanitarian assistance, in addition to reappropriating internal budgets or supplementary budgets and donations from the public through the CM Disaster Relief Fund. The Provincial Disaster Management Fund (PDMF) was set up with the primary objective of accumulating sufficient funds to meet the post-disaster needs of the province.

Related Programmes:

- Punjab Green Development Program
- Integrated flood resilience and adaptation project
- Strengthening Markets for Agriculture and Rural Transformation Punjab Program

4.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- A few insurance companies offer limited crop insurance.
- There are no risk retention initiatives or disaster management initiatives, although contingency funding is available at both district and PDMA levels.
- Organisations like WFP, FAO, the German Red Cross, NDMA and GIZ are involved in anticipatory actions.

- GIZ supports an adaptive social protection programme and a climate risk financing project, while BGR focuses on risk-sensitive spatial planning.
- DRR training was provided to teachers and students in some regions, particularly schools.
- Capacity-building initiatives exist for local governments in flood-affected regions such as Rajanpur and DG Khan.
- Finance protections are provided through funds allocated by the Provincial Disaster Management Authority (PDMA) to district administrations, with local governments playing a pivotal role in disaster response.

4.5. General Observations: SWOT

Strengths:

- Punjab is the biggest province, having a better institutional setup for disaster risk management and social protection.
- Multiple educational institutions and universities are already working on disaster and climate.
- Comparatively well-established financial institutions and insurance companies are already working.

Weaknesses:

- The disaster-prone areas are the poorest districts of the province, having multiple socio-economic challenges that may delay the designing of financial instruments.
- Existing understanding of CDRFI is limited among the public sector, and there is an over-emphasis on climate change mitigation and adaptation. This may affect the quality of proposals from government departments.
- A key challenge is the lack of coordinated efforts at the provincial level, particularly in the Planning and Development (P&D) department, to assess needs and design impactful financial products.

Opportunities:

- Existing adaptive social protection programmes recently introduced by the development agencies may help develop and implement prearranged financing instruments.
- The need for crop insurance in disaster-prone districts is already established, and crop data is generally available through the agriculture department and at the district level, which may be helpful.
- Certain private sector organisations/NGOs are available to act as partners with government agencies in implementing financial instruments.

Threats:

- The huge size of financial instruments for different sectors, particularly livestock and crops, may lead to the non-availability of equally solid financial institutions and insurance companies.
- Political instability and economic crisis may affect the functioning of financial organisations.

5. Sindh: Karachi (24-09-2024)

5.1. Climate Vulnerabilities

- Droughts, heatwaves, cyclones, floods, pest attacks, water scarcity, and sea intrusion are critical threats.
- Vulnerable groups impacted by climate change and disasters including women, children, small farmers, labourers, small-scale borrowers (especially women), people with disabilities, fishermen, and remote settlers.
- Major sectors affected by climate change including agriculture, irrigation, and livestock.
- Fertile agriculture land and infrastructure have been eroded along the coastal regions of Badin, Thatta, and Sujawal

5.2. CDR Regulations, Policies and Institutions

- The National Disaster Management Act 2010 covers institutional arrangements, including at the provincial and district level in Sindh.
- Sindh Climate Change Policy 2022 aims to mitigate the adverse effects of climate change by identifying its impacts and providing solutions. It focuses on improving environmental conditions, ensuring food and water security, and addressing air pollution.
- Sindh Private-sector Partnership Strategy for Disaster Risk Reduction 2018. It focuses on disaster preparedness. It suggests that critical priority actions include climate advocacy and mass awareness campaigns, community engagement, fostering local leadership public-private partnership through CSR, and, more specifically, creating a favourable environment for private insurers to offer crop/livestock insurance.
- Among the significant institutions, the Provincial Disaster Management Authority (PDMA), established under the National Disaster Management Act in 2010, works on mitigation, preparedness, and an organised response to disasters.
- In addition, the Environment, Climate Change & Coastal Development Department (established in 2016) oversees the implementation of environmental laws and policies. The department's attached bodies are the Sindh Environmental Protection Agency (SEPA), the Sindh Coastal Development Authority (SCDA), and the Directorate of Climate Change.

5.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- The government retains disaster risk through traditional instruments such as district contingency funds and provincial budget reserves for disaster response.
- In low-frequency / high-intensity events, the government opts for international grants and humanitarian assistance, in addition to reappropriating internal budgets or supplementary budgets and donations from the public through the CM Disaster Relief Fund.

Related Programmes:

- Pakistan Hydromet and Climate Services Project (PHCSP) - WB Funded
- Sindh Flood Emergency Housing Reconstruction Project
- Sindh Flood Emergency Rehabilitation Project

- Sindh Water and Agriculture Transformation Project
- Integrated Flood Resilience and Adaptation Project

5.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- Crops and Livestock Insurance
- Insurance of public infrastructure
- Capacity gaps include communication failures, resource limitations, lack of planning, and community awareness.
- Deficiency of data for developing CDRFI instruments

5.5. General Observations: SWOT

Strengths

- Well-developed institutions and policy environment.
- Efforts already underway to engage private sector through the private-sector partnership strategy for Disaster Risk Reduction in 2018

Weaknesses

- Understanding of CDRFI is limited among the public sector; emphasis on climate change mitigation and adaptation.
- Deficiency of risk analytics

Opportunities

- Comparatively better organised and developed insurance sector compared to other provinces and existence of private financial institutions willing to partner with government CDRFI initiatives.

Threats

- Lack of planning to cope with the cyclone threat to Karachi.
- Prearranged financing for the risk of urban flooding or a tsunami hitting Karachi and other coastal areas is likely to be challenging because of limited data on vulnerabilities and the potential compounding effects of the disaster.

6. Gilgit Baltistan (27-09-2024)

6.1. Climate Vulnerabilities

- The major climate-related disasters in the region include Glacial Lake Outburst Floods (GLOF), flash floods, land erosion, landslides, snow avalanches, cloud outbursts, debris flows, forest fires, disease outbreaks, invasive species, insect pest infestations, rockfalls, and mudflows.
- The most vulnerable groups include rural communities—pastoralists, forest workers, farmers, communities living near riverbanks, women, children, persons with disabilities, and horticulturalists—along with individuals involved in tourism, transportation, and mountaineering.

- Communities residing near rivers, glaciers, landslide-prone areas, hill torrents, and sites vulnerable to snow avalanches are also at considerable risk.

6.2. CDR Regulations, Policies and Institutions

- Gilgit Baltistan Climate Change Strategy and Action Plan was devised keeping in view the unique geographical features, demographics and environmental conditions in 2023; The broader objective of this strategy and action plan is to 'mainstream climate change mitigation and adaptation aspects into future development planning in Gilgit-Baltistan'. The aim is 'to take possible mitigation and adaptive measures, improve climate resilience among vulnerable population, undertake participatory approach and enhance resource planning and strengthen the institutional mechanism to minimise the adverse impacts of climate change through the whole-of-society approach'. However, the policy only covers climate change mitigation and adaptation aspects, thus, leaving out risk reduction and risk transfer (the Global Shield's focus areas).
- Funding for disaster risk management comes from the federal government through the Public Sector Development Programme (PSDP), provincial contributions through a 1% climate fund from the Annual Development Programme (ADP), and foreign-funded projects. NGOs and donor-funded projects provide additional support.

6.3. CDRFI and Related Programmes / Initiatives (Existing and Planned)

CDRFI

- No specific disaster risk financing project is underway. The contingency funds available with the government are used for immediate relief and humanitarian activities. Rehabilitation and reconstruction are funded through the Annual Development Programmes of the GB Government and the Federal government's Public Sector Development Programmes (PSDP)

Related Programmes:

- Mitigation of Disaster Risks in Collaboration with NDRMF in GB (Mainly flood protection infrastructure reinforcement projects)

6.4. CDRFI Gaps / Potential Areas for Global Shield Financing

- Endowment funds, contingency funds, subsidies, and pool funds can be developed to mitigate the impact of future disasters.
- Micro-financing programmes targeting livelihood losses, funding recovery, and rehabilitation interventions are critical needs.
- Government of Gilgit Baltistan is conducting a Multi-Hazard Vulnerability Risk Assessment (MHVRA) for all districts, developing infrastructure, offering household-level assistance, and promoting financial inclusion through sharia-compliant insurance and credit products.

6.5. General Observations: (SWOT Analysis)

Strengths

- Better organised communities

- NGOs and civil society are closely collaborating with the government on DRM and climate change adaptation.

Weaknesses

- The disaster-prone areas are the poorest districts of the province where communities also face challenges, including lack of access to basic infrastructure.
- Understanding of CDRFI is limited among the public sector, and there is an over-emphasis on climate change mitigation and adaptation.

Opportunities

- UN agencies and International/ local NGOs/ development organisations, notably UNDP, Agha Khan Foundation and Rural Supports Network, are actively working in the region and can become potential partners with the public sector for implementing financial instruments.

Threats

- Overly hazard-prone regions where CDRF instruments are required in a wide range of areas, from Infrastructure insurance to micro-level individual financing

7. Federal (07-10-2024)

The consultation session included international development partners and federal-level stakeholders. Senior leadership from the Ministry of Climate Change, United Nations Development Programme Pakistan, V20, and Sustainable Development Policy Institute provided welcoming remarks.

Ms. Van Nguyen, Deputy Resident Representative of UNDP Pakistan, emphasised the challenges faced by Pakistan due to climate change. She highlighted the importance of CDRFI in building resilience and promoting financial inclusion, stressing the need for accessible insurance solutions, especially for vulnerable communities affected by climate disasters. Mr. Hamza Haroon, Regional Director of the Climate Vulnerability Forum (V20), emphasized how the GS initiative is an excellent opportunity to address Pakistan's climate-related financing challenges. Dr Abid Qaiyum Suleri, Executive Director of SDPI and member of the COP 29 International Advisory Committee, reflected on the resilience of Pakistani society, highlighting the country's expertise in finding resilience despite fragility. He noted that this resilience aligns with the objectives of the Global Shield initiative. In the upcoming COP 29, he emphasised that climate finance will be the central focus, allowing Pakistan to highlight how the country can tap into non-traditional financing mechanisms, such as the Global Shield.

Mr. Zulfiqar Younas, Additional Secretary Climate Finance at the Ministry of Climate Change, recognised the presence of representatives from various ministries, partner agencies, and provincial/regional levels. He emphasized the importance of Global Shield for Pakistan, particularly in the face of shrinking development finance. Mr. Younas elaborated on key initiatives by the Ministry of Climate Change, such as the final stages of the National Climate Finance Strategy, which aims to facilitate systematic access to climate finance and more effective resource allocation. He expressed confidence in launching this strategy at COP 29 and highlighted other interventions like the Green Taxonomy initiative, Living Indus, Recharge Pakistan, and the GLOF Plus Project. Mr. Younas thanked development partners, civil society, academia, and NGOs for their support, and he encouraged them to continue contributing new ideas and initiatives. He expressed confidence that Pakistan, with collective effort, will be well-prepared to address climate challenges and present a strong request for Global Shield´s support at COP 29.

During the group work, participants highlighted the climate vulnerabilities in all regions of Pakistan, listed the programmes mainly being financed and managed by the international development agencies, and endorsed the findings of regional/provincial consultation, as summarized below:

7.1. Climate Vulnerabilities

- Floods and torrential rains in Southern Punjab, Sindh, and Balochistan are major climate disasters. Droughts, flash floods, cloud bursts, cyclones, urban floods, and hill torrents are other climate-induced disasters. Heat waves are becoming more frequent and intense.
- Vulnerable groups included smallholder farmers, low-income rural communities, and marginalised populations in flood-prone regions. These communities were deemed most affected due to their reliance on agriculture and limited access to social safety nets.
- Children, especially those under the age of five, women, the elderly, persons with disabilities, climate refugees, Indigenous people, minorities, and informal workers, including agricultural and construction workers, are also among the vulnerable communities.

7.2. CDR related Programmes and Initiatives

- Ministry of Poverty Alleviation and Social Safety/ BISP: Development of National Registries; Social Safety Net programmes
- FAO: Climate-smart Agriculture Initiatives
- World Food Program: Disaster Preparedness and Anticipatory Action Programme for selected districts of Sindh, Balochistan and KP: Building long-term resilience of flood-affected communities Food Security Intervention in the Sindh province.
- KfW: Social Protection for Health and Climate Resilience Project
- World Bank: Pakistan Resilient and Accessible Microfinance Project, Green Taxonomy, Financial Inclusion and Infrastructure Project
- GIZ: Adaptive Social Protection Programme

7.3. CDRFI Gaps / Potential Areas for Global Shield Financing

- Existing protection mechanisms are inadequate, especially regarding restoring flood protection infrastructure and irrigation systems.
- Climate-resilient insurance policies, better access to climate funds, and adaptive agriculture finance could significantly contribute to resilience-building among vulnerable communities. More simplified regulatory frameworks are required to facilitate timely access to these resources.
- Capacity gaps identified include insufficient institutional readiness and training for agencies to manage CDRFI projects effectively; initiatives focused on capacity building and harmonising data systems to overcome these challenges.
- Institutional capacity building to enhance the capabilities of agencies managing CDRFI projects.
- Projects on regenerative agriculture to ensure food security post-disaster, climate-resilient livelihood initiatives, groundwater recharge projects, and improved insurance policies.
- There is a need for enhanced financial instruments tailored to the needs of vulnerable groups, such as parametric insurance and sovereign risk finance for public infrastructure insurance.
- Establishment of a microfinance catastrophic fund facility deemed essential for supporting approximately 10.5 million existing microfinance clients and a potential market of 45 million.
- Contingent funds to support anticipatory action and emergency responses, which can be initiated with insurance support from the private sector.

- A dedicated Microfinance Fund can serve as a facility to promote anticipatory resilience to climate impacts.
- Creating community grants connecting social protection initiatives with climate adaptation efforts.
- Interoperability between data centres to improve data accessibility and funding for climate-friendly seeds, research, and climate-smart education practices.
- Programmes focusing on digital literacy and climate awareness to empower communities in facing climate-related challenges.

7.4. General Observations

- The international organisations operating at the federal level have a substantive knowledge base for a contribution towards Pakistan's request for Global Shield´s support.
- The Ministry of Climate Change and Environmental Coordination is already working on a climate disaster financial strategy that will supplement the GS CDRFI proposals.
- Participants of the consultative session mainly focused on the policy level interventions and the federal agencies are required to work in collaboration with the provincial departments, where more focused CDRFI support is required.

8. National (24-10-2024)

To validate the findings from the stocktake and gaps analysis as part of the global shield in-country process, a national consultation session was organised. This session was attended by representatives from MoCC&EC, relevant federal government departments and agencies, and multiple national and international development organisations, including UN agencies. Senior leaders from the Ministry of Climate Change, the Global Shield, the United Nations Development Programme in Pakistan, and the Sustainable Development Policy Institute provided an overview of the process. They facilitated discussions to refine the initial findings from provincial and regional consultations.

Ms. Romina Khursheed Alam, Coordinator to the Prime Minister on Climate Change, reaffirmed GIZ's vital role in the Global Shield initiative. She noted that prearranged and trigger-based financing mechanisms facilitate immediate resource availability for effective disaster responses, benefiting diverse economies and communities. The initiative also fosters collaboration among various sectors to develop tailored solutions for Pakistan's unique regional challenges.

Ms. Aisha Humera, Secretary MoCC & EC, highlighted that Pakistan ranks as the fifth most climate-affected country, with approximately 33 million people impacted by various climate-related issues. She pointed out that Pakistan bears a staggering 2.2% loss in GDP due to climate change, which has hindered national progress towards stability. The Global Shield initiative, in partnership with MoCC, aims to bridge existing gaps and provides timely solutions that, if implemented, could significantly benefit Pakistan.

Dr. Sebastian Paust, Head of Development Cooperation, German Embassy, pointed out that Global Shield's stocktaking and gap analysis validation event marks a significant milestone in Pakistan's in-country process. He explained that the G7, under Germany's presidency, launched the Global Shield initiative at COP27 to improve financial protection against climate risks for vulnerable populations in countries such as Pakistan. He commended Pakistan's selection as a Global Shield Pathfinder country, noting that this status reinforces the importance of implementing prearranged financial protections before future climate disasters strike. He acknowledged the Ministry of Climate Change and

Environmental Coordination's pivotal role in leading this process. He also acknowledged UNDP Pakistan, SDPI, and the Global Shield Secretariat for their valuable support.

On behalf of UNDP Pakistan, Ms Van Nguyen, the Deputy Resident Representative, said that Global Shield's In-Country Process was initiated in November 2023. She emphasised the importance of the validation workshop, viewing it as a valuable opportunity to refine and validate the findings, ensuring the initiative moves forward effectively.

Dr Abid Suleri, Executive Director at SDPI, emphasised the importance of the Global Shield initiative in addressing Pakistan's climate vulnerabilities. He stressed the need to institutionalize the partnerships like Global Shield, which could significantly enhance the country's capacity to manage climate impacts. Dr. Suleri pointed out that COP 29 will be an opportunity for Pakistan to present Global Shield as a key initiative.

8.1 Presentations on Global Shield In-Country Process & Findings of Stocktake and Gap Analysis

A detailed presentation on the overview of Global Shield In-Country Process and findings of the stocktake and gaps analysis, highlighting the critical issues of climate and disaster risk financing in Pakistan. UNDP's representative briefed the participants about the inclusive In-Country Process, a prerequisite for developing proposals for Global Shield support. She elaborated on the provincial/regional level consultation and highlighted the contribution of partner agencies (OPM, GRMA, MiN, GIZ, WB) in the Stocktake and Gaps Analysis report.

Mr. Daniel Stadtmueller, Team lead for Implementation and Analytics, Global Shield Secretariat, presented an overview of the initiative's background, objectives, and programmes. He emphasised Global Shield's goal of establishing a coherent and sustainable approach to prearranged financing. The initiative is structured around three key pillars: global and local cooperation to enhance financial protection, an inclusive in-country process to assess and bridge protection gaps, and a flexible financing structure to support government requests with both technical and financial aid. Daniel underscored the importance of collaboration at multiple levels to address fragmentation in disaster response efforts. Global Shield aims to consolidate these efforts to enable swift and efficient response mechanisms involving development partners, humanitarian organisations, and the private sector. The initiative also focuses on supporting vulnerable populations by providing a reliable prearranged financing mechanism to prevent the need to reallocate essential government budgets.

He discussed the in-country process in Pakistan, which sets the stage for a deeper analysis and identification of key areas for improvement in the country's climate and disaster finance landscape. The validation session aims to gather insights to advance this process. Global Shield offers a variety of financial instruments, such as retention funds for frequent disasters, risk transfer products involving the private sector, contingent credit, and forecast-based instruments for anticipatory action. He further highlighted that these instruments are designed to be proactive, activating funds even before a disaster occurs, thereby supporting preparedness efforts. He noted that the gap analysis identified deficiencies in financial, institutional, and data resources, which would help prioritise urgent protection needs in Pakistan. Mr. Daniel elaborated on the broader in-country process in Pakistan and 12 other countries. Following stocktaking and gap analysis, the goal is for Pakistan to submit a support request that outlines specific solutions and general vulnerabilities to be addressed by Global Shield. Once submitted, the coordination hub and financing structure will design a joint support package tailored to Pakistan's needs. Additionally, Mr. Daniel shared a case study illustrating Ghana's experience with Global Shield.

Ms. Sana Ehsan, National Project Coordinator for Insurance and Risk Financing at UNDP Pakistan, provided the context of Pakistan's relevance to the Global Shield initiative and explained the methodology and importance of the Global Shield's Pakistan in-country process. She elaborated on the stocktaking and a gap analysis exercise conducted over the last two months to build a foundation for support requests to Global Shield. She emphasised that the involvement of international development partners, civil society, and the private sector was critical in the process and emphasised their input for validating the findings of stocktake and gaps analysis.

Mr. Shahid Farooq, SDPI's Technical Advisor explained the findings of the stocktake and the gap analysis. The presentation covered the current CDRFI scenario in Pakistan, comparing Pakistan's overly risky retention approach with global practices, including market-based risk transfer instruments. He described Pakistan's ongoing and planned CDRFI-related programmes captured during the stocktake exercise. The presentation also focused on the CDRFI gaps, including legal, policy, and institutional deficiencies. The gaps in the financial and insurance sectors and the shortcomings related to risk analytics & modelling were particularly highlighted. The Technical Advisor also highlighted the positive developments towards creating an enabling environment for market-based risk transfer instruments. These include the revision of some climate change policies incorporating the risk financing approaches, the development of the National Disaster Risk Financing Strategy, the development of the Nat Cat Model by NDRMF, the willingness of the insurance and banking sector in CDRF projects, and most importantly, the pilot initiatives and assistance of International Development Agencies for strengthening the CDRFI ecosystem. The representative of OPM Pakistan elaborated on the Gender Equality & Social Inclusion (GESI) related gaps in existing risk financing approaches and made recommendations for strengthening GESI inclusive risk financing. During provincial and federal consultations, the technical advisor finally explained the Financial Protection Instruments & Technical support Identified.

8.2 Validation and Suggestions for Improved GS Proposals

Question and Answer Session:

The participants took a keen interest in the stocktake and gaps analysis findings and actively participated in the Q&A session. The following observations and suggestions by the participants significantly helped the validation of the findings:

- Social protection and Adaptive Social Protection were mainly identified as support areas by KP; however, Adaptive Social Protection (ASP) is relevant to the whole country. Therefore, the proposals on ASP may be considered for other provinces and regions (GIZ)
- The proposals related to ASP and anticipatory cash transfers for vulnerable communities should also consider unemployment insurance, particularly for the informal economy (ILO)
- Preparedness and adaptation arrangements should also be considered; effective forecasting, preparation for floods, and protection measures for vulnerable communities may also be considered in the proposals (Ministry of Water Resources)
- Local civil society representatives and community leaders are important stakeholders that should be involved in the process (Asian Disaster Preparedness Czyentre)
- Exposure of public property and agriculture sector has been identified as key risk areas. Therefore, the proposals for Global Shield support need to focus on accurate data (SECP)
- Engagement with the national level private sector organisations working on weather forecasting for the development of risk transfer instruments (WeatherWalay)

- The land use management aspect is important as the land use planning and the suitability of the construction intervention at the right place is critical for resilient infrastructure; the proposals on the insurance of infrastructure may also consider this aspect (FAO Pakistan)
- A host of proposals for Global Shield assistance are expected; therefore, a comprehensive screening/vetting process should be in place for finalising the consolidated request to Global Shield (NDMA)
- Infrastructure insurance, particularly for schools, emerged as a potential area. However, the challenges regarding the lack of data on public infrastructure exposed to disasters must be focused on while developing the proposals. In addition, the National Insurance Company Limited and NDRMF are conducting risk assessment of the same.

8.3 Summary of Group Discussion

Potential Areas for Global Shield Financing

- Schools and hospitals are the priority areas for future interventions to continue providing education and medical facilities that would have been discontinued once disasters strike.
- Risk Transfer Instruments backed by the Contingency Fund for Public Infrastructure are required. Multiple macro-level instruments (Sovereign and sub-sovereign) can be prioritized for the public sector line of infrastructure.
- Peril security in each province should be strongly linked to risk analytics and Early Warning Systems.
- The financial sector can alleviate the burden of emergency response on BISP. Greater risk transfer to the private sector, strengthening and scaling up the private insurance sector (including disaster insurance and re-insurance) in the country, and making the financial sector (microfinance) more resilient are needed.
- Meso, macro, and micro insurance could be subsidized by the government when there is a market failure. The products can be covered by the Government or Global Shield.
- In the short term, the focus should be on risk reduction of existing public infrastructure. In the medium term, risk analytics are required, which are to be mainstreamed in both public sector offices and insurance companies. Besides, capacity building of insurance industries, communities, and public sector officials can be done.
- In the long term, insurance can be used as a corrective measure to deal with the impacts of future calamities through trigger resilience building and risk reduction activities. Furthermore, premium financing mainstreamed in Annual Development Plans by 2030 can be a viable option in selected departments such as Education.
- Insurance companies can create innovative offerings that provide immediate payouts through digital wallets at the time of onboarding, ensuring quick access to funds when needed.
- Output buyers and insurance should be addressed at the macro level, including government and federal involvement, to ensure a comprehensive approach to supporting farmers and the agricultural sector.
- Karachi urban floods can be used as a case study to develop short-term interventions including clearance of waterways and drainage network and in the medium term, by doing risk analytics to highlight the risk hotspots (vulnerabilities, related to communities, infrastructure, operations etc.). The long-term measures can focus on additional interventions for storm water management, including power infrastructure, particularly transmission lines.

General Observations

- Enhancing interoperability of NSER with other databases, including data on vulnerability and hazards from NatCat, Multi Hazard Vulnerability & Risk Assessment and other data can improve targeting of Anticipatory Action and emergency response.
- Robust policy framework is required to handle climate related challenges. Making social protection programmes more responsive to climate and disaster risk.
- Livelihoods insurance is a product that is missing in the country. Supporting livelihoods diversification is required so that people can change and adapt, building on existing initiatives by NGOs, INGOs and private sector.
- Comprehensive needs assessment and risk analysis are critical to identify specific challenges faced by farmers. By understanding these risks, targeted interventions can be developed to support agricultural productivity, including the creation of tailored insurance products that address the unique needs of the farming community.
- Implementing a decision support system that leverages parametric weather information is crucial. Utilising satellite data and information from weather stations, timely insights can be provided to farmers to inform their decision-making processes and manage climate risks effectively.
- Evidence-based and data-driven approaches, based on support mechanisms, are necessary for improving agricultural productivity and sustainability.
- Development of risk transfer mechanisms is essential for safeguarding farmers against unpredictable weather patterns. A proposed pool of funds could subsidize insurance premiums, making coverage more accessible for small and medium farmers who often struggle with the costs.
- No clarity about when contingency Social Protection funds should be released at the district level. There is a need for clear parameters and a framework to govern this. There is a need to have protection mechanism for financial sector (microfinancing if we talk about SMEs) to protect their financial health and in turn enable them to continue to provide access to finance and savings to climate-affected households.
- Capacity building across every sector and organisation involved in agriculture is vital. Training programmes can empower farmers with the knowledge and skills necessary to adapt to changing climatic conditions, enhancing their resilience and productivity.
- Awareness raising and improving digital payment mechanisms —in general and for SP programmes in particular— are required, such as mobile payment systems especially for women, digital financial literacy training, including mobile banking.
- Scaling up the BISP hybrid saving scheme can be an effective tool for vulnerable communities that are in need of social protection.
- Socio economic indicators can be layered with hazard and vulnerability maps/data to better identify people most at risk due to climate hazards.
- Ensuring that all information and products developed are accessible and easily comprehensible for farmers is crucial. This approach fosters better engagement and uptake of the proposed solutions, ultimately leading to enhanced agricultural resilience.

References

ADB. (2021). Climate Risk Country Profile: Pakistan. Asian Development Bank, https://www.adb.org/sites/default/files/publication/700916/climate-risk-country-profile-pakistan.pdf.

ADB. (2022). The role of the private sector in Pakistan's school education. Asian Development Bank, https://www.adb.org/sites/default/files/publication/771201/adb-brief-208-role-private-sector-pakistan-school-education.pdf.

ADB. (2024). Pakistan national urban assessment: Pivoting toward sustainable urbanisation. Asian Development Bank, https://www.adb.org/sites/default/files/institutional-document/988626/pakistan-national-urban-assessment.pdf.

Adnan, M., Xioa, B., Bibi, S., Xiao, P., Zhoa, P., and Wang, H. (2024). Addressing current climate issues in Pakistan: An opportunity for a sustainable future. Environmental Challenges, Vol. 15, https://www.sciencedirect.com/science/article/pii/S2667010024000532.

Adnan, S., Ullah, K. (2020) Development of drought hazard index for vulnerability assessment in Pakistan. Nat Hazards 103, 2989–3010. https://doi.org/10.1007/s11069-020-04116-3.

Ahmad, M.N., Shao, Z., Aslam, R.W. et al. (2022). Landslide hazard, susceptibility and risk assessment (HSRA) based on remote sensing and GIS data models: a case study of Muzaffarabad Pakistan. Stoch Environ Res Risk Assess 36, 4041–4056. https://doi.org/10.1007/s00477-022-02245-8.

Ahmad, N. (2008). Development of a Seismic Risk/Loss Model for Mansehra City, Pakistan. Dissertation – Master Degree in Earthquake Engineering and Engineering Seismology at the Istituto Univeritario di Studi Superiori Universita degli Studi di Pavia.

Ahmad, N., Shaheen, N., and Hussain, S. (2020). Internal Displacement: Relationship of mental health and education of children in Swat, Pakistan. Pak J Med Sci, Vol. 36, No. 5, https://www.pjms.org.pk/index.php/pjms/article/view/1847/577.

Ahmed, A. (2018, November 11). World Bank report says eighty percent of Pakistan's poor live in rural areas. Dawn News, https://www.dawn.com/news/1444874.

Ahmed, S., and Javed, A. (2017). The effect of public sector expenditures and investment on economic growth: Evidence from Pakistan. Journal of Economics and Political Economy, Volume 4, Issue 2, https://journals.econsciences.com/index.php/JEPE/article/view/1347/1333.

Ahmed, S., Javed, A., Manzoor, R., Ahmed, V., Shah, D. (2017). Impact of school facilities and teachers' training on child education: Evidence from Balochistan and KP. Working Paper No 190, Sustainable Development Policy Institute, https://sdpi.org/assets/lib/uploads/Impact-of-school-facilities-and-teachers-training-on-child-education-Evidence-from-Balochistan-and-KP.pdf.

Ahmed, T., Rehman, K., Shafique, M. et al. (2024). Local-scale integrated seismic risk assessment using Northern Pakistan's satellite data and field information. Stoch Environ Res Risk Assess 38, 1897–1918. https://doi.org/10.1007/s00477-024-02661-y.

Ahmed, V., and Javed, A. (2016). National study on agriculture investment in Pakistan. Working Paper # 157, Sustainable Development Policy Institute, https://sdpi.org/sdpiweb/publications/files/National-Study-on-Agriculture-Investment-in-Pakistan(W-157).pdf.

Akram, M., F. Khan, H. Ullah, S. Ali, and A. Hussain. (2024). Enhancing Drought Risk Assessment in the Punjab, Pakistan: A Copula-Based Modeling Approach for Future Projections. J. Appl. Meteor. Climatol., https://doi.org/10.1175/JAMC-D-24-0041.1, in press.

Amin, A., and Maqbool, S. (2021). Connecting Pakistan: Covid-19 as a catalyst for digital transformation. Tabad Lab, https://www.tabadlab.com/wp-content/uploads/2021/05/2021-05-25-Tabadlab-Connecting-Pakistan-Covid-19-as-a-Catalyst-for-Digital-Transformation.pdf.

Amin, A., Nasim, W., Mubeen, M. et al. Regional climate assessment of precipitation and temperature in Southern Punjab (Pakistan) using SimCLIM climate model for different temporal scales. Theor Appl Climatol 131, 121–131 (2018). https://doi.org/10.1007/s00704-016-1960-1.

Amin, M., Khan A., Abida, P., Rauf, Z., & Hassan, S., Arif, G. and Muhammad, I. (2019). Drought Risk Assessment: A Case Study in Punjab, Pakistan. 35. 234. https://researcherslinks.com/current-issues/Drought-Risk-Assessment-A-Case-Study-in-Punjab-Pakistan/14/1/2043/html.

Antman, F. M. (2012). The Impact of Migration on Family Left Behind. Discussion Paper No. 6374, Institute for the study of Labour (IZA), https://docs.iza.org/dp6374.pdf.

Asad, R., Saleem, M.Q., Habib, M.S. et al. (2023). Seismic risk assessment and hotspots prioritization: a developing country perspective. Nat Hazards 117, 2863–2901. https://doi.org/10.1007/s11069-023-05970-7.

Ashraf, A., Naz, R., & Roohi, R. (2012). Glacial lake outburst flood hazards in Hindukush, Karakoram and Himalayan Ranges of Pakistan: implications and risk analysis. Geomatics, Natural Hazards and Risk, 3(2), 113–132. https://doi.org/10.1080/19475705.2011.615344.

Ashraf, I., Ahmad, S., Ashraf, U., and Khan, M. (2023). Community perspectives to improve flood management and socio-economic impacts of floods at Central Indus River, Pakistan. International Journal of Disaster Risk Reduction, Vol. 92, https://www.sciencedirect.com/science/article/pii/S221242092300198X.

Aslam et al. (2017). Vulnerability and impact assessment of extreme climatic event: A case study of southern Punjab, Pakistan. Science of The Total Environment. 580(15). 468-481. https://doi.org/10.1016/j.scitotenv.2016.11.155.

Aslam et al. 2018. Integrated climate change risk assessment and evaluation of adaptation perspective in southern Punjab, Pakistan. https://www.sciencedirect.com/science/article/abs/pii/S0048969718305199.

Atta-Ur-Rahman, Shaw, R. (2015). Flood Risk and Reduction Approaches in Pakistan. In: Rahman, AU., Khan, A., Shaw, R. (eds) Disaster Risk Reduction Approaches in Pakistan. Disaster Risk Reduction. Springer, Tokyo. https://doi.org/10.1007/978-4-431-55369-4_4.

A. Z. Zaidi, Z. Yasmeen and M. D. Siddiqui. (2013). Glacial Lake Outburst Flood (GLOF) risk mapping in Hunza River Basin (Pakistan) using geospatial techniques," 2013 6th International Conference on Recent Advances in Space Technologies (RAST), Istanbul, Turkey, 2013, pp. 191-195, doi: 10.1109/RAST.2013.6581198.

Baig, K., Shahid, M., Akhtar, R., and Jamshed, J. (2024). Internally Displaced Persons: Rights, Implementation, and the Way Forward in Pakistan. International Research Alliance for Sustainable Development, Vol. 4, No. 1, https://internationalrasd.org/journals/index.php/ctls/article/view/1889.

Bhatti, A.Q., Ul Hassan, S.Z., Rafi, Z., Khatoon, Z., Ali, Q. (2011). Probabilistic seismic hazard analysis of Islamabad, Pakistan. Journal of Asian Earth Sciences 42(3) 8-478. https://doi.org/10.1016/j.jseaes.2011.05.006.

Bowen, T., Del Ninno, C., Andrews, C., Coll-Black, S., Johnson, K., Kawasoe, Y., and Williams, A. (2020). Adaptive social protection: building resilience to shocks. World Bank Publications. p.79, https://documents1.worldbank.org/curated/ar/579641590038388922/pdf/Adaptive-Social-Protection-Building-Resilience-to-Shocks.pdf.

BGR. 2024. Pakistan - Promoting Resilience against Natural Disaster Impacts (NADIR). Project status April 16, 2024. https://www.bgr.bund.de/EN/Themen/Zusammenarbeit/TechnZusammenarb/Projekte/Laufend/Asien/3013_2019-2143-6_Pakistan_Resilienz_en.html?nn=1548294. Accessed 16 October 2024.

Bukhari, M. (2023). Pakistan: National Disaster Risk Management Fund. Asian Development Bank.

Bündnis Entwicklung Hilft / IFHV (2024): WordRiskReport 2024. Berlin: Bündnis Entwicklung Hilft.

Chang, M., Cui, P., Dou, X. and Su, F. (2021). Quantitative risk assessment of landslides over the China-Pakistan economic corridor. International Journal of Disaster Risk Reduction 63, 102441. https://doi.org/10.1016/j.ijdrr.2021.10244.

CII. (2018). Raising the profile of Pakistan's insurance sector. Best Practice Series: Committed to Professionalization. Chartered Insurance Institute, https://www.cii.co.uk/media/9224099/best-practice-series-pakistan-insurance-institute.pdf.

Coalition for Disaster Resilient Infrastructure (CDRI). (2023). Global Infrastructure Resilience: Capturing the resilience dividend - A Biennial Report from the Coalition for Disaster Resilient Infrastructure, New Delhi. GIRI & Key Figures Country Profile – Pakistan. https://giri.unepgrid.ch/facts-figures/multi-hazards. Accessed 4 October 2024.

Dehlavi, A., Gorst, A., Groom, B., Zaman, F. (2015). Climate change adaptation in the Indus ecoregion: A microeconomic study of adaptation strategies' determinants, impacts and cost-effectiveness. WWF-Pakistan, https://d2ouvy59p0dg6k.cloudfront.net/downloads/110215_idrcstudy_1.pdf.

EM-DAT, CRED / UCLouvain, Brussels, Belgium – www.emdat.be. Accessed 4 October 2024.

Entcheva, R. (2023). *2022 Pakistan Floods*. Center for Disaster Philanthropy. https://disasterphilanthropy.org/disasters/2022-pakistan-floods/

Environmental Protection Department, Punjab. (2024). Climate Resilient Punjab Vision & Action Plan 2024. Government of Punjab

Fahad, S., Wang, J. Climate change, vulnerability, and its impacts in rural Pakistan: a review. Environ Sci Pollut Res 27, 1334–1338 (2020). https://doi.org/10.1007/s11356-019-06878-1.

FAO. (2015). Climate change and food security: risks and responses. Food and Agriculture Organization of the United Nations, https://openknowledge.fao.org/server/api/core/bitstreams/a4fd8ac5-4582-4a66-91b0-55abf642a400/content.

Fleiss, M., Kienberger. S., Aubrecht, C., Kidd, R. and Zeil, P. (2011). Mapping the 2010 Pakistan floods and its impact on human life: A post-disaster assessment of socio-economic indicators. Gi4DM (Geoinformation for Disaster Management) Conference.

https://publications.ait.ac.at/en/publications/mapping-the-2010-pakistan-floods-and-its-impact-on-human-life-a-p.

Frieler, K. et al. (2017). Assessing the Impacts of 1.5°C Global Warming – Simulation Protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development, 10, 4321–4345, https://gmd.copernicus.org/articles/10/4321/2017/.

GOP. (2021). National Climate Change Policy. Government of Pakistan, Ministry of Climate Change, https://www.mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf.

GoP. (2022). Pakistan floods 2022: Post-disaster needs assessment. Ministry of Planning, Development & Special Initiatives, Government of Pakistan, https://www.pc.gov.pk/uploads/downloads/PDNA-2022.pdf.

GoP. (2023). State-Owned Enterprises. Consolidated Report FY 2020-22. Finance Division, Government of Pakistan. Available at https://www.finance.gov.pk/publications/Federal_Footprint_SOEs_Consolidated_Report_FY2020_22.pdf.

GoP. (2023a). National Adaptation Plan: Pakistan 2023. Ministry of Climate Change & Environmental Coordination, Government of Pakistan, https://unfccc.int/sites/default/files/resource/National_Adaptation_Plan_Pakistan.pdf.

GoP. (2024). Economic Survey of Pakistan, Chapter 16: Social protection. Finance Division, Government of Pakistan, https://finance.gov.pk/survey/chapter_24/16_social%20protection.pdf.

GRMA programme in Pakistan inception report January 2023. (2023). In *https://grma.global/wp-content/uploads/2024/03/GRMA_Pakistan_InceptionReport_Final.pdf*. Global Risk Modeling Alliance. Retrieved October 19, 2024, from https://grma.global/wp-content/uploads/2024/03/GRMA_Pakistan_InceptionReport_Final.pdf

Hamid, K., and Sheikh, K. (2023, December 5). We can only move forward together": Ensuring inclusive post-disaster recovery in Pakistan. World Bank Blogs, https://blogs.worldbank.org/en/endpovertyinsouthasia/we-can-only-move-forward-together-ensuring-inclusive-post-disaster-recovery.

Hassan, A. (2018). Difference in the Population Size between Rural and Urban Areas of Pakistan. Munich Personal RePEc Archive, 90054, https://mpra.ub.uni-muenchen.de/90054/1/MPRA_paper_90054.pdf.

Hussain, Muhammad Awais, Zhang Shuai, Muhammad Aamir Moawwez, Tariq Umar, Muhammad Rashid Iqbal, Muhammad Kamran, and Muhammad Muneer. (2023). A Review of Spatial Variations of Multiple Natural Hazards and Risk Management Strategies in Pakistan. Water 15, no. 3: 407. https://doi.org/10.3390/w15030407.

IFRC. (2021). Climate change impacts on health and livelihoods: pakistan assessment. Red Cross Red Crescent Climate Centre, https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf.

Iqbal, N., Nawaz, S. (2019). Targeting efficiency and effectiveness of national cash transfers program: lessons from BISP, Pakistan. In: Chaudhry, A., Chaudhry, T.T. (Eds.), Economic Challenges Facing Pakistan in the Regional and Global Environment 2017-19. Lahore School of Economics, Lahore, Pakistan, https://www.jstor.org/stable/26842691.

Ishfaq, S., Ahmed, V., Hassan, D., and Javed, A. (2017). Internal migration and labour mobility in Pakistan. South Asia Migration Report, https://sdpi.org/sdpiweb/publications/files/Internal-Migration-and-Labour-Mobility-in-Pakistan.pdf

IMF. (2024). IMF Staff Country Report Pakistan. The International Monetary Fund, IMF Country Report No. 24/105, https://www.imf.org/en/Publications/CR/Issues/2024/05/10/Pakistan-Second-and-Final-Review-Under-the-Stand-by-Arrangement-Press-Release-Staff-Report-548741

Islam, T., Abrar, M., Arshad, R., and Akram, N. (2022). Income inequality in Pakistan. International Journal of Social Economics, Vol. 49, Issue 11, https://www.emerald.com/insight/content/doi/10.1108/IJSE-09-2021-0573/full/html

Javed, A. (2020). Youth development in Pakistan: A provincial analysis. Journal of Development Policy, Research & Practice, Volume 4, https://journals.sdpipk.org/index.php/JoDPRP/article/view/22/21.

Javed, A., Ahmed, V., and Amal, B. (2021). The social safety nets and poverty alleviation in Pakistan: An evaluation of livelihood enhancement and protection program. Britian International of Humanities and Social Sciences, https://biarjournal.com/index.php/biohs/article/view/357/385.

Javed, A., and Ahmed, V. (2022). Digital trade as an engine of growth. Pakistan Journal of Social Issues, Vol. XIII https://sdpi.org/assets/site_assets/Digital-Trade-as-Engine-of-Growth-for-Pakistan.pdf.

Javed, M., and Javed, A. (2023). Covid-Induced Inequalities: Education, health services, digital access, and female labour force participation: A case study from Pakistan. CAREC Institute, https://sdpi.org/assets/lib/uploads/Chapter%203%20COVID-induced-inequalities-for-publication.pdf.

Johnson, K. A., Walker, T., Coudouel, A., Nishikawa Chavez, K. V., Cook, S. J., Denisova, A., Wanniarachchi, T. J. (2023). Responsive by Design: Building Adaptive Social Protection Systems in South Asia, World Bank Group, https://policycommons.net/artifacts/3530486/responsive-by-design/4331428/

Joint Research Centre (JRC). 2024. INFORM COUNTRY RISK PROFILE 2025. European Commission JRC Disaster Risk Management Knowledge Centre, https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Country-Risk-Profile.

Joyo, M., Ram, N., & Magsi, H. (2018). Risk assessment of climate variability on rice productivity in sindh province of pakistan: Department of Agricultural Economics, Sindh Agriculture University, Tandojam, Pakistan. Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences, 34(1), 68–77, https://pjaaevs.sau.edu.pk/index.php/ojs/article/view/257.

Khan, B., Iqbal, J.W., and Yosufzai, M.A.K. 2011. Arab J Geosci (2011) 4:115–122. Doi 10.1007/s12517-009-0110-9.

Khan, F.A. and Salman, A. 2012. A simple human vulnerability index to climate change hazards for Pakistan. Int. J. Disaster Risk Sci. 2012, 3 (3): 163–176. doi:10.1007/s13753-012-0017-z

Khan, I. (2023, February 22). Pakistan's Gender Gap in Financial Inclusion. Retrieved from Karandaaz: https://karandaaz.com.pk/blog/pakistans-gender-gap-financial-inclusion/.

Khan, I., Lei, H., Shah, A.A. et al. (2021). Climate change impact assessment, flood management, and mitigation strategies in Pakistan for a sustainable future. Environ Sci Pollut Res 28, 29720–29731. https://doi.org/10.1007/s11356-021-12801-4.

Khan, M.A. (2015). Climate Change Risk and Reduction Approaches in Pakistan. In: Rahman, AU., Khan, A., Shaw, R. (eds) Disaster Risk Reduction Approaches in Pakistan. Disaster Risk Reduction. Springer, Tokyo. https://doi.org/10.1007/978-4-431-55369-4_11.

Khan, S.A., Pilakoutas, K., Hajirasouliha, I. et al. (2018). Seismic risk assessment for developing countries: Pakistan as a case study. Earthq. Eng. Eng. Vib. 17, 787–804. https://doi.org/10.1007/s11803-018-0476-3.

Khan, S.A., Shah, M.A. & Qaisar, M. (2003). Seismic risk analysis of the coastal area of Pakistan. Acta Seimol. Sin. 16, 382–394. https://doi.org/10.1007/s11589-003-0071-0.

Khan, M. (2023). State Life: The outlier in Pakistan's insurance industry. Retrieved via https://www.dawn.com/news/1749571.

Khetran, M. S. (2023). Issue Brief on "Urban Flooding in Pakistan. Institute of Strategic Studies Islamabad, https://issi.org.pk/issue-brief-on-urban-flooding-in-pakistan/.

Koons, E. (2024). Heat wave in Pakistan 2024: A scorching reality. Energy Tracker Asia. https://energytracker.asia/heat-wave-in-pakistan/

KP Metrological Department. (2018). Impact of heat wave on Pakistan's agriculture sector. Agriculture News, Extension Department, Khyber Pakhtunkhwa Metrological Department.

Larsen, O., Oliver, J. and Casiles Lanuza, E. (2014). Developing a disaster risk insurance framework for vulnerable communities in Pakistan: Pakistan disaster risk profile. Report No. 16. Bonn: United Nations University Institute for Environment and Human Security (UNU-EHS), https://collections.unu.edu/eserv/UNU:1854/pdf11810.pdf.

Lwamba, E., Shilsler, S., Ridlehoover, W., Kupfer, M., Tshabalala, N., Nduku, P., Langer, L., Grant, S., Sonnenfeld, A., Anda, D., Eyers, J., and Snilstveit, B. (2022). Strengthening women's empowerment and gender equality in fragile contexts towards peaceful and inclusive societies: A systematic review and meta-analysis. Cambell systematic reviews, https://onlinelibrary.wiley.com/doi/full/10.1002/cl2.1214.

Mahmood, S., Rahman, Au. & Shaw, R. (2019). Spatial appraisal of flood risk assessment and evaluation using the integrated hydro-probabilistic approach in Panjkora River Basin, Pakistan. Environ Monit Assess 191, 573. https://doi.org/10.1007/.

Malik, N., and Ahsan, R. (2020). Civil society in Pakistan: an exclusive discourse of projectisation. Dialectical Antropology 44, 41-56, https://link.springer.com/article/10.1007/s10624-020-09581-7.

M. Ashraf and J. K. Routray. (2015). Spatio-Temporal Characteristics of Precipitation and Drought in Balochistan Province, Pakistan," Nat. Hazards, vol. 77, pp. 229–254, 2015, doi: 10.1007/s11069-015-1593-1.

Manzoor, R., Javed, A., Ahmed, V., and Rauf, A. (2021). Digital financial services in Pakistan: Opportunities, challenges, and suggestions. Journal of Finance & Economics Research, Vol. 6 (2), 1-16, https://www.researchgate.net/publication/358709115_Digital_Financial_Services_in_Pakistan_Opportunities_Challenges_and_Suggestions.

Manzoor, R., Rauf, A., Ahmed, V., and Javed, A. (2021). Digital financial services in Pakistan: Opportunities, challenges, and suggestions. Journal of Finance and Economic Research, Vol. 6, Issue, 2, https://journals.iqra.edu.pk/archives/view/jfer/6/JFER2106201.

Maqsoom, A., Aslam, B., Khalil, U., Mehmood, M. A., Ashraf, H., & Siddique, A. (2022). An integrated approach based earthquake risk assessment of a seismically active and rapidly urbanising area in Northern Pakistan. Geocarto International, 37(27), 16043–16073. https://doi.org/10.1080/10106049.2022.2105404.

Masood, D., and Javed, A. (2023). Climate change and food security: A spotlight on availability conditions in Pakistan. Journal of Economics and Management Sciences, Fall 2023, Volume 4, No. 2, pp. 120-128, https://www.researchgate.net/profile/Asif-Javed-9/publication/380105433_CLIMATE_CHANGE_AND_FOOD_SECURITY_A_SPOTLIGHT_ON_AVAILABILITY_CONDITIONS_IN_PAKISTAN/links/662b7c819d2a69723f688eb5/CLIMATE-CHANGE-AND-FOOD-SECURITY-A-SPOTLIGHT-ON-AVAILABILITY-CONDITIONS-IN-PAKISTAN.pdf.

Mian, B. (2024, June 12). Youth hit hardest as 4.5m remain jobless. Dawn News, https://www.dawn.com/news/1839336#:~:text=The%20employed%20labour%20force%20is,unemployed%20compared%20to%2010pc%20men.

Ministry of Finance. (2023-24). Economic Survey of Pakistan 2023-24. Finance Division, Government of Pakistan, https://finance.gov.pk/survey_2024.html.

Mukhtar MA, Shangguan D, Ding Y, Anjum MN, Banerjee A, Butt AQ, Nilesh yadav, Li D, Yang Q, Khan AA, Muhammad A and He BB (2024).Integrated flood risk assessment in Hunza-Nagar, Pakistan: unifying big climate data analytics and multi-criteria decision-making with GIS. Front. Environ. Sci. 12:1337081, https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2024.1337081/full.

Nasim, W., Amin, A,. Fahad S., et al. (2018). Future risk assessment by estimating historical heat wave trends with projected heat accumulation using SimCLIM climate model in Pakistan. Atmospheric Research 205, 118-133. https://doi.org/10.1016/j.atmosres.2018.01.009.

Nauman, Saima, Zed Zulkafli, Abdul Halim Bin Ghazali, and Badronnisa Yusuf. (2019). Impact Assessment of Future Climate Change on Streamflows Upstream of Khanpur Dam, Pakistan using Soil and Water Assessment Tool" Water 11, no. 5: 1090. https://doi.org/10.3390/w11051090.

NDMA Floods, SITREP (2022). Retrieved Sep 28, 2024, from *https://www.ndma.gov.pk/storage/sitreps/November2022/knZgtME1krVP1jU80UQ1.pdf*.

NDMP. (2012). Pakistan, Ministry of Climate Change, National Disaster Management Authority, "National Disaster Management Plan" (Islamabad, 2012). Government of Pakistan, https://www.ndma.gov.pk/storage/plans/July2024/GRUGMk75kGY2CkYtpQL2.pdf

NDMA. (2010). National Disaster Management Authority, https://www.ndma.gov.pk/storage/NDMA-Act/NDMA-Act.pdf

OPHI and UNDP. (2016). Multidimensional Poverty in Pakistan. Oxford Poverty and Human Development Initiative (OPHI), and United Nations Deve Goverment of Pakistan. https://www.undp.org/sites/g/files/zskgke326/files/migration/pk/Multidimensional-Poverty-in-Pakistan.pdf.

OPM. (2006). Poverty and Social Impact Assessment: Pakistan Microfinance Policy. Oxford Policy Management, https://www.findevgateway.org/sites/default/files/publications/files/mfg-en-paper-poverty-and-social-impact-assessment-pakistan-microfinance-policy-final-report-may-2006.pdf.

Pakistan Bureau of Statistics. (2023). Agriculture statistics. Retrieved from Pakistan Bureau of Statistics: https://www.pbs.gov.pk/content/agriculture-statistics.

Pakistan, Pakistan National Disaster Management Authority and UN Country Team Pakistan, Pakistan: Drought Response Plan (Jan - Dec 2019)" (Islamabad, 2019). Available at https://reliefweb.int/report/.

Pal, I., Ali, F., Mukhopadhyay, A., et al. (2023). Extreme flood analysis for Lower Indus Basin, Pakistan study under disaster risk reduction. In Multi-Hazard Vulnerability and Resilience Building – Cross Cutting Issues. Pages 281-314. https://doi.org/10.1016/B978-0-323-95682-6.00017-6.

Paulikas, M.J. and Rahman, M.K. (2015), Flooding fatalities in Pakistan. J. Flood Risk Manage, 8: 62-70. https://doi.org/10.1111/jfr3.12084.

PBS. (2023). Pakistan Bureau of Statistics, Government of Pakistan, https://www.pbs.gov.pk/index.php/

PIE. (2022). Pakistan Education Statistics 2021-2022. Pakistan Institute of Education, Government of Pakistan, https://pie.gov.pk/SiteImage/Downloads/PES%20Highlights%202021-22%20New.pdf

Piller, T., Benvenuti, A., and De Bono, A. (2023). The GIRI global building exposure model (BEM). Background paper for CDRI GIRI. https://giri.unepgrid.ch/search-documentation.

PMN. (2018). Microinsurance: Regulatory & Supply Landscape in Pakistan. Pakistan Microfinace Network.

ProPakistani. (2024, June 10). Fintech revolution: How digital wallets are changing Pakistani financial accessibility. ProPakistani, https://propakistani.pk/2024/06/10/fintech-revolution-how-digital-wallets-are-changing-the-pakistani-financial-accessibility/.

Qadri, S. M. Talha, M. Qasim Mirza, Afia Raja, Saman Yaghmaei-Sabegh, Mohammed Hail Hakimi, Syed Haroon Ali, and Mohammad Younis Khan. (2023). Application of Probabilistic Seismic Hazard Assessment to Understand the Earthquake Hazard in Attock City, Pakistan: A Step towards Linking Hazards and Sustainability" Sustainability 15, no. 2: 1023. https://doi.org/10.3390/su15021023.

Rafiq, M., Li, Y., Cheng, Y. Rahman, G., Zhao, Y., Khan, H. (2023). Estimation of regional meteorological aridity and drought characteristics in Baluchistan province, Pakistan. PLoS One, 18 (11), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0293073.

Rahman, A.u., Najam, F.A., Zaman, S. et al. An updated probabilistic seismic hazard assessment (PSHA) for Pakistan. Bull Earthquake Eng 19, 1625–1662 (2021). https://doi.org/10.1007/s10518-021-01054-8.

Rana, I.A., Routray, J.K. Integrated methodology for flood risk assessment and application in urban communities of Pakistan. Nat Hazards 91, 239–266 (2018). https://doi.org/10.1007/s11069-017-3124-8.

Rasul, G., and Nepal, A. (2024). Addressing poverty and inequality in the mountains of Pakistan. Discover Global Society, Vol. 2, No. 60, https://link.springer.com/article/10.1007/s44282-024-00086-0#:~:text=To%20address%20this%20issue%2C%20Pakistan,inequalities%2C%20and%20promoting%20sustainable%20development.

Rathore, K., Shhid, R., Ali, K., Saeed, A. (2019). Factors Affecting Service Sector's Contribution to GDP in Pakistan. Pakistan Vision, 175-190, https://pu.edu.pk/images/journal/studies/PDF-FILES/13_v20_2_19.pdf.

Rehman, K., Burton, P.W. (2020). Seismicity and seismic hazard parameters in and around Pakistan. J Seismol 24, 635–653. https://doi.org/10.1007/s10950-020-09917-4.

Rehman, S., and Bakar, N. (2019). Manufacturing sector in Pakistan: A Comprehensive Review for the Future Growth and Development. Pakistan Journal of Humanities and Social Sciences, 77-91, https://ideas.repec.org/a/ani/ipjhss/v7y2019i1p77-91.html.

Rehman, S.U., Lindholm, C., Ahmed, N. et al. (2014). Probabilistic seismic hazard analysis for the city of Quetta, Pakistan. Acta Geophys. 62, 737–761. https://doi.org/10.2478/s11600-013-0186-1.

Sayeeda A. Sayed, Pedro Arcos González. (2014). Flood Disaster Profile of Pakistan: A Review. Science Journal of Public Health. Vol. 2, No. 3, 2014, pp. 144-149, https://lib.icimod.org/record/34021.

SBP's Banking on Equity Policy, "What is Banking on Equity Policy?". Available at https://www.sbp.org.pk/boe/index.html

SECP (2023). S.R.O. 435 2023 dated March 28 2023 for ammendments regarding digital insurer in Insurance Rules 2017. Securities and Exchange Commission of Pakistan. https://www.secp.gov.pk/document/sro-435-2023-dated-march-28-2023-for-amendments-regarding-digital-insurer-in-insurance-rules-2017-3/.

SECP. (2020). Draft Insurance Ordinance (Amendment) Bill 2020. Securities and Exchange Commision of Pakistan, https://www.secp.gov.pk/document/draft-insurance-ordinance-amendment-bill-2020/.

SECP. (2022). Annual Report 2022. Securities and Exchange Commission of Pakistan, https://www.secp.gov.pk/document/annual-report-2022/?ind=1669281930528&filename=Annual-Report-2022-web.pdf&wpdmdl=46161&refresh=6707a8a0bba6d1728555168.

Seyfert, K., & Ahmad, M. (2020). Options for making Pakistan's flagship national cash transfer programme shock responsive. Maintains report. Oxford Policy Management, https://www.opml.co.uk/files/Publications/A2241-maintains/making-bisp-shock-responsive-14062021.pdf.

Shackelford, B., Cronk, R., Behnke, N., Cooper, B., Tu, R., D'Souza, M., Bartram, J., Schwitzer, R., and Jaff, D. (2020). Environmental health in forced displacement: A systematic scoping review of the emergency phase. Science of Total Environment, Vol. 714, https://www.sciencedirect.com/science/article/abs/pii/S0048969720300632.

Shah, A. A., Ye, J., Shaw, R., Ullah, R., and Ali, M. (2020). Factors affecting flood-induced household vulnerability and health risks in Pakistan: The case of Khyber Pakhtunkhwa (KP) Province. International Journal of Disaster Risk Reduction, 42, https://rajibshaw.org/wpRS/wp-content/uploads/2020/03/Shah-et-al-IJDRR.pdf.

Shah, A., Ali, K., Nizami, S.M., Jan I.U., Hussain, I., Begum, F. (2019). Risk assessment of Shishper Glacier, Hassanabad Hunza, North Pakistan. Journal of Himalayan Earth Sciences. 52, 1. 1-11, https://www.proquest.com/docview/2274321845?sourcetype=Scholarly%20Journals.

Shah, S. (2018). Framework for SME Sector Development: Pakistan. Planning Commission of Pakistan, Ministry of Planning, Development & Reform, Government of Pakistan, https://www.pc.gov.pk/uploads/report/macro.pdf.

Siddique, M.T. and Molinos, J.G. (2024). Risk from future climate change to Pakistan's protected area network: A composite analysis for hotspot identification. Science of The Total Environment. 916(15), 169948. https://doi.org/10.1016/j.scitotenv.2024.169948.

Sindh Social Protection Authority (2024). Mother & Child Support Program (MCSP/SSDPS) – Sindh Social Protection Authority, https://sspa.gos.pk/our-initiatives/mother-child-support-program-mcsp-ssdps/.

Singhal, P. S. (2024). The Critical Need for Accessible Disaster Response Systems. Bootcamp, https://medium.com/design-bootcamp/the-critical-need-for-accessible-disaster-response-systems-ab891752a1ce#:~:text=Accessible%20disaster%20response%20systems%20are,fits%2Dall%20solutions%20are%20inadequate.

SNG. Annual Review Template of 2023 via https://iati.fcdo.gov.uk/iati_documents/D0003527.odt.

START Network. (2022). Pakistan Heatwave Model Operational Document March 2022. https://start-network.app.box.com/s/amltath7dtlbarhu7jpniccd6n6ibp8d/file/943633018261. Accessed 4 October 2024

State Bank of Pakistan. (2024). Payment system review: For the 3rd quarter of fiscal year 2023-24 (January-March 2024). State Bank of Pakistan, https://www.sbp.org.pk/psd/pdf/PS-Review-Q3FY24.pdf.

Suleri, A (2024). Rethinking Policy, in The News International, May 12, 2024; https://www.thenews.com.pk/tns/detail/1187515-rethinking-policy.

Suleri, A (2024a). A Climate Change Authority, in The News International, April 02, 2024; https://www.thenews.com.pk/print/1174712-a-climate-change-authority.

Suleri, A., and Iqbal, M. (2019). National food secuirtyy challenges and strategies in Pakistan: Cooperation for technology and trade. In Regional Coopertion for Sustainable Food Security in South Asia (eds.) Kumar, N., and George, J. Taylor & Francis Group, https://www.taylorfrancis.com/chapters/edit/10.4324/9780429346507-9/national-food-security-challenges-strategies-pakistan-abid-qaiyum-suleri-mehreen-iqbal.

Syed, A., Taqi, R., Bhatta, T., and Eash, N. (2022). Climate impacts on the agriculture sector of Pakistan: Risks and amicable solutions. Environmental Challeges, Vol. 6, Elsevier, https://www.sciencedirect.com/science/article/pii/S2667010021004078.

T. Bibi, F. Nawaz, A. Abdul Rahman, K. Azahari Razak, and A. Latif. (2018). flood risk assessment of river kabul and swat catchment area: district Charsadda, Pakistan. https://isprs-archives.copernicus.org/articles/XLII-4-W9/105/2018/isprs-archives-XLII-4-W9-105-2018.html.

Thakur, T. (2023). Gender and Climate Disaster: A Worsening Situation for Pakistani Women. Women in International Security, https://wiisglobal.org/gender-and-climate-disaster-a-worsening-situation-for-pakistani-women/.

Tufail, Z., Ahmer W., Gulzar, S., Hasanain, M., and Shah, H.H. (2023). Menstrual hygiene management in flood-affected Pakistan: Addressing challenges and ensuring women's health and dignity. Front Glob Womens Health, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10433887/.

UNDP. (2016). Drought risk assessment in Balochistan, Pakistan, UNDP, https://www.undp.org/pakistan/publications/drought-risk-assessment-balochistan-province-pakistan

UNDP. (2022). Financing climate action in Pakistan. Advocacy Brief, United Nations Development Programme, https://www.undp.org/sites/g/files/zskgke326/files/2022-06/Advocacy%20Brief%20Financing%20Climate%20Action%20in%20Pakistan.pdf.

UNDP. (2024). Inclusive insurance and risk financing in Pakistan Snapshot and way forward 2024. United Nations Development Programme, https://irff.undp.org/sites/default/files/13-pakistan-final.pdf.

UN-Habitat. (2023). Pakistan country report 2023. UN-Habitat, https://unhabitat.org/sites/default/files/2023/06/4._pakistan_country_report_2023_b5_final_compressed.pdf

UNICEF. (2017). Situation Analysis of Children in Pakistan. UNICEF, https://www.unicef.org/pakistan/media/596/file/Situation%20Analysis%20of%20Children%20in%20Pakistan.pdf.

UNICEF. (2023 August 25). Devastating floods in Pakistan. UNICEF, https://www.unicef.org/emergencies/devastating-floods-pakistan-2022.

UNICEF. (2023). Pakistan Humanitarian Situation Report No. 15 (Floods). UNICEF, https://www.unicef.org/media/152126/file/UNICEF%20Pakistan%20Humanitarian%20Situation%20Report%20--%20End-of-Year%202023.pdf.

UNICEF. (2023, March 21). More than 10 million people, including children, living in Pakistan's flood-affected areas still lack access to safe drinking water – UNICEF, https://www.unicef.org/press-releases/more-10-million-people-including-children-living-pakistans-flood-affected-areas#:~:text=ISLAMABAD%2C%2021%20March%202023%20%2D%20Six,use%20potentially%20disease%2Dridden%20water.

UNICEF. (2024, April 22). UNICEF calls for urgent action to save Pakistan's children on the frontlines of climate change. UNICEF, https://www.unicef.org/press-releases/unicef-calls-urgent-action-save-pakistans-children-frontlines-climate-change.

UNICEF, https://www.unicef.org/pakistan/nutrition-0

Villanueva, P., Ruiz, A., Cooke, K., Okodoi, N., Mahmood, D., Maggioni, A., and Taylor, M. (2024). Assessing cost effectiveness impacts of CDRFI implementation under the InsuResilience Vision 2025. Global Sheild, https://www.globalshield.org/wp-content/uploads/2024/07/Vision-2025-Mid-Term-Review-Report-3.pdf.

Waheed, Z. (2023, December 8). Climate Change's greatest victims are women and girls. UNICEF, https://www.unicef.org/rosa/blog/climate-changes-greatest-victims-are-women-and-girls.

Waseem, H.B. and Rana, I.A. (2023). Floods in Pakistan: A state-of-the-art review. Natural Hazards Research. 3(3) 359-373. https://doi.org/10.1016/j.nhres.2023.06.005.

Waseem, M., Ahmad, S., Ahmad, I. et al. (2023). Urban flood risk assessment using AHP and geospatial techniques in swat Pakistan. SN Appl. Sci. 5, 215. https://doi.org/10.1007/s42452-023-05445-1.

Waseem, M., Lai, C.G. & Spacone, E. Seismic hazard assessment of northern Pakistan. Nat Hazards 90, 563–600 (2018). https://doi.org/10.1007/s11069-017-3058-1.

Watson, C., Lone, T., Qazi, U., Smith, G., and Rashid, F. (2017). Shock Responsive Social Protection Systems Research. Case Study: Pakistan. Oxford Policy Management, Oxford, UK

WFID Partnership (2022) Towards Women's Financial Inclusion: A Gender Diagnostic of Pakistan. https://data2x.org/wp-content/uploads/2022/06/06.21_DataDiagnostics-Pakistan.pdf

World Bank (2016). Shock waves: Managing the impacts of climate change on poverty. The World Bank, https://openknowledge.worldbank.org/server/api/core/bitstreams/aa3a35e0-2a20-5d9c-8872-191c6b72a9b9/content.

World Bank Group and the Asian Development Bank (WBG and ADB). (2021). Climate Risk Country Profile: Pakistan. The World Bank Group and Asian Development Bank. https://www.adb.org/sites/default/files/publication/700916/climate-risk-country-profile-pakistan.pdf.

World Bank. (2018). State of financial inclusion of women in Pakistan. The World Bank, https://documents1.worldbank.org/curated/en/395011550264178924/pdf/134710-WP-PUBLIC-15-2-2019-13-41-38-StateofFinancialInclusionofWomeninPakistanFINALFeb.pdf.

World Bank (2021). The Global Findex Database, The Global Findex Database 2021: Financial Inclusion, Digital Payments, and ... - Asli Demirgüç-Kunt, Leora Klapper, Dorothe Singer, Saniya Ansar - Google Books

World Bank. (2023a). Social dimensions of climate change. The World Bank, https://www.worldbank.org/en/topic/social-dimensions-of-climate-change

World Bank. (2023b). Strengthening Markets for Agriculture and Rural Transformation (SMART) Punjab Program. The World Bank, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/244841513566044794/pakistan-strengthening-markets-for-agriculture-and-rural-transformation-in-punjab-program-project#:~:text=The%20development%20objective%20of%20the,foster%20agribusiness%20development%20in%20Punjab.

World Bank. (2023c). Poverty & equity brief, South Asia, Pakistan. The World Bank, https://databankfiles.worldbank.org/public/ddpext_download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/current/Global_POVEQ_PAK.pdf.

World Bank. (2024). Pakistan development update: Fiscal impact of federal State Owned Enterprises. The World Bank, https://thedocs.worldbank.org/en/doc/140b30353b40dbb294cca42bcb86529a-0310062024/original/Pakistan-Development-Update-April-2024.pdf.

World Bank. (2009). Climate-Smart Agriculture: Pakistan. The World Bank, https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/CSA-in-Pakistan.pdf.

World Bank. (2020). Options to Strengthen Disaster Risk Financing in Pakistan. World Bank. https://doi.org/10.1596/33592.

World Economic Forum. (2022). Global Gender Gap Report 2022. World Economic Forum, https://www3.weforum.org/docs/WEF_GGGR_2022.pdf.

WTO. (2023). Small business and climate change. World Trade Organization, https://www.wto.org/english/tratop_e/msmes_e/ersd_research_note3_small_business_and_climate_change.pdf.

Yepes-Estrada, C., Calderon, A., Costa, C., Crowley, H., Dabbeek, J., Hoyos, M., Martins, L., Paul, N., Rao, A., Silva, V. (2023). Global Building Exposure Model for Earthquake Risk Assessment. Earthquake Spectra. doi:10.1177/87552930231194048. Data available at https://github.com/gem/global_exposure_model.

Zahid, R. (2023, December 21). Youth Unemployment in Pakistan – Policy Brief. Retrieved from Imarat Institute of Policy Studies: https://iips.com.pk/youth-unemployment-in-pakistan-policy-brief/.

Zulfiqar, K., Chaudhary, M.A., and Aslam, A. (2016). Financial inclusion and its implications for inclusive growth in Pakistan. Pakistan Economic and Social Review, 54 (2), 297-325, https://www.jstor.org/stable/26616711.