Print ISSN: 0215-0411 - Online ISSN : 0215-0419
Volume: 3 , Issue: 4, Winter 2024

Special Issue
Winter 2024

Khyber Journal of Public Policy

KJPP

National Institute of Public Administration

National School of Public Policy

Report of Policy Lab on Bridging Gaps in Climate Change Mitigation Policies and their Implementation in Pakistan

پاکستان میں موسمیاتی تبدیلی سے نمٹنے کی پالیسیوں کے اطلاق میں حائل رکاوٹوں کا خاتمہ

Policy Analysis & Recommendations- Part-10 of 11

Climate Risk Reduction, Disaster Preparedness, and Flood Resilience Developed Strategies for Disaster Risk Reduction and Flood Resilience

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بِسْمِ اللَّهِ الرَّحْمَـٰنِ الرَّحِيمِ

إِنَّ اللَّهَ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّىٰ يُغَيِّرُوا مَا بِأَنفُسِهِمْ

(سورة الرعد 13:11)

ترجمہ (اردو):

بے شک، اللہ کسی قوم کی حالت نہیں بدلتا جب تک وہ خود اپنی حالت کو نہ بدلے۔

Translation (English):

Indeed, Allah does not change the condition of a people until they change what is in themselves.

(Surah Ar-Ra'd 13:11

ظَهَرَ الْفَسَادُ فِي الْبَرِّ وَالْبَحْرِ بِمَا كَسَبَتْ أَيْدِي النَّاسِ لِيُذِيقَهُمْ بَعْضَ الَّذِي عَمِلُوا لَعَلَّهُمْ يَرْجِعُونَ

(سورة الروم 30:41)

ترجمہ (اردو):

خشکی اور تری میں فساد ظاہر ہو گیا ہے، لوگوں کے اپنے ہاتھوں کے کیے ہوئے اعمال کی وجہ سے، تاکہ اللہ انہیں ان کے کچھ اعمال کا مزہ چکھائے، شاید کہ وہ باز آ جائیں۔

Translation (English):

Corruption has appeared on land and sea because of what the hands of people have earned, so that He may let them taste part of what they have done, that perhaps they will return (to righteousness).

(Surah Ar-Rum 30:41)

Climate Risk Reduction, Disaster Preparedness, and Flood Resilience developed strategies for disaster risk reduction and flood resilience

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PREFACE

Climate change presents an existential challenge to Pakistan, demanding urgent, well-coordinated, and evidence-based policy responses. Recognizing the gravity of the issue, the Policy Lab on Climate Change Mitigation in Pakistan was conceived, designed, and led under the visionary guidance of Dr. Muqeem ul Islam, Chief Instructor, National Institute of Public Administration (NIPA), Peshawar, during the 41st Mid-Career Management Course. This initiative aimed to foster a dynamic and policy-oriented dialogue through a Public Policy Simulation Exercise, conducted from September 24th to 29th, 2024, followed by research presentations and seminars on September 30th and October 1st, 2024.

The Policy Lab brought together policymakers, researchers, and practitioners to develop actionable strategies for climate change mitigation, with a particular focus on Pakistan's national and regional policy frameworks. Structured into eleven dedicated research groups, the Policy Lab comprehensively addressed various dimensions of climate governance, adaptation, and mitigation. Each research group (RG) was tasked with developing strategic policy recommendations aligned with national priorities and international commitments.

RG-1: Task Force on National Climate Policy Framework and International Obligations focused on aligning Pakistan's policies with global frameworks like the Paris Agreement and the Sustainable Development Goals.

RG-2: Task Force on Climate Policy Framework of Khyber Pakhtunkhwa ensured regional priorities were harmonized with national and international commitments.

RG-3: Committee on Biodiversity, Ecosystem Restoration, and Reforestation worked to protect biodiversity, enhance reforestation, and promote ecosystem restoration.

RG-4: Committee on Climate-Smart Agriculture, Food Security, and Sustainable Land & Water Management explored innovative solutions for sustainable agriculture and resource management.

RG-5: Committee on Energy Conservation, Renewable Resources, and Electric Vehicle Adoption developed policies for energy efficiency and transition to renewable energy.

RG-6: Committee on Carbon Financing, Carbon Credits, and Global Climate Resilience Investments proposed financial mechanisms to support climate action and resilience building.

RG-7: Committee on Capacity Building, Climate Education, and Mass Awareness emphasized the need for public engagement, education, and institutional capacity development.

RG-8: Committee on Climate-Adaptive Infrastructure and Environmentally Sustainable Urban Growth addressed sustainable urbanization and resilient infrastructure development.

RG-9: Committee on Circular Economy and Sustainable Waste Management advanced the adoption of circular economy principles and efficient waste management systems.

RG-10: Committee on Climate Risk Reduction, Disaster Preparedness, and Flood Resilience developed strategies for disaster risk reduction and flood resilience.

RG-11: Committee on Gender Inclusion and Cultural Engagement for Climate Mitigation ensured inclusivity in climate policies, with a focus on empowering women and recognizing cultural dimensions.

The research outcomes of the Policy Lab present a roadmap for Pakistan's climate resilience, rooted in policy innovation, multi-stakeholder engagement, and actionable frameworks. This report serves as a valuable resource for decision-makers, practitioners, and researchers committed to mitigating climate change impacts in Pakistan. It is hoped that the insights and recommendations put forth in this document will inform future policies and drive Pakistan towards a sustainable and climate-resilient future.

It is hoped that this document will serve as a significant milestone in the design, implementation, and facilitation of policies, paving the way for broader economic and industrial transformation in Pakistan, انشاءالله .

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SEPTEMBER 23, 2024

Executive Summary

Context and Urgency of Climate Risk Management

- Pakistan's exposure to climate-related disasters, especially floods, is a significant challenge due to its geographical vulnerability and the intensifying effects of climate change. Recent catastrophic floods (like those in 2010 and 2022) demonstrate the growing threat to human lives, property, and economic stability.
- These natural disasters not only affect immediate livelihoods but have long-term implications, including exacerbating food insecurity, causing displacement, and impacting infrastructure, further straining the country's development.

Challenges in Disaster Management and Preparedness

- Despite the institutional framework established to manage disaster risk, gaps persist between policy and execution. National disaster management policies have not been fully implemented at the ground level due to inefficiencies in coordination, lack of resources, and the failure to integrate community-based solutions.
- There is an urgent need for better enforcement of disaster risk reduction measures at all administrative levels, from federal to district.

Key Areas for Improvement

1. **Enhanced Coordination Among Stakeholders**
    - Clear roles and coordination mechanisms must be established across the federal, provincial, and district levels of government, NGOs, and community organizations to ensure swift and effective responses.
    - Stronger partnerships are needed between government agencies and international bodies for better data sharing, forecasting, and resource mobilization during disasters.
2. **Community Engagement and Awareness**
    - Empowering local communities through education and training on flood risk management, preparedness, and early warning systems can substantially reduce vulnerability.
    - A culture of proactive disaster management must be instilled through continuous community outreach programs and local participation.
3. **Resilience Building through Infrastructure**
    - Investments in flood-resilient infrastructure, such as embankments, drainage systems, and flood-resistant buildings, are crucial for reducing the impact of floods on vulnerable populations.
    - Infrastructure planning should be climate-adaptive, considering both short-term risk reduction and long-term sustainability.
4. **Integrating Environmental and Ecosystem Management**

- Nature-based solutions, such as reforestation, wetland restoration, and sustainable land use practices, should be prioritized to reduce flood risks.
- Coordinating environmental protection efforts with disaster management plans can help restore ecosystems and mitigate the cascading effects of floods.

5. **Strengthening Early Warning Systems**
   - Improving flood forecasting and early warning systems can provide timely alerts to communities, allowing them to evacuate or prepare in advance.
   - Technological innovations, such as satellite monitoring, should be integrated into national disaster management efforts to enhance the accuracy and timeliness of flood predictions.

Strengthening Disaster Management Framework

- The study identifies critical areas within the Khyber Pakhtunkhwa (KPK) Provincial Disaster Management Authority (PDMA) requiring urgent improvements. Although disaster management efforts are in place, significant gaps remain in preparedness, mitigation, and prevention, which affect the overall effectiveness of climate change adaptation strategies.

Key Gaps in Current Disaster Management Practices

- **Risk Assessment & Hazard Mapping**: There is a pressing need for comprehensive and accurate hazard mapping and vulnerability assessments, particularly in flood-prone regions.
- **Contingency & Evacuation Planning**: Limited focus on evacuation plans, especially for vulnerable populations, impedes timely disaster response. Contingency planning remains underdeveloped in several districts.
- **Early Warning Systems**: Existing early warning mechanisms are inadequate, with many communities lacking timely alerts and proper communication during emergencies.
- **Resource Management**: There is an inefficient warehousing system that hampers the distribution of relief materials during crises. Investment in local stockpiles and warehousing infrastructure is critical.

Actionable Recommendations

1. **Legal Framework Enhancement**
   - Streamline existing disaster management laws to eliminate overlaps, enabling a coherent and cohesive disaster response structure across federal, provincial, and local levels.
2. **Inter-Agency Collaboration**
   - Establish formal communication protocols and regular joint training sessions to foster collaboration among federal, provincial, and local disaster management agencies, ensuring a coordinated and efficient response.

3. **Resource Mobilization and Funding**
    - Advocate for increased funding and resource allocation for disaster management at all government levels to ensure sustainability and operational effectiveness.
4. **Province-specific Disaster Management Plans**
    - Require provinces and districts to develop detailed disaster management plans that include risk assessments, resource allocation strategies, and community engagement tactics for improved preparedness.
5. **Investment in Technology and Infrastructure**
    - Upgrade weather radar systems to modern automatic systems aligned with international standards for improved forecasting and timely alerts.
    - Invest in modern telecommunication infrastructure to ensure timely and reliable communication during disasters.
6. **Community-Centric Disaster Management**
    - Engage marginalized and vulnerable groups in disaster preparedness programs, ensuring that their specific needs are addressed and that they are included in the resilience-building process.
7. **Afforestation and Climate Risk Reduction**
    - Implement large-scale afforestation programs and prioritize disaster risk reduction initiatives, focusing on long-term resilience building to mitigate the effects of climate change.
8. **Implementation of National Policies**
    - Enforce the National Climate Change Policy with dedicated actions focused on climate risk reduction at both the national and provincial levels.

Conclusion The findings of this study underscore the necessity of building a robust, collaborative, and proactive disaster management system in KPK. By addressing the identified gaps and following through on the proposed recommendations, the region can enhance its resilience to climate change, reduce disaster-related risks, and improve the safety and well-being of its communities.

Introduction

According to the Global Climate Risk Index 2019, the growing effects of climate change, climate risk reduction, disaster preparedness, and flood resilience are becoming increasingly important issues in Pakistan. Pakistan ranks among the top ten countries and is one of the most vulnerable nations in the world to climate-related calamities (Global Climate Risk Reduction, n.d.).

In recent years, Pakistan has witnessed several extreme floods, resulting in major loss of life and property and causing chaos and destruction in several hotspots. The International Union for Conservation of Nature (2009) highlighted that Pakistan is highly vulnerable to disasters caused by climate change, particularly prone to floods due to unpredictable rains and micro-cloudbursts.

According to the Annual PDMA Report 2022, the most frequent and destructive natural disaster in the nation is flooding, which includes riverine floods, glacial lake outburst floods (GLOF), and urban flooding. Socioeconomic vulnerabilities coupled with climate unpredictability have made Pakistan's infrastructure, environment, and populations extremely susceptible to the negative consequences of natural disasters (Annual PDMA Report KP, 2022).

The Climate Change Preparedness Report 2017 notes that Pakistan has experienced several devastating floods in recent decades that have negatively impacted both rural and urban areas. The disastrous 2010 floods, which affected more than 20 million people and resulted in losses exceeding $10 billion, highlight the nation's vulnerability. More recently, Pakistan was devastated by the 2022 floods, which forced millions of people to relocate and caused significant property and human loss. In addition to causing daily disruptions for millions, these disasters seriously jeopardize national development by leading to food insecurity, health problems, and unstable economies.

In response, there has been a growing emphasis on climate risk reduction, disaster preparedness, and flood resilience as part of Pakistan's national policies. Climate risk reduction aims to minimize the exposure and vulnerability of communities to climate-related hazards by integrating climate adaptation measures into planning and governance.

Statement of Problem

Natural hazards, particularly climate change-induced floods, have severely impacted the social and economic well-being of Pakistan. Despite the institutional framework, the strategies outlined in the national disaster management policy have not been fully implemented. This study aims to identify the reasons behind the existing gap between theory and practice in climate risk reduction, disaster preparedness, and flood resilience.

Scope

This research aims to provide a critical analysis of the disaster management policies, laws, and practices in relation to climate risk reduction, disaster preparedness, and flood resilience in Pakistan. The study will focus on the legal and institutional framework for disaster management, the enforcement mechanisms for these laws at the federal, provincial, and district levels, and the role of civil society and communities in promoting a disaster management culture.

Research Methodology

The topic at hand is exploratory and requires thorough investigation; therefore, a qualitative method of research is adopted for the study. Data has been obtained directly by interviewing relevant resource persons from academia and institutions. Journals, reports, research papers, and online resources have been consulted, and the required data has been retrieved. Thus, the data reviewed comes from both primary and secondary sources.

Literature Review

Due to geophysical conditions, extreme climate conditions, and high degrees of exposure and vulnerability, Pakistan is a disaster-prone country. Pakistan's exposure to natural hazards and disasters can be ranked as moderate to severe. A range of hydro meteorological, geophysical, and biological hazards—including earthquakes, floods, tsunamis, cyclones, storms, droughts, glacial lake outbursts, landslides, avalanches, pest attacks, and epidemics—pose risks to Pakistani society (Asian Disaster Reduction Report, 2015).

According to the NDMA, the analysis of hazard risks, vulnerabilities, and dynamic pressures highlights a scenario of more people living in and around hazard-prone areas. More people are likely to be living in existing settlements in hazard-prone areas, and new settlements will continue to increase with the expanding population. This trend may worsen over the years, as the population of Pakistan is expected to double in another 25 to 30 years. On the other hand, the frequency, severity, and intensity of certain hazards are on the rise, such as droughts, flooding, soil erosion, and landslides, resulting from environmental degradation and climate change (NDMA Annual Report, 2022).

An essential component of management is understanding the concepts of emergency planning, community readiness, and their connections to drills, training, and plans. Effective emergency planning is a constant effort. Organizational personnel and equipment, emergency facilities, organizational structure, and hazard vulnerability all have the potential to transform over time. The process of emergency preparedness serves as a tool for recognizing, tracking, and handling these modifications. A component of readiness is preparation (Perry, R. W., & Lindell, M. K., 2003).

Generally, heavy concentrated rainfall during the monsoon season causes floods, which are sometimes intensified by the melting of snow that flows into rivers. Occasionally, destructive floods are also caused by monsoon currents originating in the Bay of Bengal and resultant depressions, which often result in heavy downpours in the Himalayan foothills, additionally affected by weather systems

from the Arabian Sea (Seasonal Low) and from the Mediterranean Sea (Ministry of Water & Power, 2010).

Heavy monsoon rains induced massive and unprecedented floods from August to September 2022 across most of Pakistan. The Government of Khyber Pakhtunkhwa's Relief, Rehabilitation, and Settlement Department declared a rain emergency in 17 affected districts of the province. According to official estimates, floods have claimed the lives of 306 individuals, caused the temporary displacement of approximately 674,318 people, and roughly 70,000 people have been rescued. Approximately 121,390 acres of agricultural land have been damaged due to inundation, affecting sugarcane, rice, maize, and vegetable crops, while 6,577 livestock, mainly cattle, have perished. The floods also resulted in severe damage to communication infrastructure, with approximately 1,600 kilometers of roads and 107 bridges damaged. Similarly, the floods have damaged 91,000 houses (both fully and partially) across the province (MSRNA, 2022).

Institutional Framework

Disaster Management System of Pakistan

Pakistan has three administrative levels of governance:

- **National Disaster Management Authority (NDMA)** as the focal point at the federal level.
- **Provincial Disaster Management Authority (PDMA)**, which is the focal point for disaster risk management (DRM) endeavors in respective provinces.
- **District Disaster Management Units (DDMUs)** at the district level.

If a disaster occurs, the DDMUs are the first responders for rescue operations, and if needed, the situation is dealt with by provincial or national management authorities. The Director General of PDMA performs his duties as Secretary at the provincial level. The stakeholders responsible for executing pre-disaster activities and managing post-disaster scenarios include the district administration, with the help of the civil defense department, other member departments, NGOs, and international organizations (IOs).

The enactment of the National Disaster Management Act of 2010 provides for the following institutional arrangements:

- Disaster Management Commission at the national level (NDMC)
- Provincial/Regional levels (PDMC)
- National Disaster Management Authority (NDMA)
- Provincial Disaster Management Authority (PDMC)
- District Disaster Management Units (DDMUs)
- National Emergency Operation Centers (NEOC)
- Provincial Emergency Operation Centers (PEOC)
- Disaster Management Force 1122-KP
- National Disaster Response Force (NDRF)
- Pakistan Meteorological Department
- Civil Defense

National Disaster Management Authority (NDMA)

The National Disaster Management Authority (NDMA) was formed in 2007. It is the executive arm and secretariat of the National Disaster Management Commission (NDMC) and is responsible for managing the complete spectrum of disasters in Pakistan. NDMA maps all hazards in the country, organizes training and awareness-raising activities, and acts as the Government of Pakistan's focal point for dealing with the national and international community. The National Disaster Risk Management Framework (NDRMF) was prepared by the NDMA in March 2007. The NDRMF serves as an overall guideline for disaster risk management at the national, provincial, and district levels. In March 2010, the NDMA formulated the National Disaster Response Plan (NDRP), which presents emergency response activities for all stakeholders, including Standard Operating Procedures (SOPs) for emergency response. NDMA is responsible for performing the following functions:

- Mapping all hazards in the country and conducting risk analyses on a regular basis.
- Developing guidelines and standards for national and provincial stakeholders regarding their roles in disaster risk management.
- Providing technical assistance to federal ministries, departments, and provincial disaster management authorities for disaster risk management initiatives.
- Organizing training and awareness-raising activities for the capacity development of stakeholders, particularly in hazard-prone areas.
- Coordinating the emergency response of the federal government in the event of a national-level disaster through the National Emergency Operations Centre (NEOC).
- Establishing a National Disaster Management Fund.
- Coordinating, formulating, and developing guidelines and standards for provincial/regional and local stakeholders regarding their roles in disaster risk management.
- Ensuring the preparation of disaster risk management plans by all districts.

Promoting education, awareness, and training on disaster risk reduction and response. (NDMA Act, 2010)

SUPARCO

- Provides space-based information and services to support disaster management in the country (SUPARCO website, n.d.).

Pakistan Meteorological Department (PMD)

- National Weather Forecasting Centre, Islamabad (NWFC)
- Marine Meteorology & Tropical Cyclone Early Warning Centre, Karachi (TCWC)
- National Drought Monitoring Centre, Islamabad (NDMC)
- National Seismic Monitoring and Tsunami Early Warning Centre, Karachi (NTWC)
- Flood Forecasting Division, Lahore (FFD) (PMD website, n.d.).

Federal Flood Commission (FFC)

- Prepare flood protection plans for the country.
- Review and approve flood protection schemes prepared by provincial governments and concerned federal agencies.
- Implement measures to improve the flood forecasting and warning system.
- Prepare a research program for flood control and protection.
- Standardize designs and specifications for flood protection works.
- Evaluate and monitor the progress of the National Flood Protection Plan implementation (Ministry of Water Resources website, n.d.).

Provincial Disaster Management Authority (PDMA)

- Formulate the provincial disaster management policy, obtaining the approval of the Provincial Commission.
- Coordinate and monitor the implementation of the National Policy, National Plan, and Provincial Plan.
- Examine the vulnerability of different parts of the province to various disasters and specify prevention or mitigation measures.
- Lay down guidelines to be followed for the preparation of disaster management plans by the Provincial Departments and District Authorities.
- Evaluate preparedness at all governmental and non-governmental levels to respond to disasters and enhance preparedness, coordinating response in the event of a disaster.
- Give directions to any provincial department or authority regarding actions to be taken in response to a disaster.
- Promote general education, awareness, and community training in this regard.
- Provide necessary technical assistance or advice to district authorities and local authorities for carrying out their functions effectively (PDMA Act, 2012).
- Advise the provincial government regarding all financial matters related to disaster management.
- Examine construction in the area and, if it is of the opinion that the standards laid down have not been followed, it may direct compliance with those standards.
- Ensure that communication systems are in order and that disaster management drills are carried out regularly.
- Perform such other functions as may be assigned to it by the national authority.

District Disaster Management Unit (DDMU)

- Prepare a disaster management plan, including a district response plan for the district.
- Coordinate and monitor the implementation of the national policy, provincial policy, national plan, provincial plan, and district plan.
- Ensure that areas in the district vulnerable to disasters are identified and that measures for the prevention of disasters and the mitigation of their

effects are undertaken by the government departments at the district level as well as by the local authorities.

- Ensure that the guidelines for prevention, mitigation, preparedness, and response measures, as laid down by the national authority and the provincial authority, are followed by all departments of the government at the district level and by the local authorities in the district.
- Give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary.
- Lay down guidelines for the preparation of disaster management plans by the government departments at the district level and local authorities in the district.
- Monitor the implementation of disaster management plans prepared by the government departments at the district level.
- Lay down guidelines to be followed by the government departments at the district level.
- Organize and coordinate specialized training programs for different levels of officers, employees, and voluntary rescue workers in the district.
- Facilitate community training and awareness programs for the prevention of disasters or mitigation, with the support of local authorities, governmental organizations, and non-governmental organizations.
- Set up, maintain, review, and upgrade the mechanism for early warnings and dissemination of proper information to the public.
- Prepare, review, and update the district-level response plan and guidelines.
- Coordinate with and give guidelines to local authorities in the district to ensure that pre-disaster and post-disaster management activities in the district are carried out promptly and effectively.
- Review development plans prepared by the government departments at the district level, statutory authorities, or local authorities to make necessary provisions therein for the prevention of disasters or mitigation.
- Identify buildings and places that could, in the event of a disaster situation, be used as relief centers or camps, and make arrangements for water supply and sanitation in such buildings or places.
- Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available on short notice.
- Provide information to the provincial authority relating to different aspects of disaster management.
- Encourage the involvement of non-governmental organizations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management.
- Ensure communication systems are in order and that disaster management drills are carried out periodically.
- Perform such other functions as the provincial government or provincial authority may assign to it or as it deems necessary for disaster management in the district (PDMA Act, 2012).

The Irrigation Department of Khyber Pakhtunkhwa

The Irrigation Department is pivotal in flood control and enhancing flood resilience by managing water resources and infrastructure. Its key roles include:

1. **Flood Protection Infrastructure:** The department constructs and maintains embankments, spurs, dikes, and levees to control flooding and safeguard vulnerable areas, while employing river training works to manage water flow and reduce erosion.
2. **Water Drainage Systems:** It manages drainage networks to prevent waterlogging and mitigate urban flooding, particularly during monsoon seasons.
3. **Flood Forecasting and Early Warning:** In collaboration with the Pakistan Meteorological Department (PMD), it forecasts floods and disseminates early warnings to at-risk communities for timely evacuation and preparedness.
4. **Water Resource Management:** The department manages watercourses for floodwater storage and implements canal systems to divert excess water, minimizing damage to critical areas.
5. **Resilience Building and Disaster Preparedness:** It integrates climate resilience into infrastructure planning and conducts community training on flood preparedness and recovery.
6. **Coordination with Authorities:** It works with the Provincial Disaster Management Authority (PDMA) to align flood control efforts with provincial disaster management plans.
7. **Post-Flood Recovery:** After floods, the department assesses damage to infrastructure and facilitates repairs to restore flood control systems.
8. This comprehensive approach enhances KP's capacity to manage and mitigate the impacts of floods (Water Act KP, 2020).

Environmental Protection Agency Khyber Pakhtunkhwa

1. **Policy Formulation:** The EPA helps develop policies that integrate environmental considerations into flood management strategies, promoting sustainable land use and watershed management.
2. **Environmental Impact Assessments (EIAs):** The agency conducts EIAs for development projects, ensuring that flood risks and environmental impacts are taken into account before approvals are granted.
3. **Monitoring and Data Collection:** The EPA monitors environmental indicators and collects data related to flooding, which aids in understanding trends and improving response strategies.
4. **Public Awareness and Education:** The agency engages in community outreach programs to raise awareness about flood risks and promote preparedness and resilience measures among local populations (Environmental Protection Act KP, 2014).
5. **Collaboration and Coordination:** The EPA works alongside other government agencies, NGOs, and community groups to create integrated flood management plans that consider ecological health and community needs.

6. **Research and Capacity Building:** It supports research initiatives aimed at improving flood forecasting and resilience practices and builds capacity within local communities for better flood risk management.
7. **Restoration and Rehabilitation:** Post-flood, the EPA may be involved in efforts to restore ecosystems and rehabilitate affected areas, ensuring that recovery efforts consider environmental sustainability.

Forest Department Khyber Pakhtunkhwa

1. **Tree Planting Initiatives:** Implementing afforestation and reforestation projects to enhance forest cover, which helps in reducing soil erosion and increasing water retention.
2. **Community Engagement:** Collaborating with local communities to promote tree planting and sustainable land management practices.
3. **Biodiversity Conservation:** Protecting and managing forest ecosystems to maintain biodiversity, which is vital for ecosystem resilience against climate change.
4. **Planning, Monitoring & Evaluation:** Gathering data on forest health and changes in land use to inform policy and response strategies.
5. **Emergency Response Planning:** Preparing response plans that integrate forest management practices to mitigate the impact of disasters.
6. **Capacity Building:** Conducting training programs for communities on disaster preparedness and sustainable land management.
7. **Interdepartmental Collaboration:** Working with other government departments and agencies to develop comprehensive disaster management plans (Forest Ordinance KP, 2002).

Institutional Analysis

From August to September 2022, heavy monsoon rains led to unprecedented floods across much of Pakistan. The Khyber Pakhtunkhwa government declared a rain emergency in 17 affected districts. Official estimates report that the floods resulted in 306 fatalities, displacing around 674,318 people, with about 70,000 rescued. Approximately 121,390 acres of agricultural land, including crops like sugarcane, rice, and maize, were damaged, and 6,577 livestock, primarily cattle, were lost.

Despite the plethora of institutions working for climate risk reduction, disaster preparedness, and flood resilience in KP, a huge loss was sustained, as mentioned above. The following are the weaknesses of the institutions employed for disaster management:

- **NDMA:** Limited local adaptation of national policies and insufficient real-time data-sharing mechanisms with provincial and district authorities.
- **PDMA:** Resource constraints limit the effective implementation of programs. There is weak collaboration with local communities for preparedness initiatives.
- **DDMA:** Limited capacity and resources across different districts, coupled with a lack of tailored disaster response plans that consider local vulnerabilities.

Legal Framework

- National Disaster Management Ordinance 2007
- National Disaster Management Act 2010
- Provincial Disaster Management Act 2012

Legal Analysis

The 18th constitutional amendment to the 1973 Constitution of Pakistan created confusion in the entire legal structure, as many subjects that were in the federal legislative list were devolved to the provinces. Now, the NDMA has no administrative control over the PDMAs, which limits disaster management to collaboration and sharing of information only.

Second, many provisions outlined in the PDMA Act exceed the scope of the PDMA, such as making the construction of buildings and houses disaster- and climate-resilient, which makes the implementation of these provisions very difficult.

Comparative Analysis with India and Bangladesh

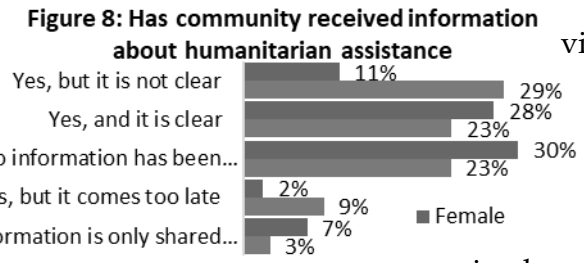
Area	Pakistan	India	Bangladesh
Institutional Framework	NDMA	NDMA	Disaster Management and Relief Ministry
Policy Framework	National Disaster Management Act, 2010	Disaster Management Act, 2005	Disaster Management Act, 2012
Risk Assessment	Limitation in Date collection and Analysis	Regular Risk Assessment	Community based risk assessment
Response Mechanism	Slow due to infrastructure and bureaucratic delays	Well defined but slow in rural areas	Highly efficient and speedy due to community involvement
Community Involvement	Low	Moderate	Strong

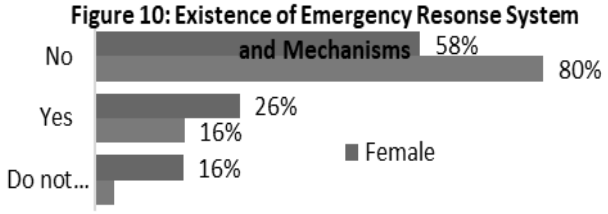
KP Floods of 2022: A Case Study

Heavy monsoon rains induced massive and unprecedented floods from August to September 2022 across most of Pakistan. The Government of Khyber Pakhtunkhwa's Relief, Rehabilitation, and Settlement Department declared a rain emergency in 17 affected districts of the province. According to official estimates, the floods claimed the lives of 306 individuals and caused the temporary displacement of approximately 674,318 people, while roughly 70,000 people were rescued. Approximately 121,390 acres of agricultural land were damaged due to inundation, affecting sugarcane, rice, maize, and vegetable crops, while 6,577 livestock, mainly cattle, perished. The floods also resulted in severe damage to communication infrastructure, with approximately 1,600 kilometers of roads and 107 bridges also being damaged. Similarly, the floods damaged either 91,000 houses (fully and partially) across the province.

Community Engagement

Sufficient and timely information sharing with communities about the provision of humanitarian assistance, including procedures, is vital to ensuring the inclusion of all segments of society. According to the MSRNA findings, 27 percent of key informants (KIs) reported that their communities had received information regarding humanitarian aid after the floods. The remainder received some information, but only 25 percent considered the information provided to be clear and, therefore, helpful to the community. Similarly, 20 percent reported that the information was 'not clear,' while 7 percent of KIs highlighted that the information came very late, and 6 percent believed that it was provided to a small number of community members. Comparing the responses of male and female KIs, female respondents had a relatively clearer understanding of the information provided. Communities generally preferred to receive information through traditional sources. When asked about the preferred mode of communication, 54 percent of male KIs and 39 percent of female KIs mentioned that community members generally prefer to receive information through community leaders, followed by social media (51 percent and 40 percent, respectively).

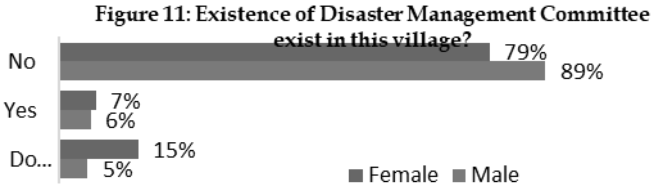




Overall, 21 percent of KIs assumed that community members were well aware of the Complaint and Feedback Mechanisms (CFM) in place regarding the provided humanitarian assistance. Awareness of CFM stood at 19 percent across flood-affected areas of the province. Regarding the question related to the existence of emergency response systems and mechanisms (community emergency response teams, search and rescue teams, etc.) at the local level for saving lives and livelihoods from various hazards, over 80.4 percent of the responses from male responders and 58 percent of female respondents confirmed that no such systems exist in their villages, which were selected at random from the 10 highly affected priority districts of Khyber Pakhtunkhwa. Over 64.8 percent of male and female KIs in focus group discussions confirmed that emergency response systems/mechanisms are not established in their villages.

Khyber Pakhtunkhwa is prone to climate-induced and other natural disasters. The integration of Disaster Risk Reduction (DRR) and Emergency Preparedness into all sectors under the preparedness, response, recovery, and development phases

is, therefore, critical and can contribute to saving the lives and livelihoods of vulnerable communities in hazard-prone districts across Pakistan, resulting in building the resilience of vulnerable communities to disasters.

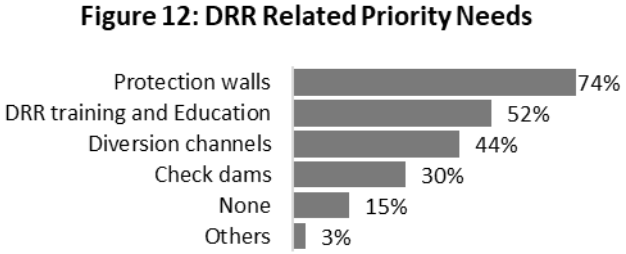


The MSRNA questionnaire, therefore, included DRR-related questions for communities in 10 priority hazard-prone districts among the 17 districts of KP. Similarly, regarding the existence of Village Disaster Management Committees (VDMCs) in villages, 88.9 percent of male respondents and 78.7 percent of female respondents confirmed that no such committees exist in their villages.

Concerning the status of training, equipping, and institutionalization of these Village Disaster Management Committees (VDMCs) in villages, over 96.1 percent of responses from male respondents and 95.8 percent of female respondents reported 'Not Applicable,' since this question was contingent upon the previous question—no existence of committees, therefore, made the question irrelevant.

DRR Related Priority Needs

On priority needs for saving lives and properties from natural disaster, overall, 74.1 percent of the responses from male respondents indicated construction of protection walls as their first priority need and 52.1 percent identified DRR training and education as a priority need.



Among female KIs, more than 52.0 percent identified protection walls as a priority need and over 43.8 percent highlighted DRR training and education as a priority need.

Affected Population in 2022 Floods KP

Estimated Number of Affected Population

Ranking	District	Estimated Number of Households in the affected areas	% Affected	Estimated Population Affected
1	D. I. Khan	147,853	66%	772509
2	Dir Upper	122,750	59%	575286
3	Swat	74,877	65%	384220
4	Nowshera	73,677	52%	304197
5	Tank	77,220	48%	294416
6	Dir Lower	68,050	53%	282506
7	Charsadda	39,155	80%	246791
8	Kohistan Lower	44,468	56%	198323
9	Kohistan Upper	29,489	62%	144374
10	Chitral Upper	14,507	89%	101426
	Grand Total	**692,042**	**63%**	**3,304,048**

MSRNA REPORT KP

Demographics of Flood Hit Villages of 2022 KP

S.No.	Villages affected/Covered	
	District	Number of Villages affected
1	**Charsadda**	38
2	**Chitral Upper**	20
3	**D. I. Khan**	152/200
4	**Kohistan Lower**	55
5	**Kohistan Upper**	37
6	**Dir Lower**	59
7	**Nowshera**	38
8	**Swat**	61
9	**Tank**	39

Faultline of the 2010 Flood Nowshera

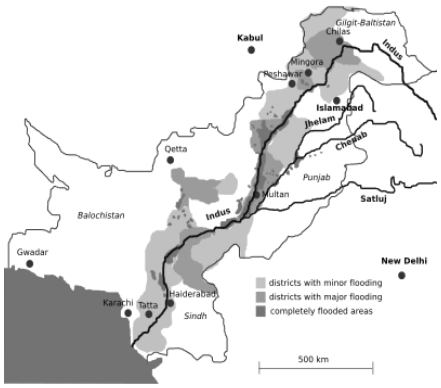
The 2010 monsoon flood disaster in Pakistan was massive and unprecedented, killing more than 1,700 people, affecting over 20 percent of the land area, and impacting more than 20 million individuals. It caused losses amounting to billions of dollars due to damages to infrastructure, housing, agriculture, livestock, and other family assets. Essential infrastructure, including roads, bridges, and markets, has been severely damaged, and many remain impassable. According to one of the United Nations surveys, approximately 10.1 million people were in need of shelter and humanitarian assistance. The number of people requiring food assistance to support recovery and rehabilitation is estimated at approximately 3.6 million. More than 1.1 million houses were completely destroyed or rendered uninhabitable, and over 2 million hectares of standing crops were damaged or lost.

Table 1: Flood Damages and Reconstruction Cost

(Rs. in Billion)

Province/ Area	Damages	Reconstruction Cost
AJK	7	13
Balochistan	53	27
FATA	6	8
Federal	93	96
Gilgit Bultistan	4	7
Khyber Pakhtunkhwa	100	106
Punjab	219	93
Sindh	373	228
Total	**855**	**578**

Source: National Flood Reconstruction Plan 2010



Source Report on 2010 floods Finance Division Website

Nowshera 2010 floods wrecked a havoc upon on the small town of PIR SABAQ because there was no Siphon Gate installed where the KHUWAR (nullah) opens in the River Kabul thus the torrential surge was let loose on the town because on the part of negligence of authorities.

Source Google Earth

PESTLE Analysis of Institutions

Political:

• Lack of political will regarding disaster management.
• Decentralized governance impacts the efficiency of disaster preparedness efforts.
• Ongoing political issues affect efficiency.

Economic:

• Insufficient allocation of resources.
• Floods impact economic conditions.
• Increases infrastructure vulnerability.

Social:

• Poor engagement of communities at the local level in terms of awareness and training.
• Increases the vulnerability of marginalized communities.
• Increases the tendency toward urbanization.

Technological:

• Lack of modern telecommunication systems and automatic weather radar systems for early warning.

- Conventional flood-resistant infrastructure and drainage systems.
- Performance audit of existing early warning systems.

Legal:
- Parallel and overlapping legal frameworks with unrealistic provisions.
- Lack of accountability of institutions in disaster preparedness and response.
- Limited scope of existing laws.

Environmental:
- Increased frequency and intensity of flooding events.
- Insufficient investment in biodiversity and ecosystems.
- Lack of adequate climate-resilient infrastructure.

GAP Analysis

Field	Current State	Desired State	GAP
Institutional Framework	Weak intuitional framework and lack of resources	Strong institutions and coordination	Lack of adequate resources
Legal Framework	Fragmented and unrealistic legal regime	Well defined and realistic	Lack of effective central control and realistic provisions
Funding	Insufficient funding	Sufficient funding allocation	Lack of adequate allocation of financial resources
Community engagement	Less involvement of community	Effective involvement of community	Lack of community involvement programs at large
Infrastructure	Poor and insufficient infrastructure	Improved and sufficient infrastructure	Lack of political will and financial resources
Annual Plans as per NDMA/PDMA Act	No annual plans instead partial contingency plans	Preparation and updation of annual disaster management plans	Ineffective administration
Demarcation of Flood Zones	Nil	Complete mapping of flood zones	Lack of political, administrative will and lack of financial resources

Issues and Challenges

1. **Fragmented Legal Framework:** Overlapping laws create confusion, hindering effective disaster management.
2. **Decentralized Governance:** The 18th Amendment's devolution of powers has led to inconsistent practices across provinces.
3. **Lack of NDMA Control:** The National Disaster Management Authority (NDMA) has no administrative control over Provincial Disaster Management Authorities (PDMAs).
4. **Resource Constraints:** Insufficient funding severely limits the capacity of disaster management institutions.
5. **Unrealistic PDMA Provisions:** Some provisions of the PDMA Act exceed their intended scope, complicating enforcement.
6. **Weak Institutional Coordination:** Poor synergy among federal, provincial, and local authorities impairs disaster response.
7. **Absence of Annual Plans:** The lack of comprehensive annual disaster management plans leads to inadequate preparedness.
8. **Limited Risk Assessment:** Poor data collection and analysis hinder effective risk assessments.
9. **Inadequate Funding:** Insufficient budget allocations hamper operational effectiveness in disaster management.
10. **Community Engagement Deficit:** Low community involvement reduces the effectiveness of disaster response efforts.
11. **Marginalized Group Vulnerability:** Increased vulnerability among marginalized communities due to a lack of awareness and resources.
12. **Urbanization Pressure:** Rapid urbanization exacerbates infrastructure vulnerabilities and disaster risks.
13. **Outdated Technology:** Insufficient modern telecommunication and early warning systems impede timely disaster response.
14. **Ineffective Early Warning Systems:** Poor audits of existing systems lead to missed warnings and inadequate preparedness.
15. **Frequent Flooding:** Increased flood intensity due to climate change challenges current disaster management strategies.
16. **Inadequate Flood Zone Mapping:** The lack of complete flood zone demarcation complicates planning and response.
17. **Poor Infrastructure:** Insufficient infrastructure hampers effective disaster response and recovery.
18. **Political Will Deficiency:** Political instability and a lack of commitment hinder disaster management initiatives.
19. **Bureaucratic Delays:** Slow bureaucratic processes delay emergency responses and recovery efforts.
20. **Lack of Accountability:** Insufficient accountability mechanisms for disaster management institutions lead to ineffective governance.
21. **Absence of Automatic Weather Radars:** Only one Automatic Radar Station is functioning in Mardan; the other two analogue radars in D.I. Khan and Chirat are dysfunctional.
22. **Limited Contact with DDMUs:** International organizations are in greater contact with NDMA rather than DDMUs.

Conclusion

In view of the study, it has been noted that the preparedness, mitigation, and prevention phases regarding the effects of climate change at PDMA-KPK need improvement. There is a continuous need for enhancements in the areas of risk assessment, prevention, hazard mapping, assessing vulnerability, contingency planning, warehousing, early warning, and evacuation planning for vulnerable populations. There is a dire need to invest resources in afforestation and disaster risk reduction (DRR) to address the effects of climate change.

Recommendations

Review and streamline existing laws related to disaster management to eliminate overlaps and ambiguities, ensuring a cohesive legal framework that facilitates effective disaster response.

- Establish formal mechanisms for collaboration among federal, provincial, and local authorities, including regular joint training exercises and communication protocols to improve synergy and response efficiency.
- Advocate for increased budget allocations and resource mobilization for disaster management institutions at all levels, ensuring they have the necessary funding to operate effectively and sustainably.
- Mandate the creation of detailed annual disaster management plans for each province and district, incorporating risk assessments, resource allocation, and community engagement strategies to improve preparedness.
- Invest in modern telecommunication infrastructure and advanced early warning systems, ensuring timely dissemination of alerts and improving overall disaster preparedness and response capabilities.
- Foster community involvement in disaster management through awareness programs and training while specifically addressing the needs of marginalized groups to enhance resilience and participation in preparedness efforts.
- Concrete steps must be taken for the implementation of the National Climate Change Policy devised by the Ministry of Climate Change for climate risk reduction.
- The weather radars installed at D.I. Khan and Chirat are analogue and have now become dysfunctional. Automatic weather radars, in line with international best practices, should be procured and installed.
- Budget allocations must be made according to the anticipated needs of the concerned departments, keeping in view the nature of hazards.

- There is a need for greater coordination of international organizations with lower tiers of disaster management organizations.

Logframe Matrix (1/2)

Assumptions / Risks	Resources / Inputs	Activities	Outputs	Outcomes	Impact
Lack of Political Will	Government collaboration	Implement National Climate change policy	Policy actions taken	Improved climate risk management	Long term climate resilience
Non alignment of budget with hazards	Financial Analysis	Align budget with departmental needs	Needs-based budgeting	Adequate resource allocation	Effective disaster response
Lack of coordination among departments and donors	Communication channels	Establish collaboration mechanism among authorities	Enhanced partnership	Broaden support network	Comprehensive disaster strategies

Logframe Matrix (2/2)

Assumptions / Risks	Resources / Inputs	Activities	Outputs	Outcomes	Impact
Inadequate procurement	Investment in procurement	Procure and install modern weather radars	New weather installed	Improved forecasting capabilities	Better disaster preparedness
Lack of community engagement	Local NGOs and community groups	Foster community involvement through trainings/programs	Increased community participation	Enhanced community resilience	Stronger community ties
Overlapping legal framework	Review of existing law	Streamline disaster management laws	Revised legal framework	Improved legal clarity	Enhanced disaster resilience

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