Government of Pakistan
Prime Minister's Office
National Disaster Management Authority (HQ)
Main Murree Road Near ITP Office, Islamabad

NATIONAL DISASTER MANAGEMENT PLAN

NDMP

2025

"In a world increasingly impacted by climate change and disasters, the National Disaster Management Authority (NDMA) Pakistan remains dedicated to advancing resilience and innovation in disaster management."

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www.ndma.gov.pk

This document has been prepared under the patronage of

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List of Acronyms

BHU	Basic Health Unit
CNG	Compress Natural Gas
COVID	Coronavirus Disease
DDMA	District Disaster Management Authority
DEOC	District Emergency Operation Centre
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EOCs	Emergency Operation Centres
EWSs	Multi-Hazard Early Warning Systems
FFC	Federal Flood Commission
FFD	Flood Forecasting Division
FRD	Flood Risk Reduction
GDP	Gross Domestic Product
GIS	Geographic Information System
GLOF	Glacial Lake Outburst Flood
HKH	Hindu Kush-Himalaya
HRF	Humanitarian Response Facilities
IASC	Inter-Agency Standing Committee
ICT	Islamabad Capital Territory
INGO	International Non-Government Organizations
IRSA	Indus River System Authority
KKH	Karakorum Highway
LPG	Liquid Petroleum Gas
MCH	Mother and Child Health
MHVRA	Multi-Hazard, Vulnerability, and Risk Assessment
MIRA	Multi-Sector Initial Rapid Assessment
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NDRMF	National Disaster Risk Management Fund
NDRP	National Disaster Response Plan
NEOC	National Emergencies Operation Centre

NIDM	National Institute of Disaster Management
NLC	National Logistic Cell
PEOCs	Provisional Emergency Operation Centres
PIA	Pakistan International Airline
PMD	Pakistan Meteorological Department
PRCS	Pakistan Red Crescent Society
RHC	Rural Health Centre
SFDRR	Sendai Framework for Disaster Risk Reduction
SIMEX	Simulation Exercise
SOP	Standard Operating Procedure
SUPARCO	Space & Upper Atmosphere Research Commission
UN	United Nation
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WAPDA	Water and Power Development Authority

Message from Chairman NDMA

Pakistan's diverse landscape, from snow-capped mountains and dense forests to riverine plains, expansive deserts, and coastal regions makes our nation vulnerable to a wide range of natural and human-induced hazards. Over the years, we have faced numerous disasters, learning valuable lessons that have strengthened our disaster management systems at local, provincial, and national levels.

It is with great honour that I present the National Disaster Management Plan 2025 (NDMP-25), a comprehensive and forward-looking strategy designed to enhance Pakistan's resilience against unforeseen disasters. This plan is not just a policy document; it is a commitment to safeguarding lives, livelihoods, and infrastructure. It reflects the collective dedication of experts, professionals, and stakeholders who have worked tirelessly to develop an inclusive, proactive, and effective disaster management framework.

A key focus of NDMP-25 is the advancement of early warning systems to ensure timely alerts, reducing the risk to human life and property. We are integrating cutting-edge technology, data analytics, and satellite-based monitoring to enhance our predictive capabilities, ensuring a swift and coordinated response in times of crisis. Furthermore, we place utmost importance on protecting vulnerable populations, ensuring that no one is left behind in our disaster preparedness and response efforts.

This plan also emphasizes collaboration and coordination among government agencies, non-governmental organizations, and international partners to enable a unified and effective disaster response. However, disaster resilience is not solely the responsibility of the government—it requires the active participation of every citizen. I urge all Pakistanis to familiarize themselves with NDMP-25, educate their communities on disaster preparedness, and actively engage in emergency drills and training exercises.

Together, through vigilance, preparedness, and collective action, we can mitigate the impact of disasters and build a safer, more resilient Pakistan for future generations.

Lieutenant General Inam Haider Malik HI(M)
Chairman NDMA

Executive Summary

Pakistan faces a wide variety of natural and human-induced hazards due to its diverse geography and the adverse effects of climate change. The country's vulnerability is exacerbated by factors such as population growth, unplanned urbanization, exposure to hazards in at-risk areas and limited institutional capacities. To effectively address these challenges, it is essential to revise the National Disaster Management Plan 2024 (NDMP-24). This plan establishes standardized guidelines for hazard mitigation and preparedness measures across various hazards, and it outlines organized emergency response procedures involving both government and non-government stakeholders at all levels.

This Plan succeeds the recently expired National Disaster Management Plan, which made significant strides between 2012 and 2024. The new National Disaster Management Plan 2025 will serve as a comprehensive framework that adopts a proactive approach, enabling both National and Provincial Disaster Management Authorities to prepare for and respond to emergencies in a cohesive and well-coordinated manner. NDMP clearly delineates the roles & responsibilities of all stakeholders and various wings within NDMA, including Technical (Tech), Infrastructure (INFRA), Provincial Coordination Cell (PCC), Disaster Risk Reduction (DRR), Planning (PLANS), Operations (OPS) and Regional Military and Media Coordination (RM&MC).

The Plan emphasizes enhancing coping capacities, capabilities and learning from past experiences to improve disaster preparedness and response mechanisms. Key elements include establishing operational procedures for the National Emergencies Operation Centre, developing contingency plans, conducting regular drills and simulation exercises.

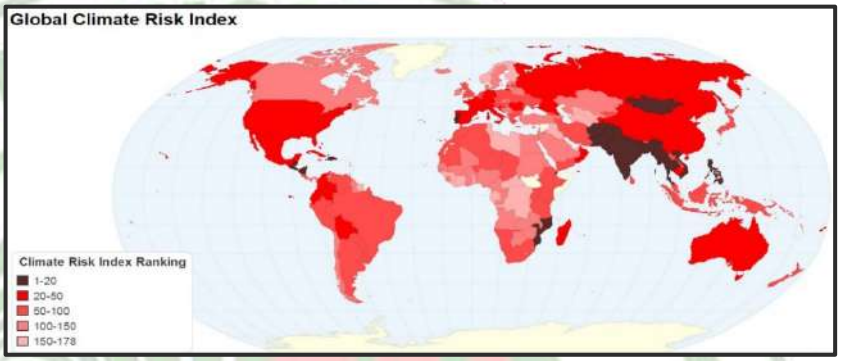
The National Disaster Management Plan 2025 underscores the necessity of effective coordination mechanisms, which include the operationalisation of Emergency Operation Centres (EOCs), rapid damage needs assessments, and efficient media management during emergencies. Additionally, it emphasizes the importance of community involvement in disaster management, outlining strategies to build community resilience.

The Plan also highlights the significance of international cooperation and coordination in disaster response and recovery efforts. Furthermore, it outlines key actions taken in 2024 that empowered Disaster Management Authorities to adopt a more holistic approach towards comprehensive resilience strategies. This collaborative framework aims to strengthen the overall capacity to prepare for, respond to, and recover from disasters effectively.

As we navigate the challenges posed by climate change, population growth, and urbanization, the NDMP 2025 underscores the importance of adapting our strategies to the evolving landscape of risks. With a commitment to continuous improvement and the incorporation of lessons learned, this plan not only prepares us for immediate challenges but also lays the foundation for sustainable disaster resilience in the long term. Through enhanced collaboration at national, provincial, and community levels, along with international partnerships, Pakistan can strive toward a future where the impacts of disasters are mitigated, communities are empowered, and recovery efforts are swift and effective. Ultimately, the NDMP 2025 is a vital step towards safeguarding lives, livelihoods, and the nation's development in the face of adversity.

1 Strengthening National Preparedness

1. **Introduction**. The recent surge in the frequency and intensity of natural disasters in Pakistan has highlighted the need for a robust disaster risk management system at all levels. As per the Global Climate Risk Index, Pakistan's pursuit of a thriving, environmentally sustainable future is intricately linked to the challenges posed by arctic warming and the nation's own climate realities. Despite its considerable distance from the Arctic Region, Pakistan's environmental landscape bears a significant imprint from the consequences of Arctic warming. With a score of 87.83 out of 100 on the Climate Risk Index, the nation finds itself precariously positioned in the face of enduring climate threats. Consequently, Pakistan faces the monumental task of navigating through these environmental perils while pursuing its Sustainable Development Goals (SDGs). Shedding light on this ongoing struggle, recent data from the 2023 Sustainable Development Report rates Pakistan with a score of 57.02, ranking it 137th out of 166 countries assessed on the Global SDG Index.



2. To chart a strategic course, the National Disaster Management Authority (NDMA) formulated the National Disaster Risk Reduction (DRR) Policy in 2013, which laid the groundwork for comprehensive disaster management initiatives. This was followed by the development of the National Disaster Management Plan (NDMP) for 2012-2024 and the National Disaster Response Plan (NDRP) in 2010, 2018 & 2024/25. These strategic documents have enabled significant milestones to be achieved nationwide through collaborative efforts involving both government and non-government organizations. Together, they have fostered a coordinated approach to disaster risk reduction, enhancing preparedness, response, and recovery capabilities across the country. The achievements under these frameworks highlight the importance of cooperation and a unified vision in building resilience against natural and human-induced hazards

3. Following the expiration of the previous NDMP-III in 2024, the National Disaster Management Plan 2025 (NDMP-2025) takes its place, providing a roadmap for attaining additional milestones in 2024. With the collective support of both government and non-government stakeholders, we are optimistic about striving towards and achieving the set targets for 2025 and beyond.

4. **Aim**. The NDMP-2025 aspires to enhance integrated disaster management frameworks that empower communities, promote proactive preparedness, and ensure sustainable recovery in the face of evolving risks and climate challenges.

5. **Mission**. The mission of NDMP-2025 is to foster resilient disaster management framework that prioritises integrated planning and community empowerment. This involves actively engaging all stakeholders throughout the disaster management cycle, implementing innovative interventions, and promoting collaboration with Stakeholders, PDMAs / GBDMA / SDMA, Partners, NGOs, INGOs. Our focus is on enhancing preparedness, response, and recovery capabilities, ensuring that communities are equipped to effectively address evolving risks and climate challenges while maintaining a state of coordinated readiness for any emergency or disaster.

6. **Objectives**. The key objectives which NDMP-2025 aims to achieve are as follows: -

a. **Establish a Robust Disaster Risk Management System**. Continue efforts to build a comprehensive disaster risk management framework, emphasizing institutionalization at grassroots levels to enhance local capacities.

b. **Hazard Analysis**. Conduct thorough analyses of natural and human-induced hazards, including climate change-related hydro-meteorological risks, to assess their potential occurrences, timing, and frequency.

c. **Risk Prioritisation**. Identify and prioritize high-risk districts for future project implementation aimed at mitigating disaster impacts and enhancing resilience against both disasters and climate change.

d. **Strategic Guidance Across Disaster Management Phase**. Provide clear strategic guidance across all phases of the disaster management cycle, with a strong focus on preparedness to facilitate effective emergency response.

e. **Define Priority Interventions**. Outline priority interventions for implementation, collaborating with relevant counterparts to bolster disaster resilience and adapt to the challenges posed by climate change.

f. **Integration with Development Programs**. Ensure that disaster risk management is integrated into future development initiatives while aligning with climate adaptation policies to create sustainable solutions.

g. **Adapt Anticipatory Actions**. Implement anticipatory actions to enhance preparedness and response capacities, allowing for proactive measures before disasters strike.

h. **Infrastructure Resilience**. Strengthen infrastructure resilience by conducting National Infra Audit & Analysis and by investing in disaster-resistant facilities and ensuring that all new developments adhere to safety standards.

i. **Disaster Risk Reduction (DRR)**. Promote comprehensive disaster risk reduction strategies that engage communities in risk assessment and management, focusing on education and capacity building.

j. **Planning**. Facilitate integrated planning processes that involve all NGOs, INGOs & Development Partners, ensuring that disaster management considerations are included in urban and rural plans.

k. **Media Engagement**. Enhance media strategies to effectively disseminate information during emergencies and promote public awareness about disaster preparedness and resilience initiatives.

l. **Risk Communication**. Strengthen collaboration with regional & military entities, Diplomats, Defense Attaches to ensure a coordinated response to large-scale disasters, leveraging their resources and expertise in emergency situations.

m. **Technical Support**. Enhance technical capabilities by investing in research, data analysis, mobile applications and the adoption of innovative technologies to improve projections, disaster response and risk assessment.

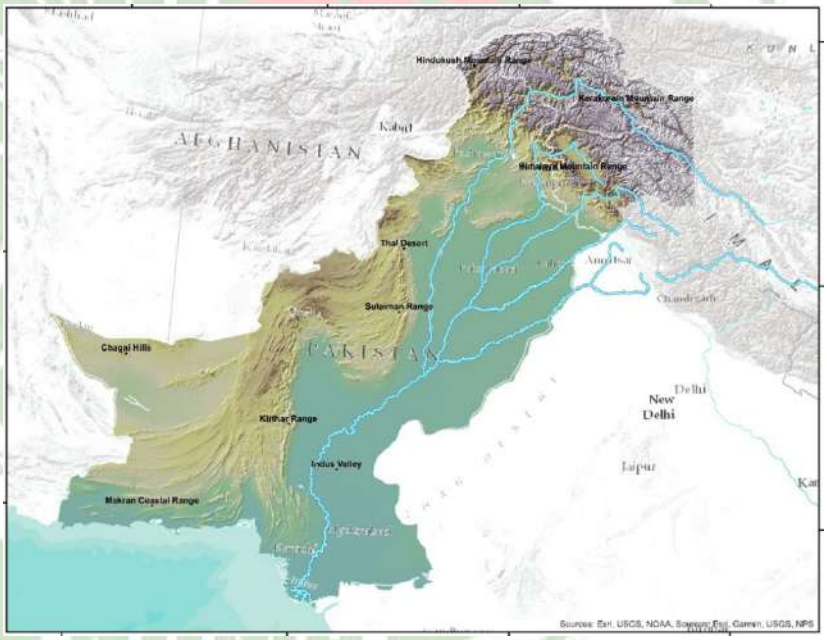
n. **Provincial Coordination**. Establish effective provincial coordination cells to facilitate communication and collaboration among local

authorities, NGOs, and communities, ensuring a unified approach to disaster management.

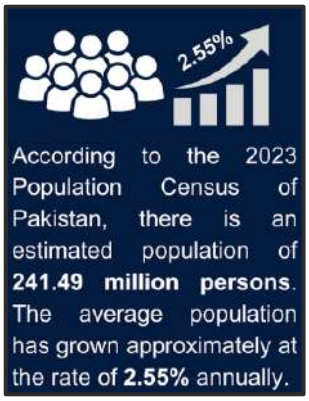
o. **Operations**. Optimise operational procedures to streamline disaster response efforts, ensuring timely and efficient action during emergencies while maintaining a focus on recovery and rehabilitation.

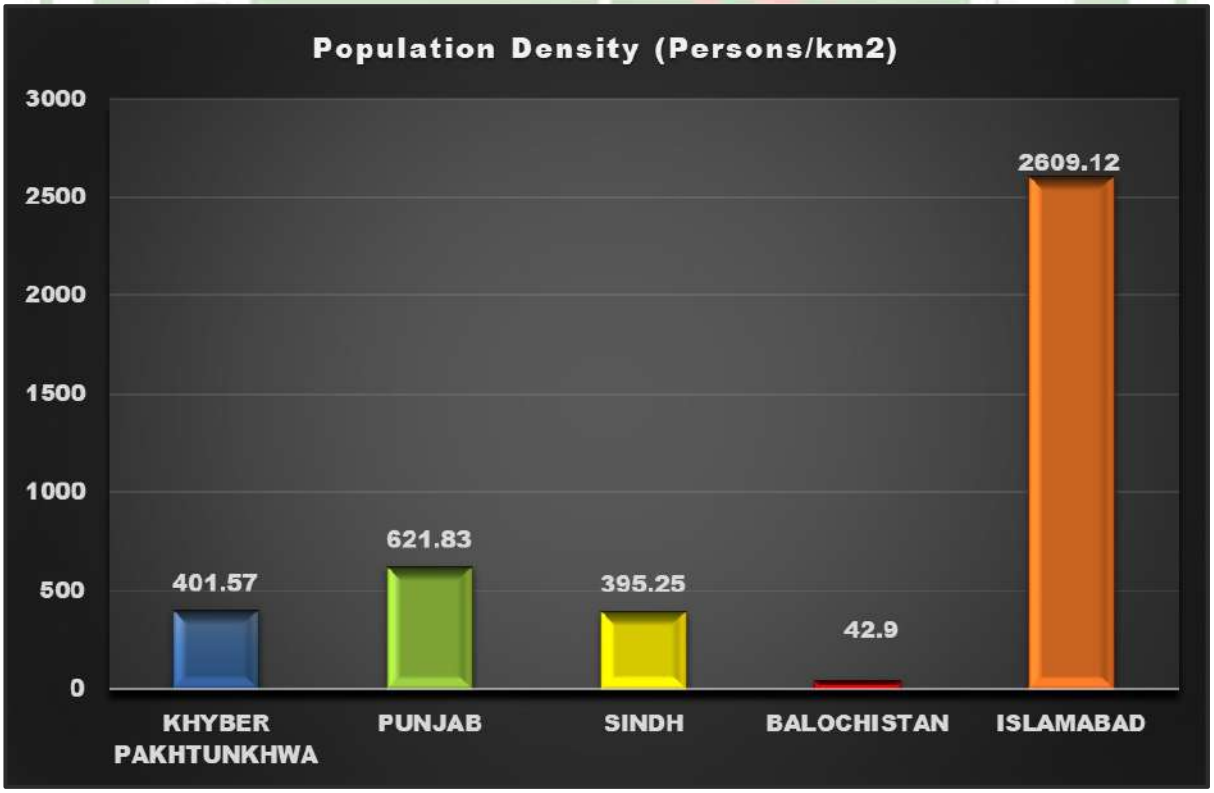
p. **Knowledge Sharing**. Collaboration between National Institute of Disaster Management (NIDM) and various universities to promote research, education, and training in disaster management. This collaboration includes developing curricula and conducting workshops aimed at enhancing academic understanding and practical skills in the field.

7. **Geographical Features**. Pakistan is characterized by its diverse geographical features, which include mountains, fertile plains, plateaus, and deserts. The eastern region is dominated by the flat Indus Plain, while the western part features the Balochistan Plateau. In the north and northwest, Pakistan is home to the Karakoram Range, one of the highest mountain ranges in the world. Notably, K2, the second-highest mountain globally, is located in Gilgit-Baltistan, along with the impressive Baltoro Glacier, which stretches 63 kilometers and is one of the longest glaciers outside the polar regions. The Indus River, which flows for approximately 3,180 kilometers, is considered the lifeline of Pakistan. Other significant rivers include the Jhelum and Chenab, categorized as Western Rivers, and the Ravi, Beas, and Sutlej, which are classified as Eastern Rivers.

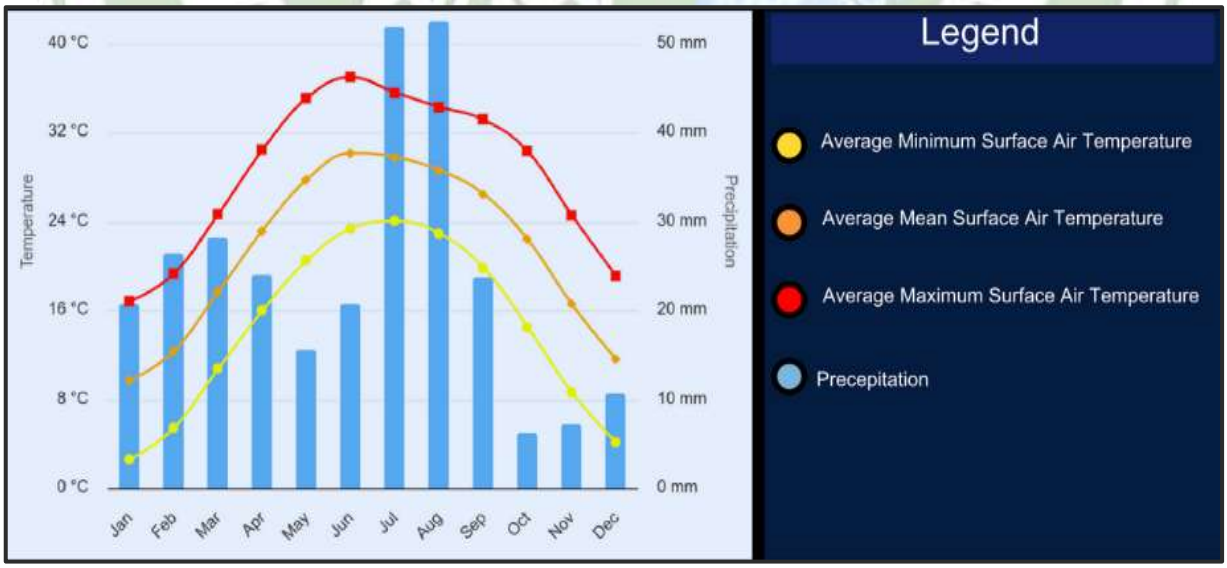


8. **Demographics**. With a recorded population of 241,499,431 people in the recent census of 2023, Pakistan has now secured its position as the world's fifth-most populous country. The intercensal population data reveals a notable growth trend, surging from 33.74 million in Census 1951 to 241.49 million in 2023, indicating a population surge of 207.75 million individuals over the past 72 years. Pakistan has had substantial population growth over the last three to four decades, resulting in an overall cumulative increase of 615.74% since 1951. As of 2023, the present population density in Pakistan stands at 303.35 individuals per sq.km. When examining population density on a provincial level, it is evident that Islamabad is experiencing a significant and rapid increase in population. According to the Population Census report of 2023, the overall population density is 303.35 persons/Km2. The province-wise population density shows that Islamabad's population is increasing at an enormous rate.



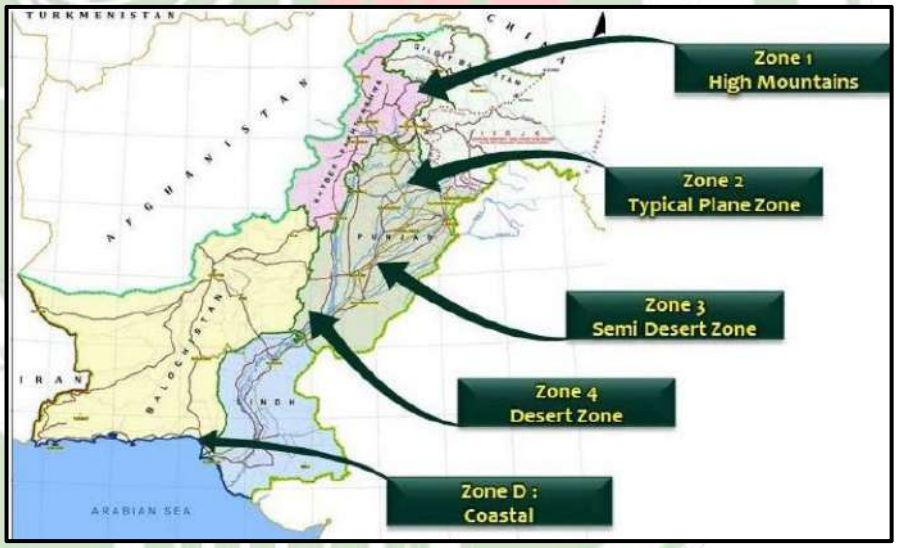


9. **Climate**. In Pakistan, the weather is mainly dry, and the average yearly rainfall is less than 297.6 mm. However, there's a noticeable climate difference between the Northern and Southern regions. The average annual temperature is around 22.45°C. In the plain areas, the hottest months are usually from June to August, and temperatures can sometimes go beyond 50°C during this period. However, the coastal areas of Sindh and Balochistan Provinces tend to have warmer summers. The winter months, spanning from December to February, see temperatures dropping significantly in the northern, western, and northwestern mountains, making these regions the coldest during winter, often accompanied by heavy snowfall. For instance, District Skardu experiences temperatures as low as -6°C to -8.7°C in December and January. Similarly, Districts Quetta and Ziarat in Balochistan Province also undergo severe winters with snowfall on their mountains. The country receives rainfall from two major sources i.e., the monsoon during the summer months and the westerly depressions during the winter months. However, most of the rainfall is received during the monsoon season (mid-June to September) which sometimes causes severe flooding in different areas of the country.



10. **Administrative Features**. Pakistan operates as a federal republic, divided into four provinces; Balochistan, Khyber Pakhtunkhwa, Punjab, Sindh, one special region – Gilgit Baltistan and the self-administered State of Azad Jammu & Kashmir, each with its own government led by a Chief Minister, and in AJ&K's case their own Prime Minister. These are further subdivided into divisions, districts, and tehsils for effective local administration. Administratively, the country is further divided into 28 divisions, 129 Districts, and 526 Tehsils/Talukas. Additionally, there are 586 Urban Areas, including some megacities.

11. **Hazard Profile**. Pakistan's diverse geography presents a unique landscape that is prone to a variety of natural disasters across its five distinct zones. Pakistan is situated at the crossroads of various tectonic plates and characterized by diverse geographical features, natural disasters pose significant risks to its population and infrastructure. The country frequently experiences earthquakes, particularly in regions such as Kashmir and Khyber Pakhtunkhwa and Balochistan with notable events like the 2005 Kashmir earthquake leaving lasting scars on communities. Additionally, Pakistan is prone to devastating floods during the monsoon season, affecting millions of people and causing widespread damage to homes, agriculture, and infrastructure. The coastal areas of Balochistan and Sindh also face the threat of tropical cyclones and tsunamis. Droughts further exacerbate challenges, particularly in arid regions such as Balochistan, Southern Khyber Pakhtunkhwa, Southern Punjab and Interior Sindh, leading to water scarcity and agricultural losses. Apart from natural hazards, various human-induced hazards also have created threats to society, the economy, and the environment including natural habitat and livestock. These hazards encompass industrial, technological, and transport accidents, oil spills, urban fires, civil conflicts, and more.



12. **Floods**. Pakistan is one of the top five South Asian countries most affected by floods on an annual average. Flooding is the most frequent natural disaster in the country, causing widespread loss of life and severe damage to infrastructure and property. The main cause of floods is the tropical monsoon depression system, which develops over the Bay of Bengal between July and September. Floods in Pakistan can be categorized into five main types; riverine floods, flash floods, urban floods, glacial lake outburst floods, and coastal floods. The most vulnerable Districts across the country have been identified for planning, mitigation and early warning purposes. Details are as below: -

Areas	Districts
Balochistan	Bolan, Chagai, Gwadar, Jaffarabad, Jhal Magsi, Kech, Kharan, Khuzdar, Lasbela, Naseerabad, Nushki and Sibbi
Khyber Pakhtunkhwa	Buner, Charsadda, Nowshera, Swat, Chitral, D.I. Khan, Upper Dir, Lower Dir, Kohistan, Kurram, Lakki Marwat, Malakand, Mansehra, Mardan, North Waziristan, Orakzai, Peshawar, Shangla, South Waziristan, Swabi and Tank
Punjab	Bhakkar, D.G. Khan, Gujranwala, Gujrat, Jhang, Khushab, Layyah, Mianwali, Muzaffargarh, Narowal, Rahim Yar Khan, Rajanpur, Rawalpindi, Sialkot and Sheikhupura
Sindh	Badin, Dadu, Ghotki, Jacobabad, Thatta, Mirpurkhas, Jamshoro, Qambar, Karachi, Kashmore, Khairpur, Larkana, Sanghar, Shahdadkot, Shikarpur, Sukkur, Tando Muhammad Khan and Thatta
Gilgit-Baltistan	Astore, Chilas, Diamer, Ghanche, Gilgit, Ghizer, Hunza, Nagar and Skardu
State of AJ&K	Bagh, Bhimber, Muzaffarabad, Neelum and Poonch

13. During the past 74 years (since 1950), the country has faced annual flooding of varying degrees during moonsoon season which has affected millions of people & livlihoods across the country, causing losses and damages leading to enormous economic impacts. Details are below: -

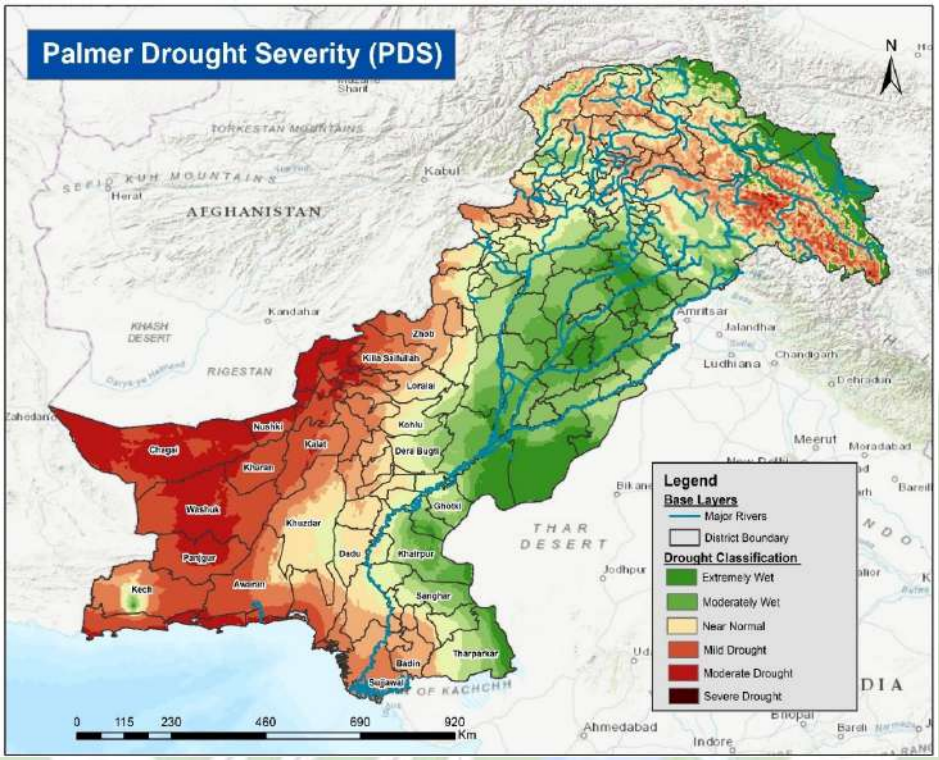
Years	Deaths	Villages Affected	Years	Deaths	Villages Affected
2024	320	6,500	**2008**	112	1,021
2023	280	4,800	**2007**	230	2,035
2022	1,739	81,000	**2006**	131	2,477
2021	230	5,000	**2005**	130	1,500

Years	Deaths	Villages Affected	Years	Deaths	Villages Affected
2020	423	1,500	**2004**	85	400
2019	240	1,000	**2003**	484	4,476
2018	249	1,000	**2001**	219	50
2017	160	300	**1995**	591	1,000
2016	217	1,000	**1992**	1,008	13,208
2015	238	3,093	**1988**	508	1,000
2014	367	4,065	**1978**	393	9,199
2013	234	2,000	**1976**	425	18,390
2012	571	11,978	**1973**	474	9,719
2011	520	38,000	**1957**	83	4,498
2010	1,985	17,553	**1956**	160	11,609
2009	73	2,000	**1950**	2,190	10,000

14. **Drought**. Drought is a prolonged period of abnormally low rainfall, leading to a shortage of water and significant impacts on agriculture, ecosystems, and human populations. In Pakistan, droughts have caused severe damage in recent years, particularly in Balochistan, Sindh, and Southern Punjab, where annual rainfall is as low as 200-250 mm. The most vulnerable Districts across the country have been identified for planning, mitigation and early warning purposes. Details are as below: -

Areas	Districts
Balochistan	**Severe** – Awaran, Gwadar, Kech, Kharan, Nushki, Panjgur and Washuk **Moderate** – Chaghi, Qila Abdullah and Pishin
Khyber Pakhtunkhwa	Chitral, D.I. Khan, Karak
Punjab	**Severe** – Bahawalnagar, Bahawalpur, Bhakkar, D.G. Khan, Muzaffargarh, Rajanpur & Rahim Yar Khan **Moderate** – Attock, Chakwal, Jhelum, Khushab, Layyah, and Mianwali
Sindh	**Severe** – Dadu, Jamshoro, Qambar, Shahdadkot, Tharparkar and Umerkot **Moderate** – Badin, Shaheed Benazirabad, Karachi, Khairpur, Mirpurkhas and Thatta

15. **Pakistan Drought Severity**. In order to enable more holistic planning for droughts in the country, a national level cataloging has been undertaken to index possible drought severity in the country. This effort utilised the Palmer Drought Severity Index (PDSI), which ultilises historical precipitation and temperature data to study moisture supply and demand with hydrometeorological models. Detailed Map showing the PDSI below: -



16. Historically, Pakistan has experienced many periods of drought across the country. Punjab experienced its worst droughts in 1899, 1920, and 1935, while Khyber Pakhtunkhwa suffered severe droughts in 1902 and 1951. Sindh faced devastating droughts in 1871, 1881, 1899, 1931, 1947, and 1999. The most severe drought at a national scale occurred from 1998 to 2001, with widespread and serious consequences across the country. These droughts caused affected millions of people across the country causing widescale loss to livelihood and economy. Details are as below: -

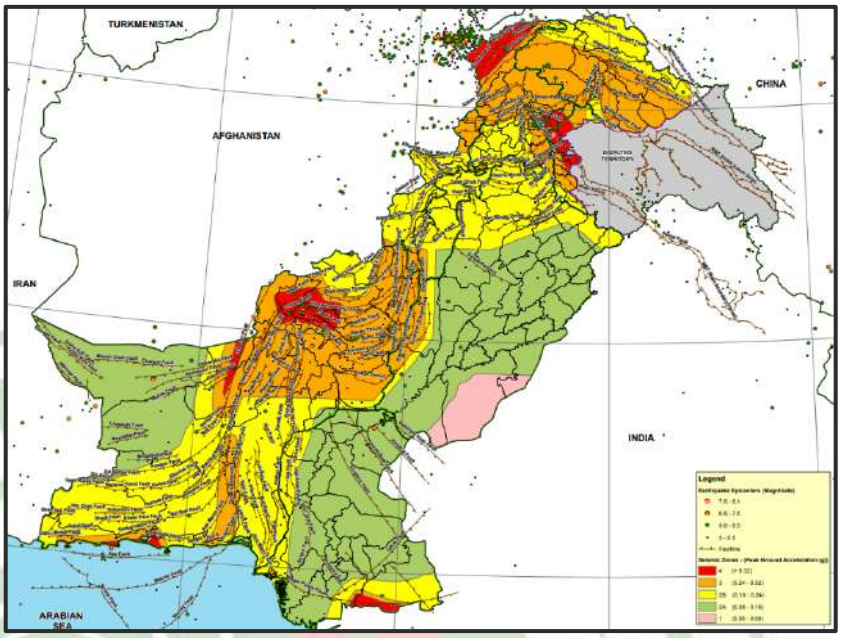
Years	Regions	Pers Affected	Key Impacts
2022	Sindh, Balochistan	2.3 million	Food insecurity, population displacement
2021	Sindh, Balochistan	2 million	Food insecurity, livelihood loss
2020	Sindh, Balochistan	1.8 million	Agriculture and livestock

2018 - 2019	Sindh, Balochistan	2.2 million	Water crisis, food shortages, humanitarian interventions
2016 - 2017	Tharparkar (Sindh), Balochistan	2.5 million	Crop failure, rise in malnutrition
2013 - 2014	Tharparkar (Sindh)	1 million	Famine like conditions, child malnutrition, livestock loss
2009	Sindh, Balochistan	1.5 million	Water shortages, population displacement
1997 - 2002	Balochistan, Sindh, Punjab	3 million	Widespread food insecurity, livelihood loss, population displacement
1971	Balochistan, Khyber Pakhtunkhwa	500,000	Water stress, reduced crop yields
1967 - 1969	Sindh, Balochistan	2 million	Severe water scarcity, decline in livestock, crop failure
1951 - 1952	Sindh, Balochistan	1 million	Agricultural losses, food shortages

17. **Earthquake**. Pakistan is situated in a highly seismic zone, lying along the Hindukush, Karakorum, Himalaya (HKH) mountain ranges in the north, and the Koh-e-Sulaiman Mountain range in the west. The region is also affected by the Chaman fault line near Quetta and the Makran Subduction Zone (MSZ) along the coastal area. Over the past and present centuries, many earthquakes have impacted the area now constituting Pakistan. Earthquakes typically occur along the Himalayas, Karakoram, Hindukush (HKH) and Koh-e-Sulaiman Mountain range, as well as along the Chaman fault near Quetta and the Makran fault on the coast. The most vulnerable Districts across the country have been identified for planning, mitigation and early warning purposes. Details are as below: -

Provinces	Districts
Balochistan	Awaran, Barkhan, Dera Bugti, Gwadar, Jhal Magsi, Kachhi, Kalat, Kech, Kharan, Khuzdar, Qila Abdullah, Lasbela, Loralai, Mastung, Musakhel, Naseerabad, Nushki, Panjgur, Pishin, Quetta, Sherani, Sibbi, Sohbatpur, Washuk
Khyber Pakhtunkhwa	Bannu, Charsadda, Hangu, Karak, Kohat, Lakki Marwat, Mardan, Peshawar, Swabi, Khyber, Kurram, Mohmand
Punjab	Attock, Bhakkar, Chakwal, D.G. Khan, Gujranwala, Gujrat, Jhelum, Khushab, Mandi Bahauddin, Mianwali, Narowal, Rajanpur, Rawalpindi, Sargodha, Sialkot
Sindh	Badin, Central Karachi, East Karachi, Korangi, Malir, South Karachi, West Karachi
Islamabad	Islamabad

18. Pakistan has been catagorised into 5 specific seismic zones across the country keeping in mind the numerous fault lines running across the length and breadth of the country. The zones are 1, 2A, 2B, 3 and 4, which denote increasing seismic risk in the zoned areas of the country. Zonation process was undertaken by a panel of seismic experts in order to enable both the govt and public in ensuring that holistic and comprehensive planning, development and construction of infrastructure projects is undertaken in country.

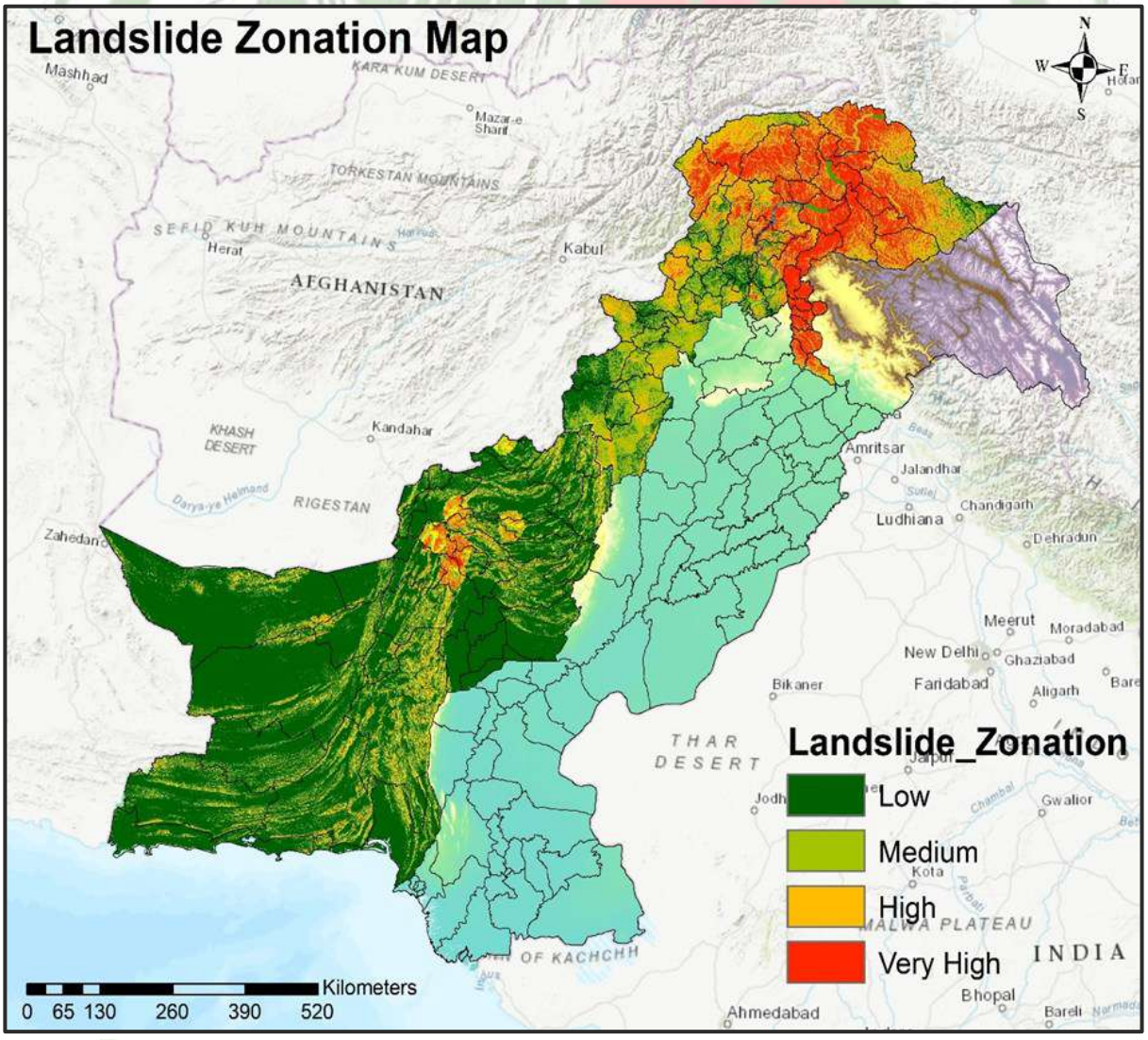


19. Historically, the two most devastating earthquakes struck Pakistan, occurred at Quetta in 1935, registering over 6.5 on the Richter scale and resulting in the deaths of 35,000 people and at Kashmir in 2005, registering 7.6 on the Richter scale, causing losses and damages across the northern parts of the country leading to 73,338 deaths. Three additional earthquakes of note occurred in 2008 at Ziarat, Balochistan registering 6.4 on Richter scale causing 166 deaths, 2013 at Awaran, Balochistan registering 7.7 on Richter scale causing 386 deaths and 2015 in Hindukush Region affecting areas of Khyber Pakhtunkhwa registering 7.5 on Richter scale causing 280 deaths. Earthquakes in the country have affected millions of persons, causing devastating losses and damages, economic and livelihood impacts. Details of recent historical earthquakes in the country is below: -

Year	Mw	Epicentre / Location	Deaths	Key Impacts
2024	6.2	Chitral, KP	8	Landslides, damaged buildings in remote areas
2023	6	Swat, KP	12	Infrastructure damage, felt in northern areas
2022	5.7	Kech, Balochistan	15	Moderate damage to buildings, several aftershocks
2021	5.9	Harnai, Balochistan	20	Destroyed homes, triggered landslides in remote areas

Year	Mw	Epicentre / Location	Deaths	Key Impacts
2019	5.6	Mirpur, State of AJ&K	40	Significant damage to roads and buildings
2015	7.5	Hindukush Region, Tajikistan	399	Destroyed homes, damaged infrastructure and triggered landslides.
2013	7.7	Awaran, Balochistan	825	Large-scale destruction in Awaran, affected remote communities
2008	6.4	Ziarat, Balochistan	166	Massive landslides, significant destruction in rural areas
2005	7.6	Muzaffarabad, AJ&K	87,350	Most devastating earthquake, widespread damage hundreds of thousands displaced
2001	7	Kutch, Pak-Ind Border	20	Limited impact in Pakistan
1974	6.2	Pattan, KP	5,300	Severe damage to infrastructure, high casualties
1945	8.1	Makran Coastline, Balochistan	4,000	Tsunami generated, affecting coastal regions in Balochistan & Sindh
1935	7.7	Quetta, Balochistan	30,000	One of the deadliest earthquakes in South Asia, widespread destruction

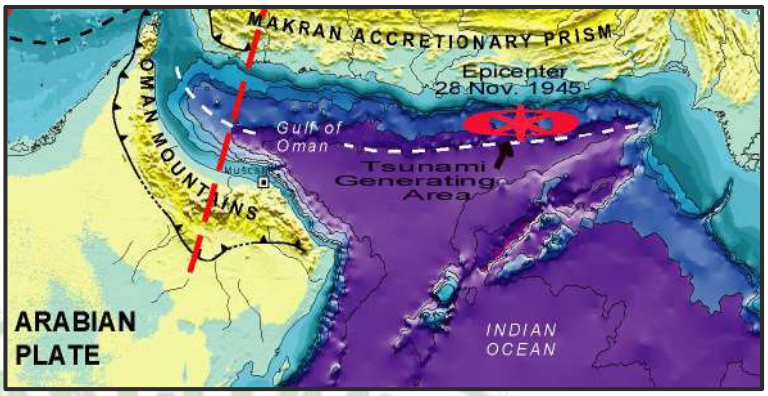
20. **Landslides**. Pakistan faces significant risk from landslides, which can occur on any terrain with the right combination of soil, moisture, and slope angle. Landslides can be triggered by natural events such as rain, floods, and earthquakes, as well as human activities like terrain grading, cutting, filling, and overdevelopment. The cracks and instability caused by these earthquakes can lead to massive landslides, especially during heavy or prolonged rains, resulting in loss of lives and agricultural land. Landslides have posed serious threats to the lives and livelihoods of large populations in the affected areas. National zonation of landslide hazards has been undertaken by NDMA and respective PDMAs / GBDMA / SDMA. Zonation has been catagorised as low, medium, high and very high in corresponding areas of the country. These details have been detailed in the map below: -



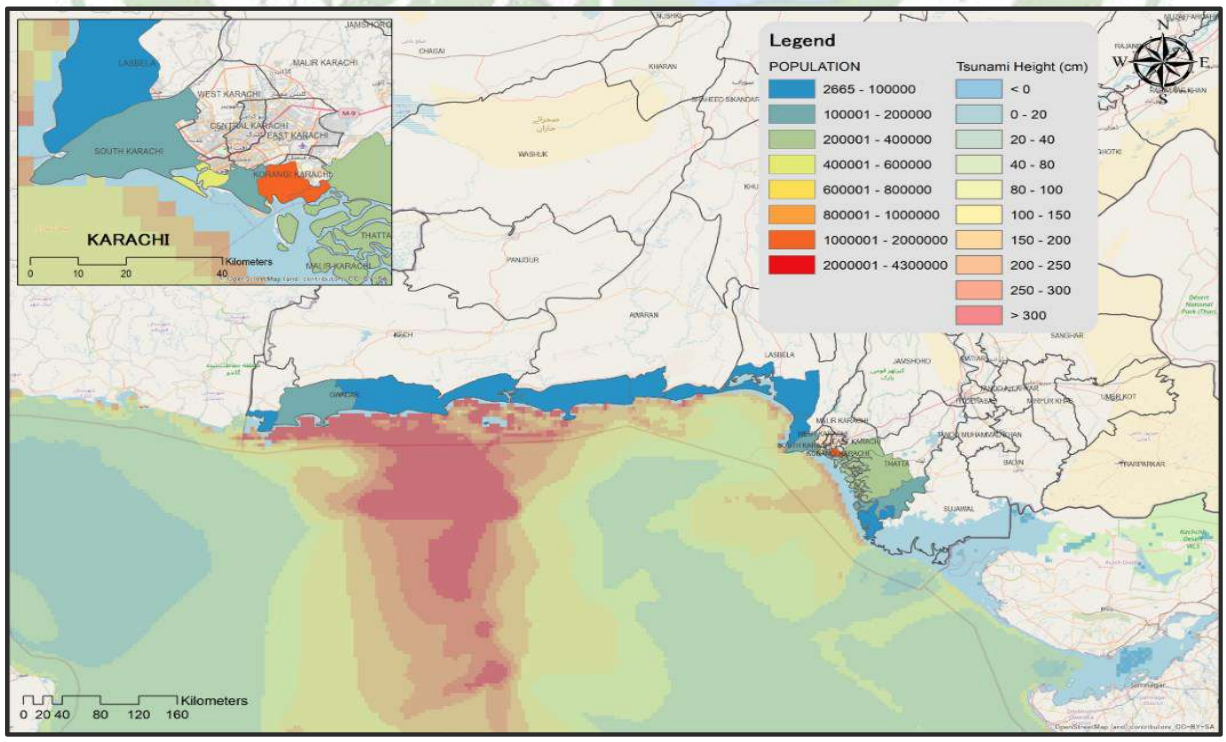
21. Historically, a number of major landslides were triggered in northern parts of Pakistan following the earthquakes of 1972, 2005, and 2015 in addition to the landslides which were triggered due to hydrometeorological and human activities in vulnerable and at-risk areas of the country. Details of historical events are below: -

Year	Location	Deaths	Key Impact
2024	Kaghan, KP	10+	Landslides damaged homes, roads blocked for weeks
2023	Swat, KP	9+	Rain-induced landslides, disrupted infrastructure
2022	Ghanche, GB	12+	Landslides following rains, blocked KKH, cutting off access
2020	Skardu, GB	15+	Landslides caused by heavy rains, affected road access
2019	Neelum, AJ&K	70+	Snow-triggered landslides during winter, buried homes
2017	Murree, Punjab	14	Heavy rain-induced landslides, caused road blockages
2016	Gilgit Baltistan	14	Flash floods and landslides blocked roads and damaged property
2015	Chitral, KP	33	Landslides caused by heavy rains, destroyed houses
2013	Neelum, AJ&K	16	Landslides triggered by heavy rains, damaged homes
2012	Skardu, GB	25+	Landslides damaged roads, isolating villages
2010	Attabad, GB	20	Created Attabad Lake, submerged villages, displaced thousands
2008	Hunza, GB	60+	Landslides blocked rivers, leading to flooding
2005	Muzaffarabad, AJ&K	1,000+	Earthquake-triggered landslides, mass casualties, entire villages buried
1992	Muzaffarabad, AJ&K	250+	Triggered by heavy rainfall, caused severe destruction
1982	Karakoram Highway	150+	Landslides blocked roads, resulting in casualties and isolation
1974	Murree, Punjab	200+	A large landslide due to heavy rains, destroying homes

22. **Tsunami**. Pakistan's coastline, particularly along the Makran Subduction Zone (MSZ) in the Arabian Sea, is vulnerable to tsunamis due to tectonic and geological activity where the Arabian plate subducts beneath the Eurasian plate. While significant undersea earthquakes, like the 1945 Makran earthquake that caused a deadly tsunami, have occurred, not all earthquakes in this region can generate tsunamis. Tsunami formation depends on factors such as the earthquake's magnitude, depth, and the vertical displacement of the sea floor. Although the risk of tsunami generating events is lower compared to other hazards, coastal areas remain vulnerable, highlighting the dire importance of early warning systems along coastal areas of the country.



23. **Tsunami Simulations**. NDMA has undertaken detailed simulations of tsunami along the coastline of Pakistan triggered by activity of the Makran Subduction Zone (MSZ) in the Arabian Sea. Districts identified as vulnerable to tsunami hazard include Gwadar, Lasbela, Korangi, Malir, South Karachi, West Karachi, Thatta and Sujawal. Detailed models of simulated wave height and population at-risk have been undertaken and the same is shared below: -



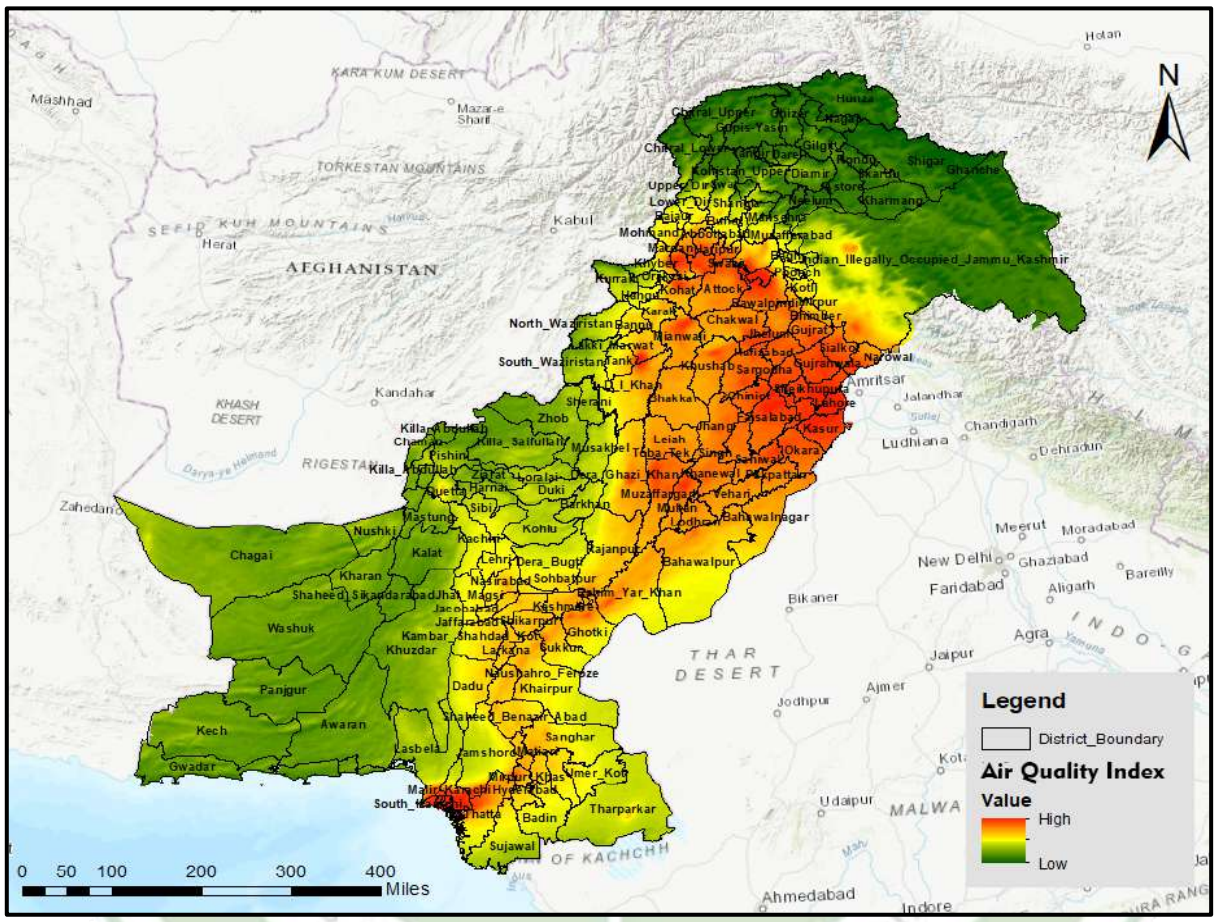
24. Historically a number of tsunami alarms have been triggered along Pakistan's coastline. However, only one tsunami of note has occurred in recent history, which occurred on 28 November 1945 due to a massive seismic event in Arabian Sea at the Makran Subduction Zone (MSZ), the earthquake registered on seismic monitors as 8.3 on the Richter scale in early morning hours. The tsunami which was generated had peak wave heights of 15 metres and caused upward of 4,000 deaths along coastal areas of the Pakistan. The proximity of major cities like Karachi to epicentres for major submarine earthquake activity, underscores the dire need to enhance local capacities for disaster risk reduction, mitigation, early warning and response planning in order to minimise loss of life, property and environment. Detail of historical tsunami events affecting the country include: -

Date	Magnitude	Location	Deaths	Run-up (metres)	Key Impact
12 Nov 2017	6.3	Arabian Sea, Near Karachi	Nil	Tsunami Alert (No run-up)	Earthquake near Karachi triggered a tsunami warning along the Sindh Coast, no major impact occurred
24 Sep 2013	7.7	Awaran, Balochistan	Nil	Tsunami Alert (No run-up)	Earthquake generated a tsunami warning, no significant waves or run-up recorded.
28 Nov 1945	8.1	Makran Coast, Balochistan	4,000	13 – 15	Most devastating tsunami in Pakistan's history, caused by an earthquake at MSZ. Significant damage to coastal areas, especially Gwadar and Karachi

25. **Smog**. Smog is a type of air pollution that combines smoke, fog, and chemical pollutants, often occurring in urban areas with high levels of industrial emissions and vehicle exhaust. In Pakistan, particularly during the winter months, cities like Lahore, Multan, Faisalabad, Rawalpindi and Peshawar experience severe smog, especially in December, when thick fog obscures sunlight and leads to poor air quality. Contributing factors include industrial emissions, vehicle pollution, and agricultural burning, along with weather conditions like temperature inversions and high humidity. Lahore and Multan in Pakistan consistently rank among the top cities globally for air pollution during this period, resulting in serious health impacts, including respiratory issues and increased mortality. Smog is primarily caused by emissions from vehicles, industries, excessive waste production & incineration, dust from surrounding desert areas, burning of agricultural waste, brick kilns, etc. The problem has only worsened over the last few years. Efforts to mitigate smog involve improving air quality monitoring, regulating emissions, and raising public awareness about pollution sources and effects. The most vulnerable Districts in Punjab have been identified for planning, mitigation and early warning purposes. Details are below: -

Province	Districts
Punjab	Lahore, Faisalabad, Sheikhupura, Nankana Sahib, Kasur, Gujrat, Narowal, Sialkot
Khyber Pakhtunkhwa	Peshawar and Mardan

26. NDMA has undertaken simulations of the annual winter season smog risk across the country and developed a detailed hazard map to highlight areas where the highest projected smog risk can occur. This has been catagorised as low, medium and high using colour coding system showing possible Air Quality Index (AQI) levels. Map is shared below: -



27. Major smog events in the country have only recently started occurring annually since 2016 in Pakistan. These events have been cataloged below: -

Year	Location	Duration	Key Impact	Health Effects
2024	Lahore, Multan & Faisalabad Punjab	Oct - Jan	Smog continues to worsen, stricter traffic control measures introduced to mitigate	Rising respiratory illnesses, increased health advisories
2023	Lahore, Punjab Karachi, Sindh	Nov - Dec	Karachi also started experiencing high smog levels; Lahore's smog remained severe	Lung infections, eye irritation, cardiovascular complications
2022	Lahore, Punjab	Nov - Jan	High AQI readings, significant disruption in daily life, protests over pollution levels	Increased outpatient visits for lung and heart-related issues

Year	Location	Duration	Key Impact	Health Effects
2021	Lahore, Punjab	Oct - Jan	Lahore became one of the most polluted cities globally, severe drop in visibility	Respiratory illnesses spiked, higher incidents of asthma and chronic bronchitis
2020	Lahore, Punjab	Oct - Dec	Smog reached hazardous levels, forced closure of schools, health emergency declared	Increased rates of pneumonia, cardiovascular problems, and asthma
2019	Lahore, Punjab	Nov - Dec	Air quality index (AQI) reached hazardous levels, government issued health advisories	Increased cases of bronchitis, respiratory infections, long-term lung damage
2018	Lahore, Punjab	Oct - Nov	Worst air quality in Lahore, massive spike in particulate matter (PM2.5), international attention on the crisis	Eye irritation, throat infections, rise in hospital admissions for breathing difficulties2017
2017	Lahore & Faisalabad, Punjab	Nov - Jan	Dense smog disrupted road traffic, health warnings issued, exacerbated air pollution crisis	Hospitals overwhelmed with respiratory illnesses, increased risk of lung infections
2016	Lahore, Punjab	Oct - Dec	First major smog event, causing severe visibility reduction, schools and flights disrupted	Respiratory issues, eye irritation, increase in asthma cases

28. **Avalanche**. An avalanche is a rapid flow of snow and ice down a mountainside, often triggered by factors such as heavy snowfall, temperature fluctuations, or human activities like skiing and construction. In Pakistan, the regions of Gilgit-Baltistan, Azad Jammu & Kashmir, and the northern parts of Khyber Pakhtunkhwa experience seasonal snow avalanches, putting local communities living near these areas at heightened risk. While avalanches can cause significant disruptions and pose dangers to life and property, their impact is generally localized, primarily affecting the communities in proximity to the affected regions. Therefore, effective monitoring and preparedness measures are

crucial to safeguarding these vulnerable populations. The most vulnerable Districts to avalanche risk in Pakistan have been identified for planning, mitigation and early warning purposes. Details are below: -

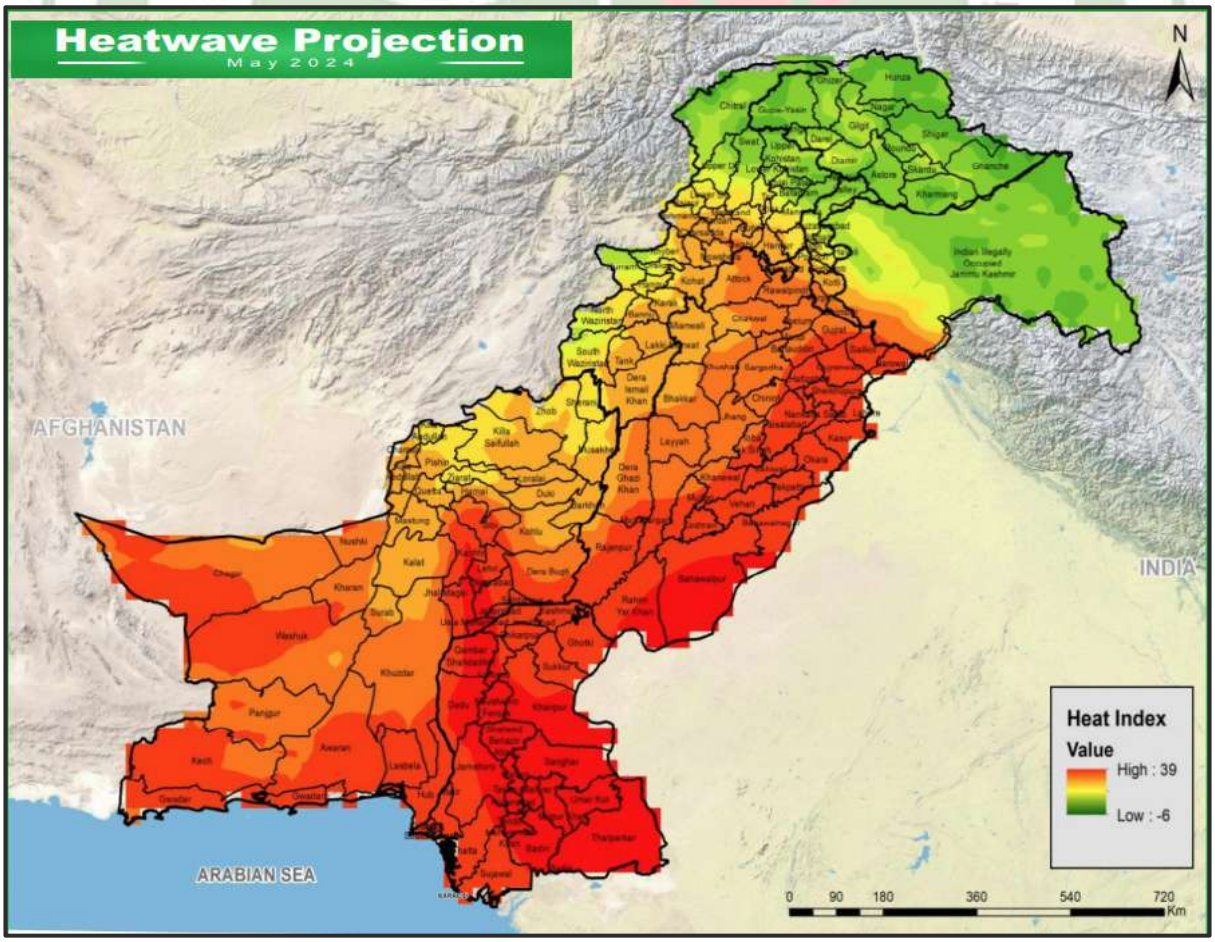
Areas	Districts
Khyber Pakhtunkhwa	Chitral and Upper Kohistan
Gilgit-Baltistan	Astore, Gilgit, Ghanche, Ghizer and Skardu
State of AJ&K	Neelum and Hattian Bala

29. Pakistan has a long history of deadly avalanches recorded since 1950, a total of 14 deadly avalanches have occurred in the country causing hundreds of deaths. Brief record of deadly avalanches in the country is below: -

Year	Location	Deaths	Key Impact
2024	Skardu, GB	8+	Destroyed infrastructure, homes, and blocked key access roads, disrupting daily life and isolating communities.
2023	Astore, GB	9+	Destroyed homes, claiming lives, blocking major roads, cut off essential supplies and response efforts.
2022	Gurez, AJ&K	10+	Killed several people and disrupted access for rescue operations.
2020	Neelum, AJ&K	100	Destroyed homes and killed residents.
2017	Neelum, AJ&K	14	Killed residents and destroyed several homes, relief operations hampered by blocked roads
2015	Chitral, KP	20+	Deaths and damaged homes.
2012	Gyari, Siachen Glacier, GB	140	Buried Pakistani Army Camp in Siachen, one of the deadliest avalanche events in the region's history
2010	Skardu, GB	38	Avalanche buried army outpost, killing soldiers and damaging infrastructure
2002	Siachen Glacier, GB	129	Indian and Pakistani soldiers on both sides of the Line of Control killed by avalanches in the Siachen Glacier region.
1993	Neelum, AJ&K	55	Killed number of people and blocked roads.
1982	Skardu, GB	70	Snow and avalanches buried several villages in the region, cutting off communication and aid.
1974	Kaghan, KP	100+	Massive avalanche destroyed villages, leading to significant casualties and displacement.
1970	Nanga Parbat Base Camp, GB	15	Avalanche struck a mountaineering team, causing fatalities and disrupting expeditions

30. **Heatwaves**. In recent years, heatwaves have become a significant threat in urban areas of Pakistan, particularly in cities like Karachi, Hyderabad, and Sukkur. These events are characterized by excessively high temperatures, high humidity, and minimal wind, lasting for several days and creating hazardous living conditions. The risks associated with heatwaves are especially pronounced for vulnerable populations, such as the elderly and those with pre-existing health conditions.

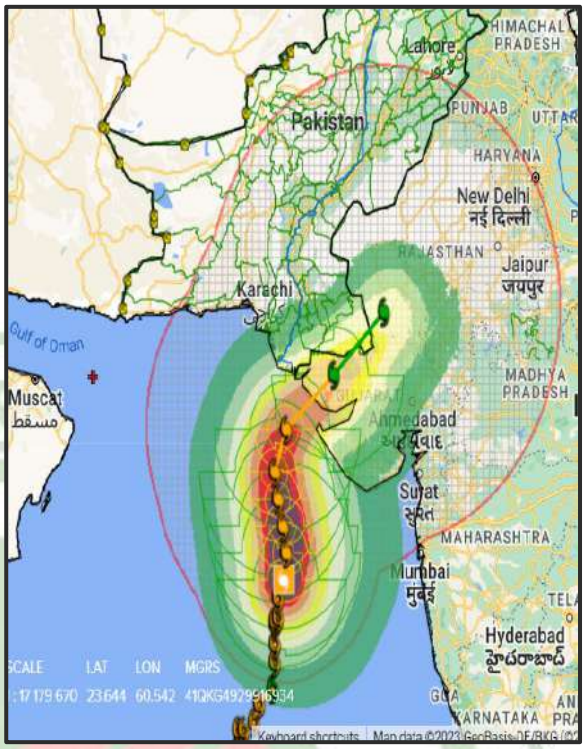
As urban areas continue to grow, the likelihood and impact of heatwaves are expected to increase, underscoring the importance of implementing effective heat management strategies and raising public awareness to mitigate health risks. NDMA undertakes annual risk mapping for heatwaves, generating colour coded map indicating low, medium and high heatwave risk in the country. Detailed map generated for Summer Season 2024 is below: -



31. Historically the country has suffered from heatwaves a number of times with deadly consequences, historical records maintained since 1987 have catalogued these events. In June 2015, Karachi experienced a particularly intense heatwave that resulted in over 1,200 deaths, while 65,000 were affected. Heatwaves are becoming more common with climate change & global warming. Details are as below: -

Year	Location	Deaths	Peak Temp (°C)	Key Impact
2024	Lahore, Punjab Karachi, Sindh	35+	48	Lahore & Karachi faced extreme heat, leading to deaths, dehydration, and power shortages.
2023	Jacobabad	30+	50	Jacobabad & surroundings faced extreme heat, causing deaths
2022	Karachi, Sindh, Punjab	40+	48	Heatwave affected southern & central Pakistan, impacting agriculture and causing heat-related deaths.
2020	Sindh, Punjab	400	47	Heatwaves in Sindh & Punjab caused deaths, with water shortages worsening the situation.
2019	Jacobabad, Sindh	50	51	Jacobabad experienced extreme temperatures, one of the hottest places on earth during this period, leading to deaths and illnesses.
2018	Karachi, Sindh	65	44	Caused deaths and affecting vulnerable population like outdoor workers and elderly.
2017	Karachi, Sindh	180	46	Led to deaths, mostly among the elderly and laborers working outdoors.
2015	Karachi, Sindh	1,200	49	One of the deadliest heatwaves in Pakistan's history, causing widespread deaths due to heatstroke. Hospitals were overwhelmed, & the power grid failed during Ramadan.
2010	Punjab, Sindh	300	48	Electricity shortages, leading to fatalities.
2007	Karachi, Sindh	200	45	Led to deaths, particularly affecting the elderly and outdoor laborers.
2000	Sindh, Punjab	500	47	Caused deaths across Sindh and Punjab, with hospitals overwhelmed by heatstroke patients.
1991	Karachi, Sindh	523	44	Severe Heatwave in Karachi caused hundreds of deaths, power outages and water shortages.

32. **Tropical Cyclone**. Cyclones occur occasionally in Pakistan, but their intensity, magnitude, and track have become more severe in recent years due to climate change and global warming in the surrounding seas & oceans. On average, Pakistan experiences tropical cyclones about twice a year, typically during the cyclone season, which coincides with the summer months of May to June and extends into October and November. The development of a cyclone involves four stages: it begins as a low-pressure area, evolves into a well-marked low-pressure area, progresses to a depression, and then transitions to deep depression before maturing into a fully formed cyclone, which is then named. This increasing severity highlights the need for improved preparedness and response strategies to mitigate the impacts of cyclones on vulnerable coastal communities. The coastline of Pakistan is vulnerable to tropical cyclones, especially the Sindh Coastline, adverse effects from tropical cyclones can cause storm surge along low-lying coastal areas. The most vulnerable Districts to tropical cyclone risk in Balochistan and Sindh have been identified for planning, mitigation and early warning purposes. Details are below: -



Provinces	Districts
Balochistan	Awaran, Gwadar, Kech and Lasbela
Sindh	Badin, Karachi, Sujawal and Thatta

33. Historically, tropical cyclones have caused large-scale damage to the coastal areas of Pakistan in Balochistan and Sindh. Historical records maintained since 1964 show that 10 tropical cyclones have caused impacts to the coastal areas of Pakistan. Details of the tropical cyclones are as below: -

Year	Name	Location	Deaths	Key Impact
2023	Cyclone Biparjoy	Karachi, Sindh	10	Heavy winds and rainfall affected Karachi and the coastal areas of Sindh, disrupting transportation, causing flooding and destroying homes.
2021	Cyclone Tauktae	Karachi, Sindh	Nil	Heavy rain and strong winds to Karachi resulted in power outages and flooding but no major casualties.
2019	Cyclone Vayu	Karachi, Sindh	Nil	A major cyclone that narrowly missed Karachi, bringing heavy rainfall and causing flooding in coastal areas.
2015	Cyclone Ashobaa	Sindh & Balochistan	Nil	Brought heavy rains to southern Pakistan, but weakened before reaching the coast, causing minimal damage.
2014	Cyclone Nanuak	Sindh & Balochistan	Nil	Heavy rainfall along coastal regions, minimal damage due to cyclone weakening before landfall.
2010	Cyclone Phet	Sindh & Balochistan	20	Brought heavy rainfall and flooding, affecting coastal towns in Sindh and Balochistan. While casualties were low, infrastructure damage was extensive.
2007	Cyclone Yemyin	Sindh & Balochistan	730	Hit the Makran coast, particularly Gwadar, Ormara, and Pasni, causing severe flooding, damaging homes, and leading to displacement.
2001	Cyclone 01A	Karachi, Sindh	100+	Struck Karachi and coastal areas, damaging fishing villages and infrastructure, causing flooding and displacement.
1999	Cyclone 02A (Keti Bandar Cyclone)	Sindh & Balochistan	6200	A devastating cyclone, particularly in Thatta and Badin, destroying villages and killing thousands, with widespread agricultural loss.
1964	Cyclone 02	Karachi, Sindh	450	Severe damage to coastal areas, homes, and infrastructure.

Snowstorms / Blizzards. A snowstorm, or blizzard, is a type of precipitation that falls as snow, typically occurring during the winter months of December and January in Pakistan. In the northern regions, the temperature at the top of the storm clouds is cold enough to form snowflakes, leading to snowfall. When this snowfall is accompanied by strong gusts of wind and significant accumulation of snow, it results in a snowstorm or blizzard. These events can last for several hours, often causing heavy snow accumulation either from new snowfall or from the redistribution of previously fallen snow due to strong winds. Such conditions can lead to disruptions in daily life, particularly in mountainous and northern areas of Pakistan. Historically, a number of snowstorms / blizzards have occurred in the country, details of major events are as below: -

Year	Location	Deaths	Key Impact
2023	Gilgit-Baltistan & Khyber Pakhtunkhwa	15+	Road closures to isolated villages, and led to fatalities due to exposure and avalanches.
2022	Murree, Punjab	23	Trapped tourists in vehicles during a heavy snowstorm, leading to asphyxiation and exposure to cold.
2020	Murree, Punjab & State of AJ&K	100+	Avalanches in Neelum and Murree, leading to road closures, isolation of towns & dozens of deaths.
2019	Gilgit-Baltistan & State of AJK	22	Avalanches in Gilgit-Baltistan and AJK caused road blockages and fatalities.
2016	Chitral, KP	30+	Triggered multiple avalanches in Chitral, killing residents and destroying homes.
2010	Murree, Punjab, Khyber Pakhtunkhwa & Gilgit-Baltistan	22	Trapped thousands of tourists in Murree and surrounding regions, leading to multiple deaths from cold exposure.
2008	Quetta, Balochistan	20+	Road blockages and fatalities due to cold exposure.
2005	State of AJK	200+	Causing avalanches and further isolating earthquake survivors.
1996	Khyber Pakhtunkhwa, Gilgit-Baltistan	50+	Trapped residents in remote areas, causing deaths due to cold exposure and avalanches.

34. **Plague of Locusts**. Locusts are a type of short-horned grasshopper known for their ability to change behaviour and form swarms of adults or bands of hoppers, which can be dense and highly mobile. In Pakistan, the arid regions of Balochistan, Southern Khyber Pakhtunkhwa, Southern Punjab, Sindh and Southern areas of State of AJ&K. have become ideal breeding grounds for locusts, making these provinces particularly vulnerable to locust infestations. As a transboundary pest, locusts travel freely across large parts of Africa and Asia, posing a significant threat to crops and rangeland vegetation. In Pakistan, locust swarms can devastate agricultural production, causing widespread damage to crops, and adversely affecting food security in the region and affecting air travel. The most vulnerable Districts to plague of locusts in the country have been identified for planning, mitigation and early warning purposes. Details are below: -

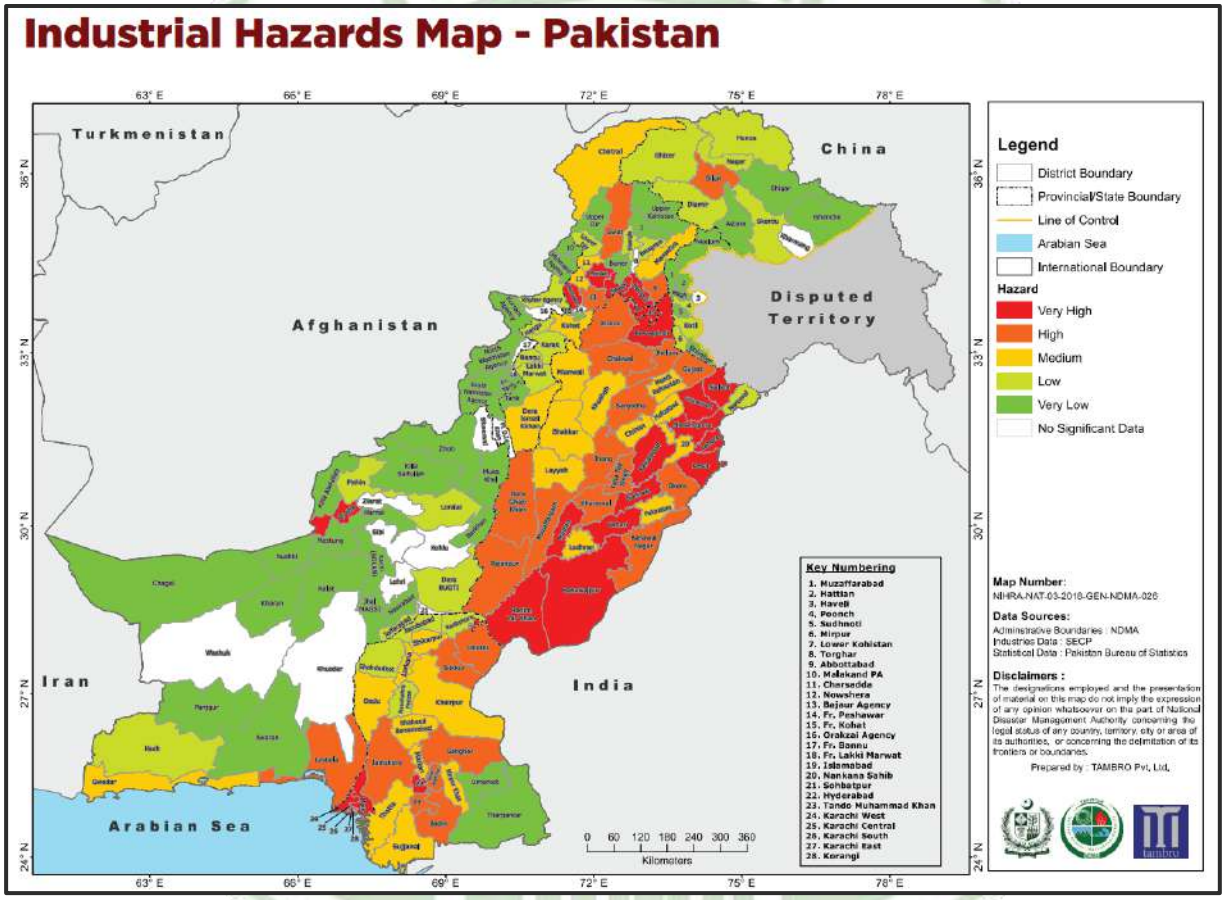
Areas	Districts
Balochistan	Chagai, Kharan, Panjgur, Khuzdar, Awaran, Pishin, Barkhan, Harnai, Kohlu, Washuk, Gwadar, Kech and Lasbela
Khyber Pakhtunkhwa	D.I. Khan, Bannu, Lakki Marwat, Orakzai, Kurram and Tank
Punjab	Rahim Yar Khan, Bahawalpur, Bahawalnagar, Bhakkar, Khushab, Rajanpur and Muzaffargarh
Sindh	Badin, Sukkur, Khairpur, Shaheed Benazirabad, Sanghar, Tharparkar and Ghotki
State of AJ&K	Bagh, Bhimber, Muzaffarabad, Neelum and Poonch

35. In Pakistan, the history of Locust attacks revealed that during the last 100 years before partition, the country remained under the grip of Desert Locust invasions in 1926, 1952, 1962, and 1992. In Pakistan, 38% of the area of Pakistan (60% in Balochistan, 25% in Sindh, and 15% in Punjab) are breeding grounds for the Desert Locust, whereas the entire country is under threat of invasion, in case if the Desert Locust is not contained in the breeding regions. During the tenure 2019-20, locust attacks caused large-scale damage to cropped areas and fruit orchards in 54 Districts of the country, including 31 Districts of Balochistan, 8 of Khyber Pakhtunkhwa,

10 of Punjab, and 5 districts of Sindh. Historical overview of locust attacks in the country is below: -

Year	Affected Areas	Impact (Hectares)	Key Impact
2023	Punjab & Sindh	70,000+	Residual locust activities continued but controlled more effectively due to enhanced early warning systems and pesticide use.
2022	Balochistan & Sindh	100,000+	Smaller infestations observed in 2022 but still affected crops in the Thar Desert and southern regions of Sindh.
2021	Balochistan, Punjab & Sindh	300,000+	Continuing threat from leftover swarms from the 2019-2020 invasion; significant damage to cotton, wheat, and fodder crops.
2019-2020	Balochistan, Punjab & Sindh	860,000	One of the largest and most devastating locust invasions in decades, affecting multiple regions and leading to the declaration of a national emergency in 2020.
2013	Punjab & Sindh	50,000+	Widespread damage to cotton and wheat crops, especially in central Sindh.
2010	Balochistan & Sindh	80,000+	Moderate locust swarms affected crops in southern Pakistan, primarily Balochistan.
2001	Sindh & Balochistan	60,000+	Smaller infestation compared to the past but still significant crop losses, especially in Sindh.
1993	Balochistan, Punjab & Sindh	250,000+	One of the most severe infestations, particularly affecting cotton and wheat crops in southern Punjab and Sindh.

36. **Industrial & Technical Hazards**. Pakistan has a thriving industrial base catering to petroleum, chemicals, manufacturing, metals, automobile, heavy manufacturing, garment, textiles, pharmaceuticals, food & beverages, etc. sectors supplying both the local and international markets. Presently the country is undergoing rapid industrialisation in various parts of the country, developing special industrial zones and expanding existing industrial bases in cities such as Karachi, Hub, Lahore, Gujrat, Gujranwala, Sialkot and Faisalabad. In light of this, NDMA undertook macro-level assessment of industrial risk to enable more holistic planning and mitigation measures. Industrial Hazard Risk Map is below: -



37. With industrial development, there always remains a risk of disasters and Pakistan has not been immune. There have been numerous small scale industrial incidents throughout the country since independence, however only a few major incidents have occurred. Please find details of major historical industrial incidents below: -

Year	Location	Deaths	Details
2023	Karachi	4	Fire erupted in an automobile parts factory and spread to neighbouring garment factory, injuring 14 persons.

Year	Location	Deaths	Details
2021	Karachi	16	Fire erupted in a multi-story chemicals factory.
2021	Wah	3	Explosion in ordinance factory, injuring 2 persons.
2020	Karachi	2	Fire erupted at Shell Oil Depot at Keamari Terminal-1 when Pakistan State Oil Pipeline caught fire, injuring 5 persons.
2017	Bahawalpur	219	Oil tanker truck carrying 50,000 litres of petrol overturned on N-5 Highway. A large number of individuals gathered to pilfer leaking petrol. Subsequently, a spark occurred igniting the fuel and causing massive explosion, injuring 34 persons.
2015	Lahore	45	Fire erupted in a shopping bag factory at Sundar Industrial Estate causing building collapse, injuring 150.
2012	Karachi	260	Fire erupted in a garment factory at Baldia Town, single most deadly industrial incident of country.
2012	Lahore	25	Fire erupted at a shoe factory, injuring 13 persons.
2003	Karachi	Nil	MV Tasman Spirit ran aground at Clifton Beach, spilling 30,000 metric tonnes of crude oil.
1988	Rawalpindi	93	Explosion at arms depot at Ohjri Camp occurred, injuring 1,100 persons.

38. **Contributing Factors to Vulnerabilities**.

Excessive Population Growth and Inadequate Urban Planning

Exposure of Vulnerable Elements in Hazard Prone Areas

High Dependency on Agriculture Sector, Poor Health

Lack of Institutional Capacity for Disaster Risk Reduction

Weak Early Warning Systems and Lack of DRR Investment

39. **Mitigation (Pre-Investment for DRR) and Preparedness Phase**. The importance of pre-disaster investment in risk assessment and preventive measures cannot be overstated, as it serves as a crucial first step in minimizing the impact of disasters. Here are key directions and strategies outlined by the National Disaster Management Authority (NDMA) to reduce the risk of future disaster damages:

40. **Promoting Proper Strategies and Programs**. NDMA, based on disaster risk assessments, will advocate for and implement strategies, plans, and programs. These measures will include both structural and non-structural approaches, with a specific focus on reducing economic losses and damage to critical infrastructure and basic services, aligning with the Sendai Framework for Disaster Risk Reduction (SFDRR).

41. **Strengthening Critical Infrastructure**. The National Disaster Management Authority (NDMA), guided by disaster risk assessments, will advocate for and implement comprehensive strategies, plans, and programs. These measures will encompass both structural and non-structural approaches, specifically aimed at reducing economic losses and damage to critical infrastructure and essential services. This aligns with the Sendai Framework for Disaster Risk Reduction (SFDRR). To enhance its response capabilities, the NDMA has established the National Emergency Operations Centre (NEOC). This centre will serve as a central hub for coordinating disaster response efforts, managing resources, and facilitating communication among various stakeholders. By integrating real-time data and improving situational awareness, the NEOC will play a vital role in ensuring a swift and effective response to emergencies, ultimately contributing to a more resilient national disaster management system.

42. **Addressing Climate Change and Urban Expansion**. In line with this initiative, the National Disaster Management Authority (NDMA) convened all relevant stakeholders at the National Emergency Operations Centre (NEOC) for simulation exercises (SIMEXs). These exercises are designed to enhance coordination and collaboration among agencies, enabling them to develop effective strategies for mitigating risks associated with evolving environmental and urban challenges. By fostering a proactive dialogue and sharing best practices, the NDMA aims to build resilience in vulnerable areas and improve overall disaster preparedness.

43. **Formulating Disaster Prevention Investment Projects**. NDMA recommends the formulation of plans for disaster prevention investment projects. This involves capacity building for diverse stakeholders and human resource development to ensure the effective and efficient implementation of countermeasures directly contributing to disaster risk reduction.

44. **Integrating DRR with SDGs**. Recognizing the interconnectedness of disaster risk reduction and sustainable development, NDMA emphasizes the need to integrate efforts. Collaboration with SDGs, such as environmental conservation and social inclusivity, allows for a more comprehensive and sustainable approach to mitigating disaster risks.

45. **Anticipatory Actions**. As per UNDRR, anticipatory actions are defined as "acting ahead of predicted hazardous events to prevent or reduce acute humanitarian impacts before they fully unfold." Anticipatory actions can be implemented through pre-agreed financing for pre-planned interventions that are activated when a certain trigger point is reached, or through informal approaches based on forecasts. NDMA is actively working to implement anticipatory action strategies to mitigate the impacts of disasters.

46. **Vulnerable Groups**. The Gender and Child Cell (GCC) of NDMA recognizes the profound and disproportionate impact of disasters on vulnerable groups, particularly women, girls, children, elderly, persons with disabilities, and other marginalized communities. In Pakistan, natural disasters, earthquakes, floods, heatwaves, drought, GLOF / Landslides, Avalanches, Local Riverine Floods, Forest Fires, Monsoon, Late Rains, Urban Smog, Fog and Snow Hazards have become increasingly frequent and severe due to climate change, affecting millions annually. Given these alarming realities, mainstreaming of interventions for vulnerable groups is not only a response to disaster management but also a commitment to promoting human rights and social justice in Pakistan.

47. **Mobile National Emergencies Operation Centre (M-NEOC)**. The Mobile National Emergencies Operation Centre (M-NEOC) is an innovative initiative established by the National Disaster Management Authority (NDMA) to help enhance disaster response capabilities across Pakistan in the event of a disaster or emergency situation. This mobile unit is designed to be rapidly deployed to any disaster-affected areas in the country, providing a mobile centralized command, control and coordination

facility in the field where all relevant stakeholders can meet. Key Features of M-NEOC includes: -

a. **Rapid Deployment**. The M-NEOC can be quickly set up in response to emergencies, ensuring immediate operational support for disaster response and recovery efforts.

b. **Enhanced Coordination**. Equipped with communication technologies and resources, the M-NEOC facilitates real-time coordination among various stakeholders, including government agencies, NGOs, and local communities.

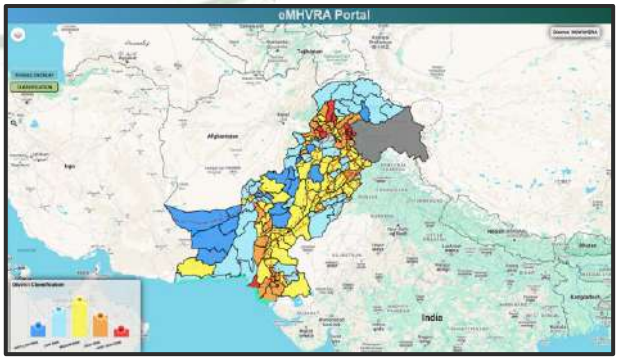
c. **Data Management**. The centre supports the collection, analysis, and dissemination of vital information during emergencies, helping to inform decision-making and resource allocation.

d. **Training & Capacity Building**. The M-NEOC serves as a platform for training local responders and volunteers, enhancing the overall preparedness and resilience of communities to future disasters.

e. **Community Engagement**. By being present in affected areas, the M-NEOC promotes active engagement with local populations, ensuring that their needs and concerns are addressed during disaster response efforts.

48. The successful operationalization of a NEOC was essential for maximizing the capabilities of emergency response agencies and ensuring a unified, efficient, and coordinated approach to managing crises at the national level. To ensure better coordination and synergy of efforts through the establishment of the Mobile National Emergency Operations Centre, the NDMA aims to strengthen the country's disaster management framework, enabling more efficient and effective responses to emergencies while fostering resilience in vulnerable communities.

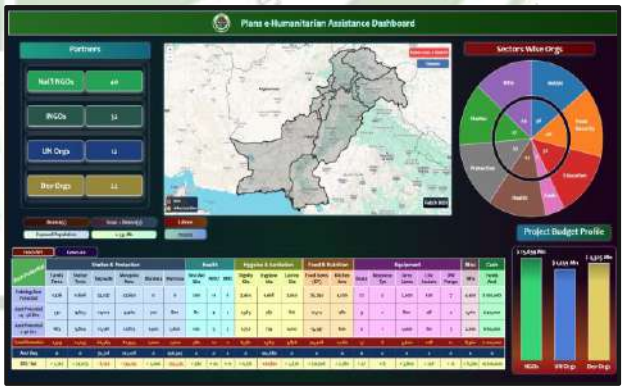
49. **e-MHVRA**. e-Multi-hazard Vulnerability and Risk Assessment is among the priority in NDMP, stressing a need to conduct detailed vulnerability and risk assessments at national and district level, and development of a digital database. e-MHVRA is a study and a database that analyses different types of



hazards and put that into a system for comprehensive evaluation while considering the probability of occurrence of multiple hazardous events for interrelations. The aim of the e-MHVRA study and database is to identify hazard prone areas to significant details, have an overall view of the effects and identification/mapping of expected loss due to the occurrence of various natural hazards etc. e-MHVRA is primarily a decision support system that can be considered as a first step towards evidence based and integrated Disaster Risk Reduction (DRR), planning and mainstreaming the risk informed development at local, provincial, and national levels. This system can significantly assist decision makers for contingency and response planning well before the onset of likely disasters. NDMA is in a process of conducting e-MHVRA across the country (which is also available in NEOC's Portal) to get the better Risk Knowledge is also expected to facilitate decisions and mechanisms related to Disaster Risk Financing in Pakistan. Such a repository of risk knowledge will be useful for making decisions related to infrastructure and other development related investments and projects at all levels of governance, particularly at district level.

50. **Clusterization of NGOs / INGOs / Development Partners.** NDMA has developed a strategic system to improve coordination and transparency within the network of NGOs and INGOs operating across the country. To streamline disaster response and preparedness efforts, NDMA implemented a cluster model for these organizations, categorizing them sector-wise based on their focus areas such as health, education, water, sanitation, shelter, food security, and emergency response.

51. As part of this initiative, NDMA launched a dedicated portal that provides real-time information about the operations of each NGO and INGO. This portal displays detailed data on which organizations are active in specific districts and sectors, allowing both the government and stakeholders to identify coverage gaps and avoid redundancy. By categorizing the NGOs/INGOs geographically and by sector, NDMA aims to create an organized response framework that enhances efficiency in resource allocation and targeted intervention during disasters.



52. This system improves NDMA's capacity for disaster management by offering a centralized platform for monitoring the activities and reach of various organizations, fostering better collaboration, accountability, and alignment with national priorities. The portal is a significant step toward coordinated disaster response in Pakistan, especially in times of increasing climate-induced disasters.

53. During recent disasters, specifically in the earthquake in 2005, floods in 2010, 2022 & 2024, the cluster approach worked very successfully to avoid duplication, strengthen partnerships, by improving prioritization and clearly defining the role and responsibilities of humanitarian organizations. At respective levels, the various clusters are activated which have been closely working with the District, Provincial, and National Disaster Management Authorities to get updates and take appropriate actions to provide relief services to the disaster affected areas.

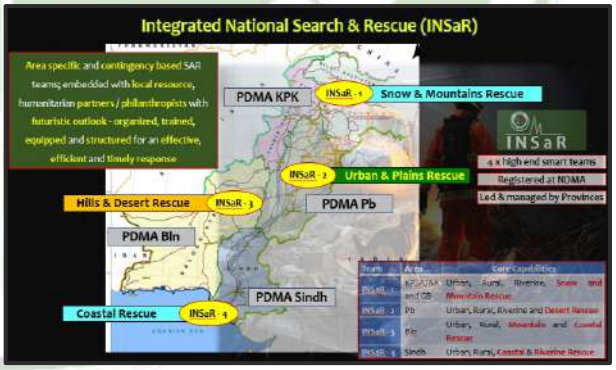
54. **Conduct of SIMEXs**. In close coordination with the PDMAs / GBDMA / SDMA and Federal / Provincial Government Organizations, NDMA conducts regular simulation exercises by involving key emergency response organizations. One of prominent activities is conducting the National Simulation Exercises (SIMEXs) regularly at National and Provincial levels. SIMEX is aimed at evaluating preparedness and coordination between the national and provincial disaster management authorities and humanitarian community by rehearsing coordination arrangements and emergency response at different tiers in given situations. At provincial levels, respective PDMAs / GBDMA / SDMA regularly conduct Mock exercises with the support of other Provincial Government and Non-Government Organisations. They conduct mock exercises at the local level by involving general public and local government.

55. **Emergency / Disaster & Declaration of Emergency**. After the onset of an emergency or disaster, a declaration of emergency may be undertaken depending upon the nature and magnitude of the emergency / disaster. Disaster situations of a smaller scale which are within the capacity of District authorities would be managed by the respective District Authorities on the declaration of emergency by the province. In case of a disaster situation of a relatively larger scale that overwhelms the capacities of District Governments/Authorities but is within the capacities of Provincial Governments/Authorities to manage shall be declared by the province. In case of a disaster situation on a large scale that overwhelms the capacities of provincial

Government/Authorities but is within the capacities of the Federal Government to manage primarily through National Emergency. However, international assistance can be requested by the Government in case of a disaster situation of a mega scale when the National Capacities are overwhelmed.

56. **MIRA**. Multi-sector Initial Rapid Assessment (MIRA) has been conducted in Pakistan after the floods of 2012, 2014, 2022 and during Tharparkar Drought of 2014. MIRA-2014 lessons learned exercise highlighted two major grey areas in implementation including unavailability of trained enumerators at the time of assessment and lack of a validation mechanism. Subsequently, rounds of revisions were conducted to keep MIRA up-to-date and relevant in emerging situations. The standard guidelines for MIRA have been developed by NDMA with technical support of UNOCHA to provide operational guiding principles on roll-out and implementation of MIRA. Approach adopted for these Guidelines is inclusive, comprehensive, decentralized, and focused on institutionalization of initiatives. MIRA methodology document has been exclusively consulted for the development of these Guidelines. To familiarize and practice the MIRA tools, NDMA has conducted a series of trainings throughout the country and has developed a pool of trained professionals from various government organizations. Currently, NDMA is in the process of developing a more straightforward and accessible questionnaire for MIRA.

57. **Integrated National Search & Rescue (INSaR)**. INSaR provides standardised search and rescue protocols based on international best practices, including frameworks set by the United Nations' International Search and Rescue Advisory Group (INSARAG). These protocols establish well-defined procedures for coordinated and efficient SAR missions, benefiting countries by elevating their disaster response effectiveness. For Pakistan, aligning with INSAR standards means that SAR teams will perform with improved coordination,



organization, and operational efficiency, ultimately enabling them to respond to disasters at the highest global standards.

58. Partnering with INSaR opens access to specialized SAR training, covering rapid assessment, logistics, and victim extraction in complex and high-risk scenarios. INSaR's expertise includes using advanced tools such as thermal imaging, seismic detection, and GIS mapping, which enhance Pakistan's SAR capabilities. Integrating these resources equips local teams with the technical skills to locate and rescue people effectively, even in challenging environments. INSaR collaboration enables swift mobilization of international resources and SAR personnel during large-scale disasters. This means that when an emergency occurs, Pakistan can rely on INSaR to supplement local efforts with experienced teams, equipment, and logistical support, addressing resource gaps and reducing response time. NDMA's recent resource mapping efforts can include INSaR-trained responders and global SAR assets, improving Pakistan's capability to track expertise and connect with INSaR resources in real-time. By integrating INSAR participants, NDMA's portal can provide up-to-date information on SAR resources within Pakistan and from international partners, facilitating a more responsive and comprehensive disaster management approach.

59. **Asia-Pacific INSARAG Regional Chair**. As the INSARAG Regional Chair for the Asia-Pacific region in 2024, NDMA Pakistan was honoured to organize a series of interconnected events in close collaboration with the United Nations. These events were scheduled to take place between 21st & 29th October 2024, across two venues.

60. The first of these was the International Rescue Challenge which was set to be held from 21-22 October, followed by the Asia Pacific Earthquake Response Exercise, which took place from 23-25 October. Both events were hosted in Lahore and were designed to promote regional cooperation, enhance rescue capabilities, and facilitate knowledge exchange among participating countries.

61. The culmination of these activities was the Asia Pacific Regional Meeting, which was held in Islamabad from 28-29 October. This prestigious meeting brought together

representatives from UNOCHA, INSARAG-certified member states from the Asia-Pacific region, international and national NGOs, search and rescue agencies, governmental officials, and academic institutions with focus on fostering collaboration, sharing best practices, and strengthening the region's disaster response mechanisms.

62. **Anticipatory Actions**. Technological advances are making it easier than ever before to forecast the occurrence and location of hydrometeorological hazards. With the growing availability of information comes a growing responsibility to act on it. Anticipatory actions are an approach which systematically links early warnings to action plans, delivery mechanisms and funding modalities that are designed to protect communities, assets, and infrastructure when a hazard poses imminent danger.

63. The historical context of anticipatory approaches in disaster management is a journey marked by the lessons learned from past crises, the evolution of technology, and a growing recognition of the need for a proactive stance in the face of an increasingly complex and unpredictable world.

64. The 20th century witnessed a gradual realization & shift in the disaster management paradigm. As scientific advancements and technological innovations progressed, early warning systems emerged as a crucial component. The devastating impacts of events like Kashmir Earthquake in 2005, mega floods in 2010 & 2022 highlighted the limitations of reactive approaches, prompting a revaluation of disaster management strategies.

65. The evolution of technology played a pivotal role in shaping anticipatory approaches. Improved meteorological tools, satellite imagery, and data analytics empowered scientists and decision-makers to predict and monitor potential hazards through advanced modelling with greater accuracy. Early warning systems transformed from basic alert mechanisms to sophisticated tools that provided timely and precise information about impending disasters, allowing for more proactive responses. The increasing awareness of climate change further underscored the need for anticipatory approaches. The changing climate patterns brought about an escalation in the frequency and intensity of extreme weather events. This recognition prompted the integration of climate science into disaster management, emphasizing the importance of understanding long-term trends and implementing measures to adapt and mitigate risks.

66. On the global stage, the evolution of anticipatory approaches is reflected in international collaborations and frameworks. Organizations like the United Nations and regional bodies have advocated for a shift towards proactive strategies. Initiatives such

as the Sendai Framework for Disaster Risk Reduction (2015 - 2030) emphasize the importance of anticipatory measures in reducing disaster risk and building resilient communities.

67. Anticipatory action interventions are being piloted across the globe and its applications show that anticipatory action can help people avoid disaster losses and protect vital assets by providing support before a crisis takes place. In recent years, the anticipatory action community of practice has built up a wealth of lessons ranging from the design, setup and activation of anticipatory action programmes, strategies and policies. Beyond that, it also makes financial sense to operate this way, as budgets struggle to keep up with immediate crisis response needs. Cost–benefit analyses, including experiences, have shown that for every USD 1 invested in anticipatory action, families can gain between USD 0.8 and USD 7 in benefits and avoided losses. In addition to financial benefits, anticipatory action can support resilience efforts, curb malnutrition, protect food security, and provide a more dignified approach to aid.

68. As anticipatory actions have grown in popularity, so has the language used to define the approach. NDMA seeks multilateral consensus on the parameters, standards and best practices in anticipatory action. For anticipatory action to be effectively mainstreamed, inclusive of vulnerable groups, and sustainable, there is a need for clarity, coherence, and integrity of concept. Without these, we risk a fragmentation of approaches and evidence, preventing a scaling of best practice.

69. NDMA has developed a comprehensive guide on anticipatory actions. This guide serves as a valuable resource, outlining best practices, methodologies, and frameworks for implementing anticipatory measures in disaster risk management. By providing clear guidance, NDMA aims to empower stakeholders at all levels to take informed, proactive steps to mitigate the impacts of disasters before they occur, ultimately enhancing community safety and resilience.

70. National and provincial governments are already implementing policies and plans that can be considered anticipatory actions, or are conducive to anticipatory actions, but these are not necessarily linked into the global discourse and community of practice. Examples of anticipatory action practices include evacuating people and livestock based on a typhoon warning or installing water storage facilities on the premise of drought warnings. Anticipatory action builds on these existing systems, with a focus on improving the reliability of how forecasts are translated into early warnings

and adequate and timely actions aimed at protecting the lives and livelihoods of at-risk populations.

71. The classic DRM cycle has a few major components: prevention and mitigation, preparedness, emergency response, and recovery. Anticipatory action sits between preparedness and response, in a window of opportunity between an early warning (or another trigger for action) and the onset of disaster. It builds on preparedness efforts but remains distinct from them, as anticipatory action efforts are always undertaken for a specific and imminent threat. Anticipatory action efforts should consider the complementarity between anticipatory action and emergency response, as anticipatory action is not meant as a standalone but can be followed by an appropriate early response. The integration of anticipatory action into contingency plans is a feasible starting point for this as it can enable the systematic integration of anticipatory action into National DRM plans and policies. Major milestones achieved for implementation of anticipatory action strategies includes: -

a. **The National Coordination Forum on Anticipatory Action (NCF-AA)** was established to bring together stakeholders from government, humanitarian agencies, and the private sector to coordinate efforts and develop a national framework for anticipatory action. Five thematic sub-committees are working on specific areas such as early warning systems, risk assessment, financing mechanisms, and community engagement, with partners working on AA as co-chairs.

b. **1st National Dialogue Platform on Anticipatory Action** was organized to foster a shared understanding of anticipatory action and develop practical recommendations for implementation. In the 1st NDP, Participants discussed the importance of forecast-based financing, early warning early action, and anticipatory humanitarian action. Since the success of the 1st NDP, the platform has been slated for a 2nd iteration, with recommendation to establish it as an annual event.

c. NDMA is also **supporting pilot projects** in various regions to test and refine anticipatory action approaches. These projects focus on areas like flood-prone regions, drought-affected areas, and areas vulnerable to heatwaves. Initiatives include pre-positioning of relief supplies, community-based early warning systems, and cash-based transfers.

72. In consultations, NDMA pointed to a range of anticipatory actions that are already being undertaken or need to be undertaken: -

a. For slow-onset hazards such as droughts, anticipatory action focuses on service provision, critical infrastructure maintenance, and livelihood support. These include the provision of climate-resilient varieties of key crops; maintenance of critical irrigation infrastructure; advice on water storage and water-saving measures at the household level; cash distribution to households that are likely to be affected; and situational monitoring.

b. For fast-onset hazards such as floods, storms and landslides, anticipatory actions focus on information dissemination and risk communication; early warning; and preparation for emergency response. These include disseminating heavy rainfall or storm warnings to the public; strengthening protective infrastructure; preparing budgets and contingency funds for emergency relief assistance; preparing for activation of strategic reserves; and checking and revisiting stockpiles.

73. **Setting-up Anticipatory Actions System**. The systems designed to systematically and reliably enable anticipatory action are crucial components of effective disaster risk management (DRM). These systems, while diverse in their specific structures, typically share three major building blocks that collectively form the backbone of anticipatory approaches. In aligning DRM systems to deliver anticipatory action, we should prioritize integrating these three building blocks into their policies and implementation strategies. This alignment ensures that anticipatory approaches are systematically embedded within the broader disaster management framework.

74. It requires a commitment to investing in advanced technologies, developing comprehensive plans, and establishing financial mechanisms that support proactive initiatives. By placing these building blocks at the core of anticipatory action policy and implementation, governments and organizations can enhance their capacity to reduce the impact of disasters and protect communities from the devastating consequences of unforeseen events. These Building blocks are: -

a. **Risk Information, Forecasting, and Early Warning Systems**. At the core of any effective anticipatory action system lies a robust foundation built on the capacity to gather, analyse, and disseminate accurate risk

information and forecasts. This foundational element is critical for proactively addressing and mitigating potential disasters. Early warning systems emerge as the linchpin of this foundation, playing a pivotal role in providing timely and precise alerts to communities and decision-makers. The sophistication of these systems relies on the integration of advanced technologies, meteorological data, and predictive models, creating a comprehensive approach to anticipating the occurrence, intensity, and potential impact of hazards. These technologies allow for real-time monitoring and data collection, enabling a more granular understanding of environmental conditions and potential risks. Predictive models are a cornerstone of the anticipatory action system, employing computational algorithms to simulate various disaster scenarios based on historical data and current environmental conditions. These models forecast the trajectory and potential outcomes of hazards, allowing decision-makers to assess the level of risk and make informed choices regarding preparedness and response strategies.

b. **Planning, Operations, and Delivery**. The second crucial building block in the foundation of an anticipatory action system involves the meticulous development of comprehensive plans, operational frameworks, and efficient delivery mechanisms. Proactive planning is an essential component, serving as the bridge between the gathered risk information and actionable strategies. This process involves translating complex risk assessments and forecasts into practical and effective plans. These plans encompass a range of aspects, from formulating contingency plans tailored to specific types of disasters to creating evacuation procedures that ensure the swift and orderly movement of populations from high-risk areas. Within the sphere of anticipatory action, proactive planning extends beyond immediate response measures. It includes the strategic mobilization of resources, aligning with the pre-identified risks and potential impact scenarios. Operational readiness is another critical facet of this building block, ensuring that response mechanisms are finely tuned, well-coordinated, and capable of rapid deployment when anticipatory actions are triggered. This involves conducting regular drills

and simulations to test the effectiveness of plans, identify potential gaps, refine operational procedures and operational readiness. The delivery aspect focuses on the actual implementation of planned actions. This stage emphasizes the need for clear and concise communication to ensure that all stakeholders are well-informed about their roles and responsibilities. Ultimately, this building block is a dynamic and interconnected process, requiring continual refinement and adaptation. It integrates proactive planning, operational readiness, and effective delivery mechanisms into a cohesive framework that ensures anticipatory actions are successfully implemented.

c. **Pre-Arranged Finance**. Financial preparedness stands as a cornerstone within the architecture of anticipatory action systems, presenting a critical and strategic component. At its core, pre-arranged finance embodies the proactive measure of securing dedicated funds well in advance of potential disasters. As anticipatory actions demand rapid decision-making and execution, having readily available financial resources is paramount for initiating activities such as early evacuations, stockpiling of essential supplies, and the implementation of other preventive measures. This building block addresses a common challenge faced in disaster management - the unpredictability and urgency of funding needs during crises. By pre-arranging finance, decision-makers can bypass these hurdles and mobilize resources swiftly, ensuring that critical activities are implemented without hindrance. This approach aligns financial investments with anticipated needs, allowing for a more strategic and efficient use of funds. In essence, the pre-arranged finance building block not only expedites the implementation of anticipatory actions but also contributes to the overall effectiveness of disaster response efforts. By ensuring that financial resources are readily available when needed, it transforms the financial dimension of disaster management from a potential bottleneck into a proactive enabler of timely and effective responses, ultimately enhancing the capacity to protect communities and reduce the impact of disasters.

75. **Hazard Specific Anticipatory Actions**. NDMA has developed guiding anticipatory actions specific to various hazards in the country to help stakeholders understand and develop detailed actions at provincial and district levels. These hazards include: -

a. **Smog**

(1) Minimize & control vehicular emissions - strengthening & expanding vehicle inspection regime - Compliance with NEQS/PEQS.

(2) Stringent mechanisms for regulation on non-compliant vehicles, such as emission taxation or penalties.

(3) Expanding Vehicle Inspection and Certification System (VICS) network.

(4) Installation of catalytic converters mandatory - new vehicles.

(5) Electric Vehicles (EVs) Market penetration - expedited through legal mandates, subsidies, & investment in related infrastructure.

(6) Development & improvement of mass transit systems (multi-modal).

(7) Strengthen regulatory control for traffic management.

(8) Promotion of New Energy Vehicles (NEVs).

(9) Import and refining of low sulphur diesel and furnace oil (< 50 ppm) and checking for fuel adulteration.

(10) Plan for gradual phasing out of obsolete technology in engines and retiring excessively old vehicles.

(11) Modernizing brick kilns – Zig Zag Kilns reduce 70% emissions while improving fuel efficiency by 40% than conventional – cost-effective.

(12) Dust control & process improvement in stone crushing units.

(13) Building capacity for technology transfer - establish technology transfer centres to identify appropriate technologies – adoption.

(14) Relocation of industry - Operationalization of Sialkot Tanneries Zone, shifting of steel furnaces, re-rolling mills in northern Lahore / Gujranwala.

(15) Energy efficiency & conservation programmes in selected public sector organizations.

(16) Development of pollution inventories release & transfer registry.

(17) Improved collection & disposal of municipal & industrial waste.

(18) Incentivizing small & medium industrial enterprises for lowering the concentrations of air pollutants.

(19) Ensure implementation of effective administration measures for emissions reduction.

(20) Enforce emission standards for industries - control the emission of key air pollutants - mandatory fitting of particulate filters.

(21) Curtail the quantum of air pollution from agriculture/ livestock sector.

(22) Discouraging & preventing the burning of crop residue and raising awareness among farmers.

b. **Riverine & Urban Flooding**

(1) Identification of low-lying areas prone to pondage and inundation in congested areas of the metropolis.

(2) Strengthening the understanding of flood risk management, floodplain regulations and effective urban planning through capacity building efforts for Municipal Corporations and line departments.

(3) Implementation of necessary measures such as widening, dredging and de-silting of storm water and sewerage drains to maintain their functionality and reduce the risk of urban flooding.

(4) Removal of encroachments along floodplains and drains to reclaim the original extents of water flow, facilitating unobstructed drainage and preventing waterlogging in urban areas during heavy rainfall events.

(5) Regular assessment and maintenance of serviceability and operability of pumping stations responsible for managing stormwater and sewage disposal, establishing robust maintenance protocols and contingency plans.

(6) Training and refresher programs for technical manpower involved in flood management and drainage operations to enhance their skills and knowledge.

(7) Provision of reliable backup electricity arrangements, such as generators for sewage disposal and pumping stations / de-watering pumps to guarantee uninterrupted operation during power outages, enabling efficient drainage and sewage management during flood events.

(8) Establishment of dedicated committees at the municipal level, particularly in major cities, responsible for planning and implementing contingency plans, involving relevant stakeholders and experts / volunteers for a coordinated and proactive approach to flood preparedness / response in urban areas.

c. **Flash Floods**

(1) Awareness drive for local communities based on historical data and vulnerability mapping.

(2) Long-term plans for rehabilitation of populations at risk of flash floods.

(3) Commissioning of emergency services such as Rescue-1122 in mountainous and inaccessible regions. As an interim measure, plan for forward placement of emergency services manpower and relief stores.

(4) Installation of signposts along waterways in regional language for community awareness. These signposts should clearly indicate the threat level of waterways, provide information on protective measures and include contact information of relevant authorities.

(5) Implement special community-based vigilance measures during dark hours and periods of intense rains, utilizing sirens or loudspeaker announcements from mosques.

(6) Strengthen early warning systems to provide timely and accurate information about potential flash floods.

(7) Conduct regular maintenance of drainage systems and infrastructure to ensure efficient water flow and reduce the risk of flash floods.

(8) Enhance coordination and communication between relevant agencies, DM authorities and local communities to facilitate prompt response and evacuation during flash flood events.

(9) Implement land use planning and zoning regulations to restrict human settlements in high-risk flash flood areas.

(10) Promote construction of flood-resistant infrastructure and buildings in flash flood-prone regions.

(11) Provide training and capacity building programs for emergency response teams and volunteers to enhance their readiness and effectiveness in managing flash flood situations.

d. **Glacial Lake Outburst Flood (GLOF)**

(1) Conduct regular monitoring of glacial lakes by relevant authorities (SUPARCO / PMD) to identify vulnerable glacial lake sites / discharge levels before onset of monsoon.

(2) Install early warning systems at GLOF sites that integrate real-time data monitoring, remote sensing and weather forecasting to monitor key indicators and promptly alert authorities / communities about potential GLOF events.

(3) Develop hydrographs along water channels downstream to predict and understand GLOFs more accurately. This will provide crucial information for effective planning and response strategies.

(4) Construct adequate trapping dams with capacity to reduce force and volume of floodwaters to mitigate potential damage to downstream areas and infrastructure.

(5) To prevent lake outbursts, under mentioned civil engineering interventions may be considered. Application of these measures will have to be considered from case-to-case basis: -

(a) Reinforce moraine dams using techniques such as concrete cementing and gabion walls to prevent overtopping of lake water.

(b) Keep volume of stored water in the lake to a safe level; initially by dropping the level and then by excavating a tunnel or deepening the breach of the moraine-dam to retain the lower level, utilizing siphon systems, electrical pumping or controlled blasting.

(6) Utilize geospatial technologies / remote sensing to create accurate and up-to- date hazard vulnerability maps, providing valuable insights into the potential impact of GLOFs on surrounding communities and infrastructure.

(7) Conduct awareness campaigns / community training programs to enhance the preparedness and resilience of local communities, educating them about risks and necessary protective measures.

(8) Establish safe evacuation routes and designated assembly points for affected communities, considering the topography and accessibility of at-risk areas. Conduct regular drills / rehearsals to test the effectiveness of evacuation plans and ensure coordinated responses during GLOF emergencies.

(9) Plan for the permanent relocation of settlements located in high-risk areas prone to GLOFs. Simultaneously, focus on constructing disaster-resilient infrastructure based on thorough hydrological studies.

(10) Foster international cooperation and knowledge exchange in GLOF risk management, leveraging experiences and best practices from other countries in GLOF monitoring, mitigation and response.

e. **Landslides / Avalanches**

(1) Review and update recorded history of landslides / avalanches in prone areas. In addition to conducting vulnerability risk assessments, gather information from local notables who have personal experience of such events for risk mitigation strategies.

(2) Raise awareness among local communities in vulnerable areas about the importance of paying special attention to weather forecasts and alerts. Heavy rainfall can trigger landslides and

avalanches, while sudden temperature variations can increase the likelihood of avalanches in susceptible areas.

(3) Establish community-based early warning system as part of the response mechanism in landslide / avalanche-prone areas. Local notables be nominated to ensure timely dissemination of alerts; this may involve use of watchmen, loudspeakers, megaphones, whistles, SMS alerts, telephonic communications or any other suitable means to alert the community.

(4) Based on landslide / avalanche alerts issued by PMD, local administration to consider precautionary measures such as closing roads and tracks leading to avalanche / landslide-prone areas. Contingency plans should include organized evacuation of people to safer locations.

(5) Conduct detailed geological and geotechnical surveys in high-risk areas to assess slope stability and identify potential landslide and avalanche zones.

(6) Implement slope stabilization techniques such as slope reinforcement, retaining walls and erosion control measures in vulnerable areas to minimize the risk of landslides / avalanches.

(7) Promote afforestation and sustainable land use practices to enhance slope stability and reduce susceptibility of slopes to erosion and failure.

(8) Develop and implement building codes / structural resilience strategies that consider the risk of landslides / avalanches, particularly in mountainous regions.

f. **Tropical Cyclones**

(1) Enhance meteorological infrastructure to improve cyclone monitoring and prediction accuracy, utilizing advanced technologies such as Doppler radar and satellite imagery.

(2) Strengthen collaboration and information sharing among meteorological departments (PMD / SUPARCO), DM agencies and stakeholders for timely dissemination of cyclone warnings.

(3) Develop clear protocols and SOPs for issuing cyclone warnings, ensuring consistent and comprehensible communication.

(4) Conduct public awareness campaigns utilizing diverse media channels, educational materials and community engagement initiatives to increase public understanding of cyclones, their associated hazards and the necessary actions individuals should take before, during and after a cyclone event.

(5) Establish community-based early warning systems in cyclone-prone areas leveraging technology and local networks to disseminate timely and location specific alerts through various channels, such as loudspeakers, sirens, SMS alerts, community radio and social media platforms, ensuring that communities receive warnings and can take appropriate actions to safeguard their lives and property.

(6) Develop evacuation plans for high-risk coastal areas, identifying safe shelters, evacuation routes, transportation arrangements and the mobilization of resources necessary for orderly and efficient evacuation of residents to designated safe areas.

(7) Conduct drills to test the effectiveness of evacuation plans and response mechanisms.

(8) Strengthen critical infrastructure in coastal areas to withstand cyclonic winds and storm surges by implementing cyclone-resistant designs, construction standards and retrofitting measures.

(9) Promote individual preparedness through family emergency plans and supply kits.

(10) Provide training and capacity building for first responders and emergency management personnel.

(11) Foster collaboration with national and international partners for assistance and technical support.

(12) Conduct post-cyclone assessments to identify lessons learned and improve future responses.

g. **Heatwaves**

(1) Drink plenty of water throughout the day, even if you do not feel thirsty.

(2) Wear light coloured clothing made from breathable fabrics such as cotton to help stay cool. Consider wearing a wide brimmed hat and sunglasses.

(3) Close curtains or blinds during the hottest part of the day to block out the sun's heat.

(4) Encouraging installation of green roofs, which provide shade and remove heat from the roof surface and surrounding.

(5) Use low-tech, high-efficiency methods like a double-roof system and walls constructed with plastic bags filled with compacted earth for effective cooling in refugee camps.

(6) Planting trees and plants to shade walls and windows in summer.

(7) Plant trees or install shade sails to create shade in outdoor areas.

(8) The use of smart irrigation technologies is another option, which involves sensors and data analysis to adjust watering schedules based on plant requirements and weather patterns.

(9) Use of green roofs and walls have been shown to reduce ambient temperatures by up to 5 degrees Celsius.

(10) Choose homes with limestone and natural materials to naturally control humidity, absorbing moisture in humid conditions and releasing it on sunny days.

(11) Green spaces can be highly beneficial in desert cities, notorious for their extreme heat.

(12) Smart building design considerations: Minimize solar heating in hot seasons, maximize indoor cooling rate in summer, optimize orientation and window size for efficiency.

(13) Companies must assess and reduce their carbon footprint, compensating for any remaining emissions.

(14) Maximize shade by building narrow roads and alleys that offer natural relief from sunlight.

(15) Provide essential health services, nutrition supplements, counselling, preschool activities, and awareness programs for children.

(16) Capacity building of local communities to better prepare for and respond to heatwaves. This includes training community members in first aid, heat stress management, and disaster preparedness.

(17) Develop innovative solutions to mitigate these impacts, such as heat-tolerant crops, energy-efficient cooling technologies, and urban planning strategies to reduce the urban heat island effect.

(18) Provide recommendations to policymakers on measures to enhance resilience to extreme temperatures, such as building codes, land-use planning, and public health policies.

(19) The development of appropriate heat wave advisories.

(20) Regular monitoring of weather patterns and issuing early warnings about potential heatwaves, allowing authorities and communities to take proactive measures to mitigate their impact.

(21) Educate communities about the consequences of heat stress risks, preventive measures, and available resources.

(22) Ambulances should initiate early cooling treatment upon picking up the patient.

(23) Coordinate with other emergency response agencies to provide medical assistance and evacuate individuals from dangerous situations.

76. **Infrastructural Weakness**. Major challenge for implementation disaster risk reduction is non-resilient construction in the country for both private and public infrastructure in the country. While public infrastructure is replaced with more resilient construction, a major weakness is the continued use of non-resilient construction for private infrastructure in the country. Several factors can be attributed to the continued use of non-resilient construction in the country, which are: -

a. **Financial Constraints**. Developing robust infrastructure often requires substantial initial investment. When resources are limited, decision-makers may opt for cheaper, less durable alternatives instead of investing in more resilient options that may have higher upfront costs.

b. **Short Term Prioritisation**. Politicians and policymakers frequently prioritize projects that offer immediate benefits over those that promote long-term resilience. This focus can lead to infrastructure that is inadequately prepared for future disasters.

c. **Lack of Awareness**. There is often insufficient knowledge regarding the specific risks associated with natural disasters. Consequently, infrastructure planning may not adequately consider the potential impacts of such events.

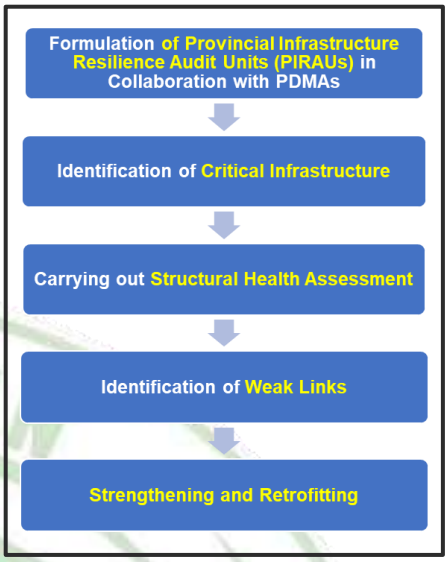
d. **Economic Pressure**. The necessity for development and economic growth can compel the construction of infrastructure in high-risk areas, such as floodplains or coastal zones vulnerable to storms, thereby increasing vulnerability to natural disasters.

e. **Political Influence**. Political factors can lead to the placement of infrastructure projects in disaster-prone regions, with resilience considerations often sidelined in these decisions.

f. **Fragmented Governance**. In areas where governance is fragmented and responsibilities are distributed among multiple entities, it can be challenging to coordinate and implement comprehensive resilience measures effectively.

g. **Resource Limitations**. Many communities, particularly in low-income or developing areas, may lack the resources necessary to invest in resilient infrastructure, making them more susceptible to the impacts of natural calamities.

77. **Infrastructure Audit for Disaster Resilience**. An infrastructure audit for disaster resilience is a systematic evaluation of the physical and organizational components that support essential services, with the goal of identifying vulnerabilities and strengthening their ability to withstand and recover from disruptive events. By conducting regular infrastructure audits for disaster resilience, communities and organizations can proactively strengthen their defences and ensure the continued delivery of essential services in the face of adversity. The detailed framework for conducting such an audit is as follows: -



a. **Identify Critical Infrastructure**. Determine which infrastructure assets are critical for disaster response and recovery. This may include transportation networks, utilities (water, electricity, gas), healthcare facilities, communication systems, and emergency shelters. These will help to identify critical infrastructure during an early warning system which can then be communicated to relevant authorities.

b. **Assess Vulnerabilities**. Potential hazards affecting infrastructure assets include natural disasters like earthquakes, hurricanes, floods, and wildfires, as well as man-made threats such as cyberattacks and terrorism. The disaster management audit will focus on district and tehsil levels, later expanding to spatial distribution of structures. A database will categorize buildings by material composition—RCC, brick masonry, stone masonry, timber, and adobe/mud. Identifying structure types will aid in modelling damage behaviour against specific hazards, helping to pinpoint vulnerable areas and promote disaster-resilient construction trends.

c. **Evaluate Risk Exposure**. Determine the likelihood and potential impact of each hazard on the identified infrastructure assets. This involves analysing historical data, modelling scenarios, and considering future climate change projections. Under this scope, the structural vulnerability data will be combined with the hazard information to identify the disaster

risk zone and help in assessing how to reduce the disaster risk in the risk prone areas.

d. **Review Design Standards and Regulations**. Assess whether existing infrastructure meets relevant building codes, standards, and regulations for disaster resilience. Identify any gaps or deficiencies that need to be addressed. This will help to shift the construction trends for resilient structures to withstand the specific disaster in those areas.

e. **Conduct Structural Assessments**. Evaluate the structural integrity of buildings, bridges, dams, and other infrastructure assets. During the structural assessment the factors that are to be considered are age, material quality, and seismic retrofitting. These factors are helpful in identifying whether the structure may withstand the disaster impact or in case of any improvement required to improve structural resilience.

f. **Assess Redundancy & Interdependencies**. In this step the redundancy and interdependencies within the infrastructure network are identified. Identification of the critical nodes and connections that could disrupt the entire system if damaged are required. All these processes contribute towards disaster preparedness.

g. **Review Emergency Plans & Protocols**. This requires examining existing emergency response plans and protocols for each infrastructure asset. Assessing their effectiveness in mitigating disaster risks and coordinating response efforts can greatly enhance disaster preparedness.

h. **Identify Mitigation Measures**. Recommend specific mitigation measures to enhance the resilience of critical infrastructure. This may include structural upgrades, improved maintenance practices, land-use planning, and investment in backup systems.

i. **Prioritize Investments**. Prioritize infrastructure investments based on the severity of risks, cost-effectiveness of mitigation measures, and potential impact on public safety and economic stability.

j. **Promote Collaboration & Coordination**. Foster collaboration among stakeholders involved in infrastructure management, disaster response, and community resilience. It is highly important that information sharing,

and coordination mechanisms are in place to facilitate effective response and recovery efforts.

k. **Monitor & Update**. Establish mechanisms for ongoing monitoring and evaluation of infrastructure resilience. Furthermore, the regular updating of the audit findings and recommendations based on new data, emerging risks, and lessons learned from past disasters will help to improve the district infrastructural resilience over time.

78. **Establishing Construction Material Hubs**. Pakistan's vulnerability to disasters and its vast area can often lead to supply chain disruptions, impacting infrastructure networks and causing shortages of construction materials in affected areas. This shortage hampers reconstruction efforts and prolongs recovery for impacted communities. To address this, the National Disaster Management Authority (NDMA) has proposed establishing Material Hubs in strategic locations, collaborating with government and private entities. These hubs will stockpile essential construction materials near vulnerable communities, ensuring immediate access for reconstruction.

79. Site selection focuses on proximity to at-risk areas to maximize coverage during disasters. The hubs will maintain a stock of materials to expedite reconstruction even during supply chain interruptions, mitigating disaster impacts. Additionally, they can serve as emergency shelters and training centers for disaster preparedness, equipping local youth and vulnerable groups with knowledge about infrastructure weaknesses and resilience strategies.

80. **Priority Interventions and Actions by Major Hazards**. NDMA has identified various strategies and interventions by priority and actions needed to be undertaken by major hazard, including floods, earthquake, landslide and drought. The following matrix identifies the responsibilities of major stakeholders at federal and provincial levels: -

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
Flood Risk Reduction	Update the National hazard & risk assessment and its database	National database development of the historical flood disasters and its impact	Priority 4	NDMA	SUPARCO, NDRMF	SUPARCO: Utilize remote sensing and GIS expertise to update the national hazard and risk assessment. NDRMF: Provide financial support for updating the national hazard and risk assessment and developing the national database. Allocate funds for equipment procurement, capacity building, and other necessary activities. NDMA: Prepare inclusive and cross-cutting gender, disability, children and old age plans which focus on historical impacts on vulnerable populations.
	Update runoff and inundation analysis model	Development of risk atlases including flood hazard, risk maps with catalogues (National Level)	Priority 2	NDMA	FFC, SUPARCO, NDRMF, PBS	FFC: Contributes expertise and data related to flood hazard assessment to enhance the accuracy and comprehensiveness of the national risk assessment. SUPARCO: Provides satellite imagery and geospatial data for the development of risk atlases and flood hazard maps, supporting better risk management planning. NDRMF: Supports the funding and implementation of initiatives aimed at updating the national hazard and risk assessment database, facilitating better risk management practices. PBS: Offers statistical expertise and sex disaggregated data management support to ensure the accuracy and

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
						reliability of the updated hazard and risk assessment database.
		Development of probabilistic flood hazard and risk maps along the Indus River with CC Impact		NDMA	FFC, NDRMF, SUPARCO	FFC: Provides technical expertise and data on flood dynamics specific to the Indus River, ensuring the accuracy of hazard and risk maps. NDRMF: Facilitates financial support for initiatives aimed at developing probabilistic flood hazard and risk maps, enhancing flood risk management. SUPARCO: Utilizes satellite technology and geospatial data to enhance the precision and effectiveness of flood hazard and risk mapping along the Indus River.
		Research studies on selected cities prone to urban flooding		MCs and Development Authorities	SUPARCO, Academia and NDRMF	Academia will collaborate with SUPARCO and NDRMF.
	Update the National hazard & risk assessment and its database Planning for better risk management	Mapping the Nullahs/hill torrents responsible for flash flooding	Priority 4	PIDs	FFC, PDMA, NDMA	FFC: Contributes technical expertise and data on Nullahs/hill torrents to ensure comprehensive mapping for the national hazard and risk assessment database. PDMA: Collaborates with NDMA and other agencies to provide localized data and insights for mapping Nullahs/hill torrents within their respective provinces and impacts on vulnerable populations specifically women, children, elderly and disabled. PIDs: Offer specialized knowledge and data on hydrology and water flow patterns in their respective regions, aiding in the accurate mapping of Nullahs/hill torrents for the national hazard and risk assessment database.

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
		National Drainage Master Plan (Undertake hydrological modelling and food-plain mapping and zoning of the Indus River system using climate change scenarios to estimate various projected flood levels)		FFC	PID	FFC: Oversees the implementation of the National Drainage Master Plan, focusing on undertaking hydrological modelling and floodplain mapping of the Indus River system. It integrates climate change scenarios to estimate various projected flood levels. PID: Collaborates with FFC to provide localized data and insights for hydrological modelling and floodplain mapping within their respective provinces. They contribute to the zoning of the Indus River system and ensure alignment with provincial development plans and policies.
		O&M Plan of the Bunds of Indus River		PID	FFC	PID: Takes charge of the O&M Plan for the bunds of the Indus River within their respective provinces. This includes regular inspections, repairs, and upkeep to ensure the structural integrity and effectiveness of the bunds in flood protection. FFC: Provides technical guidance and support to PID in the development and implementation of the O&M Plan for the bunds of the Indus River. They may also coordinate inter-provincial aspects and ensure adherence to national standards and protocols.
		Development of the Bund Training Manuals		PID	FFC	PID leads the development of Bund Training Manuals and planning & design criteria, with support from FFC, ensuring

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
		Development of planning & design criteria		PID	FFC	standardized guidelines and procedures for bund construction and maintenance along the Indus River.
	Update and formulation of Laws and (Technical-) Guidelines and Act	Guidelines of CC Impact involvement to Flood Protection Plan and Design	Priority 4	FFC	MoCC, PMD, PID	FFC prioritizes updating laws and technical guidelines, focusing on integrating climate change considerations into flood protection plans, collaborating with MoCC, PMD, and PID. PID leads the revision of the National River Act in conjunction with FFC to ensure alignment with provincial flood management needs.
		Revision of National River Act		PID	FFC	PID spearheads regional expertise and insights, ensuring local perspectives in revising the National River Act, while FFC provides national-level guidance to align the act with federal flood management strategies.
		Preparation of Tools and System for Projects' Management	Priority 2	FFC	PID	FFC focuses on preparing tools and systems for project management, while PID leads the development of planning and design criteria.
		Development of planning & design criteria		FFC	PID	
	Flood Management Development of Flood Disaster Risk Management Information	Establishment of Project Management System	Priority 2	FFC, PID	MoWR	FFC and PID working on the development of a Flood Disaster Risk Management Information System and sharing, alongside the establishment of a Project Management System, with support from MoWR
		Update of hydro-metrological Information		FFC	PID, WAPDA, PDMAs /	FFC spearheads the development of a Flood Disaster Risk Management Information System and sharing, as well as the establishment of a Project Management System, with

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
	System and sharing	sharing mechanism and system			GBDMA / SDMA	collaboration from PID, WAPDA, and PDMAs Additionally, PID leads the update of the hydro-meteorological information sharing mechanism and system.
		Provision of technical experts/staff for flood risk analysis on Hill torrent and regional rivers Capacity enhancement to understand flood disaster mechanism and hydrological analysis		PID	FFC	PID and FFC collaborate closely on flood management efforts, with PID supplying technical experts and staff for flood risk analysis on hill torrents and regional rivers, while FFC takes the lead in enhancing capacity to understand flood disaster mechanisms and conduct hydrological analysis. This partnership ensures a comprehensive approach to flood risk assessment and management, combining technical expertise with capacity-building initiatives.
		Update of hydro-metrological Information sharing mechanism and system		PID	FFC	PID and FFC jointly undertake the update of hydro-meteorological information sharing mechanisms and systems, ensuring the timely and accurate dissemination of critical data for effective flood management and response efforts.
Institutional Improvement	Provincial-level institutional strengthening for robust flood	Provincial Level Flood Hazard & Risk Map Strengthen the capacities to	Priority 2	PID	PDMA NDMA	PID leads institutional strengthening efforts to enhance resilience against floods, while PDMA contributes to the development of provincial-level flood hazard and risk maps for informed decision-making. NDMA supports capacity-building endeavours aimed at strengthening the flood

Strategy	Intervention	Action	SFDRR Link	Execution Agency		
				Main	Support	Action
	disaster risk management	address on the Flood DRM system				disaster risk management system, ensuring efficient coordination and response mechanisms within the provinces. NDMA ensures coordination and management of humanitarian stakeholders to ensure that flood disaster risk management is inclusive and targets gender specific risks.
	Development of Flood Disaster Risk Management Information System and sharing		Priority 2	PDMA	NDMA	PDMA and NDMA jointly lead the development of a Flood Disaster Risk Management Information System and sharing mechanism. This involves creating an integrated platform to collect, analyse, and disseminate critical flood-related data for effective decision-making and coordinated response efforts at both provincial and national levels. Inclusion of sex disaggregated data in the Disaster Risk Management Information System for sharing with humanitarian stakeholders.

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Flood Risk Reduction on Inter-Provincial Basins and Populated area toward NFPP-V	Promotion of projects stipulated in NFPP-IV	Management of listed (non-) Structural measures in FPSPIII.	Priority 1	FFC	PID, WAPDA, PMD, CDAs	✓	✓	✓	✓
	Update runoff and inundation analysis model	Aggregation and management of data.	Priority 2	PMD	WAPDA, SUPARCO	✓	✓	✓	
		Update of run-off-model.		PMD	FFC		✓	✓	
		Establishment of probable maximum inundation analysis by bund breach.		FFC	PMD			✓	✓
	Update the National hazard & risk assessment and its database	National database development of the historical flood disasters and its impact.	Priority 4	NDMA	SUPARCO, NDRMF	✓			
		Development of risk atlases including flood hazard, risk maps with catalogues (National Level).		NDMA,	FFC, SUPARCO, NDRMF, PBS		✓	✓	✓
		Development of probabilistic flood hazard and risk maps along the Indus River with CC Impact.		NDMA	FFC, NDRMF, SUPARCO				✓
		Research studies on selected cities prone to urban flooding.		MCs and Development Authorities	SUPARCO, Academia & NDRMF	✓	✓	✓	✓
		Mapping the Nullahs/hill torrents responsible for flash flooding.		PIDs	FFC, PDMA, NDMA	✓	✓	✓	✓
	Planning for better risk management	National Drainage Master Plan (Undertake hydrological modeling and food-plain mapping and zoning of the Indus River system using climate change	Priority 4	FFC	PID	✓	✓	✓	✓

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
		scenarios to estimate various projected flood levels).							
		O&M Plan of the Bunds of Indus River.		PID	FFC	✓	✓	✓	✓
		Plan for Improvement of Indus Barrage (seeing Balance of UP- and Downstream Discharge).	Priority 4	PID	FFC	✓	✓	✓	✓
		Review of Plan on Large Dams Construction.		WAPDA	FFC	✓	✓	✓	✓
	Update and formulation of Laws and (Technical-) Guidelines and Act	Development of the Bund Training Manuals.	Priority 2	PID	FFC			✓	✓
		Development of planning & design criteria.		PID	FFC	✓	✓	✓	✓
		Guidelines of CC Impact involvement to Flood Protection Plan and Design.		FFC	MoCC, PMD, PID	✓	✓	✓	✓
		Revision of National River Act.		PID	FFC	✓	✓	✓	✓
Institutional Improvement	Flood Management	Preparation of Tools and System for Projects' Management.	Priority 2	FFC	PID	✓	✓	✓	
				FFC	PID			✓	✓
		Establishment of Project Management System.		FFC, PID	MoWR				✓
	Development of Flood Disaster Risk Management Information System and sharing	Update of hydro-metrological Information sharing mechanism and system.	Priority 2	FFC	PID, WAPDA, PDNAs			✓	✓
	Provincial-level institutional strengthening for	Provision of technical experts/staff for flood risk analysis on Hill torrent and regional rivers.	Priority 2	PID	FFC	✓	✓	✓	✓

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
	robust flood disaster risk management	Capacity enhancement to understand flood disaster mechanism and hydrological analysis.		PID	FFC		✓	✓	✓
		Provincial Level Flood Hazard & Risk Map.		PID	PDMA			✓	✓
		Strengthen the capacities to address on the Flood DRM system.		PDNA	NDMA	✓	✓	✓	✓

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Landslide Management: Assessment, Awareness, and Stabilization Strategies	Landslide risk assessment	Landslide risk assessment at macro scale.	Priority 1	NDMA	PDMAs / GBDMA / SDMA, Forest Department, Land Use Planning Department	√			
		Identify highly vulnerable areas for mitigation				√			
		Develop Atlas of hazard-prone areas					√		
	Community Awareness	Awareness campaigns to educate public about landslide risks and safety measures.	Priority 1	DDMAs	INGOs., UNO, PDMAs / GBDMA / SDMA and NDMA	√	√	√	√
		Provide training on recognizing early signs of instability and appropriate response actions.				√	√	√	√
		Plant climate-smart vegetation to stabilize slopes, reduce soil erosion near homes						√	√
	Strengthening land stabilization through structural measures	Construct retaining walls or terraces to break up steep slopes and minimize the risk of mass movement.	Priority 2	PDMAs / GBDMA / SDMA	Forest Department, Irrigation Department, Land Use Planning Department				√
		Construct gravity retaining walls to support soil and reduce the risk of slope failure.				√	√	√	
		Gabion walls to stabilize slopes and prevent erosion.					√	√	√
		Bioengineering for slope stabilization.				√	√	√	√
		Retrofit structures to improve their resistance to seismic activity, reducing the likelihood of landslide-triggering earthquakes.						√	√

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Comprehensive Landslide Management: Assessment, Awareness, and Stabilization Strategies	Numerical modeling on water allocation and case study with hydrological perspective	Aggregation of data (water right, traditional water extraction without registrations. standard discharge for wet and dry season etc.).	Priority 1	IRSA	PCIW, MoWR	√	√	√	√
		Analysis of flow duration curve for understanding water regime (High-, Normal-, Low- and Drought- Water) and its probability.		IRSA	PCIW, MoWR		√	√	√
		Review on water consumption amount by crops and irrigation efficiency.		IRSA	PCIW, MoWR		√	√	√
		Establishment of the water allocation model.		IRSA	PCIW, MoWR		√	√	√
	Revision of IRSA Act for information consensus in terms of hydrological mechanism in the Indus River	Case study on water allocation on dry seasons by using the model.	Priority 2	IRSA	PCIW, MoWR			√	√
		Analyze of distribution during drought.		IRSA	PCIW, MoWR			√	√
		Revision and update of IRSA Act.		IRSA	PCIW, MoWR				√
Promotion of Waer conservation and harvesting	Planning improvement and construction of water storage	Improvement and construction of reservoirs and ponds.	Priority 2	PID	OCEA				
	Promotion water-saving agriculture & cropping pattern information	Study and planning of appropriate water-saving agriculture.	Priority 2	PID	OCEA				
	Construction & improvement of water storage, conveyance and field distribution structures	Improvement / construction of ponds & reservoirs; improve irrigation efficiency with climate change viewpoints.	Priority 3	PID	OCEA				

Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organizations	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Comprehensive smog management through effective assessment and planning	Urban Smog Risk Assessment & Management for Lahore and Karachi	Conduct smog risk assessment of Karachi & Lahore.	Priority 1	PDMAs / GBDMA / SDMA	Urban unit, LDA and KDA	√			
		Mapping vulnerable areas & cataloging				√			
		Develop smog risk assessment report & dissemination to concerned organizations.				√			
		Conduct awareness-raising sessions at city level.					√		
	Develop Provincial smog contingency plans	Develop smog contingency plan for Punjab	Priority 2	PDMAs / GBDMA / SDMA	Urban unit, LDA, District Administration				√
		Conduct consultations with key stakeholders.							√
		Develop a draft plan for review.							√
		Organize validation workshop to refine the plan.							√
		Publication and wide dissemination.							
	Awareness raising sessions & campaigns	Promote the use of public transportation.	Priority 3	EPAs	INGOs., UNO, DDMAs, PDMA and NDMA	√	√	√	√
		Compliance with strict emission standards.				√	√	√	√
		Implement waste management to reduce open burning, a significant contributor to air pollution.				√			√
		Enforce and improve traffic management strategies to reduce traffic-related emissions.				√	√	√	√
		Encourage public transportation to reduce the number of individual vehicles on the road, thereby decreasing emissions.				√	√	√	√

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Integrated Heatwave Preparedness and Response System	Heatwave management framework: coord, contingency, and alert	Develop coordination committee among stakeholders to keep vigilance of heatwaves	Priority 4	NDMA	PDMAs / GBDMA / SDMA, PMD	√			
		Develop contingency plans				√			
	Predict & share forecasts, alerts with govt and non-govt stakeholders	Issue heat alerts based on PMD alert with guidance of thresholds & issue daily weather outlook	Priority 3	PMD	Electronic, PEMRA, Press clubs, PDMAs / GBDMA / SDMA, DDMAs,		√	√	
		In consultation with the district admin, issue alerts when heat-related cases are recorded.					√	√	
		Organize training for employees, laborers/workers on the impacts of heat & how to protect themselves.					√	√	
	Initiate Awareness Campaigns	Develop public awareness material & print for wide dissemination.	Priority 4	PDMAs / GBDMA / SDMA	DDMA, INGOs, UNOs, and Media	√			
		Display all emergency numbers and nearby hospital details in offices/schools/universities and factories.					√	√	
		Notify post heat-related illness prevention tips and how to stay cool in locations.					√	√	
		Hold awareness workshops at community levels.				√	√		
		Access to shaded areas for outdoor workers, slum communities, & vulnerable populations.				√	√	√	
		Issue warnings using SMS / WhatsApp & broadcasting on TV & radio channels.					√	√	
	Maintain stock of emergency medicines for heatwave	Establish heat response centers, especially in congested areas.	Priority 4	Health department	PDMAs / GBDMA / SDMA, Rescue 1122, and NDMA		√	√	
		Keep ready supply of icepacks & fluids for heatstroke patients.					√	√	
		Stockpile medicines in bulk for ready use.				√	√		
		Open wedding halls & mosques for people					√	√	
		Equip ambulances to be used for cooling treatment.					√	√	
		Enhance public awareness during local events.							

Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Glacial Lake Outburst Flood (GLOF) Risk Mitigation and Preparedness"	Establish a robust Early Warning Systems for monitoring GLOF	Establish an early warning system that integrates real-time monitoring of glacial lakes and weather conditions.	Priority 4	PDMAs / GBDMA / SDMA	DDMAs, PMD, NDMA	√	√	√	√
		Implement automatic sensors and monitoring devices to detect changes in lake volume, temperature, and other relevant parameters.				√	√	√	√
		Ensure timely communication of alerts to vulnerable communities through various communication channels.				√	√	√	√
	Risk Assessment and Mapping	Conduct comprehensive risk assessments to identify vulnerable areas prone to GLOFs.		PDMAs / GBDMA / SDMA, NDMA	INGOs, DDMAs				
		Develop detailed maps of glacial lakes, potential flood pathways, and at-risk communities.				√	√		
		Use advanced remote sensing technologies to monitor glacier dynamics and lake expansion.				√	√		
	Community Awareness and Preparedness	Conduct regular awareness campaigns to educate local communities about the risks of GLOFs and the necessary evacuation procedures.	Priority 2	DDMAs, NDMA	INGOs, PDMAs / GBDMA / SDMA	√	√	√	√
		Conduct regular drills and training sessions to enhance community preparedness and response capabilities.				√	√	√	√
		Enhance the capacity of local authorities, emergency responders, and relevant stakeholders to effectively respond to GLOF events.					√	√	
		Provide training on search and rescue operations, medical assistance, and evacuation procedures.				√	√		

Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Snowstorm Preparedness: Strengthening Early Warning Systems and Emergency Shelter Planning"	Strengthening EWS with Public Awareness and Education	Establish & maintain advanced EWS for snowstorms.	Priority 2	DDMAs, PDMAs / GBDMA / SDMA	NDMA				√
		Develop close liaison with PMD, for updates on prediction & monitoring of snowstorm patterns.				√			√
		Disseminate timely alerts through various communication channels.				√			√
		Conduct public awareness about risks & safety measures.				√	√		√
		Provide guidelines on preparing emergency kits, winterizing homes, safe travel practices				√			√
	Emergency Shelter Planning	Prepare snowstorm contingency plans at district levels	Priority 1	DDMAs	PDMAs / GBDMA / SDMA, INGOs, UNO			√	
		Identify & designate emergency shelters in vuln areas				√			√
		Equip shelter places with proper heating, blankets, food, and medical supplies.							
		Prepare evacuation plans for snow emergencies.				√			√
Winter Resilience: Strengthening Infrastructure and Enhancing Emergency Preparedness	Resilient Infrastructure	Implement measures to strengthen critical infrastructure against snow-related damage, such as power lines and transportation networks.	Priority 4	DDMAs	PDMAs / GBDMA / SDMA, INGOs., UNO	√	√	√	√
		Regularly inspect and maintain infrastructure to prevent failures during heavy snowfall.				√	√	√	√
		Plan for alternate rescue operations in case the roads are blocked				√			√
		Ensure the availability of snow removal equipment and road-clearing machinery.				√			√
	Emergency Preparedness	Train healthcare professionals to deal with cold-related illnesses and injuries.	Priority 4	PDMAs / GBDMA / SDMA	NDMAs, DDMAs, District Administration, INGOs and UN	√			√
		Stockpile medical supplies and coordinate with hospitals and clinics to ensure continued healthcare services during snowstorms.				√			√
		Maintain stockpiles of essential supplies, including food, water, medications, and fuel, in strategic locations.				√			√

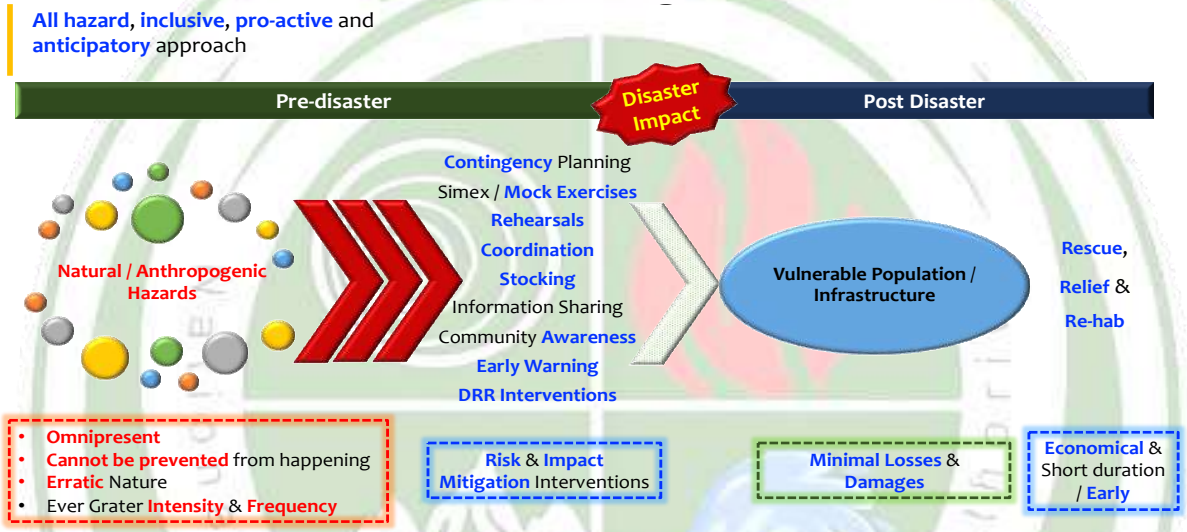
Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Integrated Fire Management: Early Detection, Public Awareness, Communication, and Resource Collaboration	Formulate Early Detection Systems	Mapping of areas prone to forest fires	Priority 3	Forest department, PDMAs / GBDMA / SDMA	DDMA, PMD, SPARCO, NDMA		√		
		Invest in early detection systems, including surveillance cameras and aerial monitoring.					√		
		Use satellite technology and drones to identify and track potential fire hotspots.					√		
	Public Awareness and Safe Evacuation	Conduct regular awareness campaigns to educate the public about fire risks and safety measures.	Priority 4	DDMAs, PDMAs / GBDMA / SDMA	Forest department, PDMAs / GBDMA / SDMA	√	√	√	√
		Develop guidelines on creating defensible space around homes and forest areas.				√			
		Develop and communicate clear evacuation plans for communities in fire-prone areas.				√			
		Conduct regular drills to ensure that residents and emergency responders are familiar with evacuation procedures.					√	√	
	Communication Systems	Establish reliable communication systems to disseminate timely information about fire risks and evacuation orders.	Priority 2	DDMAs, PDMAs / GBDMA / SDMA	Forest Department, NDMA		√	√	
		Utilize sirens, mobile notifications, and community networks for alerts.					√	√	
	Firefighting Resources	Equip firefighting crews with proper training and equipment.	Priority 2	District Administration	Forest Department, Rescue1122, DDMAs, PDMAs / GBDMA / SDMA	√	√	√	√
		Collaborate with neighboring districts to share firefighting resources during large-scale incidents.					√	√	

Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Developing / Revising Tsunami Hazard / Risk Assessment Database	Establish committee for earthquake fault evaluation.	Announcement and selection of the committee members.	Priority 4	NDMA	Academic, PEC		√	√	
		Hold regular meetings for institutionalization.		NDMA	Academic, PEC				√
		Assessing the active and non-active faults and their mapping.		NDMA	Academic, PEC				√
	Updating tsunami and inundation simulation (by scenario earthquakes)					Long-term planning			
	Developing simulation models for damage and loss estimation on the basis of tsunami risk assessment								
	Develop tsunami risk assessment for Gwadar city / Karachi city at micro-scale								
Mainstreaming Tsunami Risks in Development Plans	Revise Gwadar / Karachi development plan based on tsunami risk assessments & reflected in land use planning					Long-term planning			
	Develop scenario-based tsunami risk reduction plans & integration into tsunami evacuation plans								
	Develop tsunami evac plans based on tsunami risk assessments.	Develop guidelines for evacuation plans.				Long-term planning			
		Conduct tsunami drills on safer evacuations.	Priority 2	Dev authorities/ MCs	PDMA Balochistan, DDMA and TMA	√	√	√	√
		Develop evacuation maps for major cities.		Dev authorities/ MCs	PDMA Balochistan, DDMA and TMA				√
		Reporting of a lesson learned and its dissemination.				Long-term planning			
Tsunami EWS	Engage media for tsunami EWS	Identifying media platforms for early warning dissemination	Priority 2	PDMAs	PEMRA, Media	√	√		
		MOUs signing with Media agencies		PDMAs	PEMRA, Media		√	√	
		Enhancing communication networks through seminars, drills, and training.		PDMAs	PEMRA, Media		√	√	√
Reducing Impact of Tsunami Hazard	Construction of seawalls					Long-term planning			

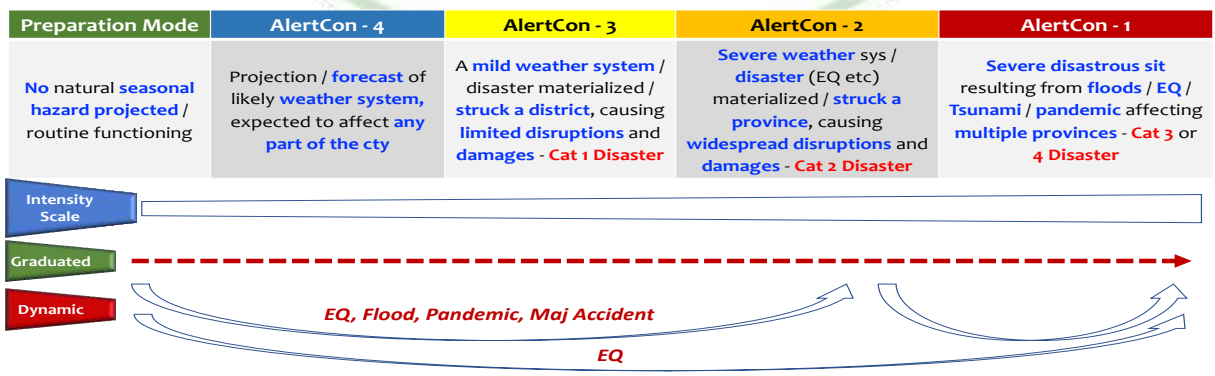
Strategy	Interventions	Actions	SFDRR Link	Execution Agency		2025			
				Main	Support Organization	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Industrial, Technological Safety & Preparedness: Risk Assessment, Emergency Response, and Public-Private Collaboration	Risk Assessment and Mapping	Conduct comprehensive risk assessments at macro and micro levels.	Priority 1	NDMA, PDMAs	Ministry of Industries & Production (MoIP)	√			
		Develop risk maps to identify vulnerable areas and potential impact zones.				√			
	Emergency Response Management in the Industrial Zones	Develop and update emergency response plans.	Priority 3	NDMA, PDMAs, MoIP	Industrial zones, DDMAs, PDMAs	√	√		
		Conduct drills and exercises to test the effectiveness of emergency response procedures.				√	√	√	√
		Conduct public awareness campaigns.				√	√	√	√
		Provide information on emergency procedures and evacuation routes.						√	√
	Promote public-private partnership	Establish committees to promote public-private partnerships in disaster preparedness.	Priority 2	NDMA	PDMAs, industries and production division, Industrial zones	√	√		
		Enforce regulations for industrial safety, ensuring compliance with international standards.				√	√		
		Implement strict penalties for non-compliance				√	√	√	√
		Encourage industries to invest in and implement advanced safety technologies.				√	√	√	√
	Training and Capacity Building	Provide training programs for industrial workers, emergency responders, and local authorities.	Priority 2	DDMAs	PDMAs, Health department, industries and production division, Industrial zones	√	√	√	√
		Build the capacity of local emergency services				√	√	√	√
		Develop plans for medical response and mass casualty				√			
		Ensure hospitals and healthcare facilities in proximity to industrial zones are equipped.				√	√	√	√

Strategy	Intervention	Action	SFDRR Link	Execution Agency		2025			
				Main	Support Organisation	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Multi-Hazard EWS	Strengthen Forecasting & EWS	Strengthen AWS, Radars, Upper Air Observation and Satellite.	Priority 2	NDMA	PDMAs / GBDMA / SDMA	✓	✓	✓	✓
		Establish Forecasting Centers		NDMA	PDMAs / GBDMA / SDMA, FFC		✓		
		Strengthen Forecasting & EWS		NDMA	PDMAs / GBDMA / SDMA, WAPDA		✓	✓	
		Earthquake & Tsunami EWS.		NDMA	GSP, PDMAs / GBDMA / SDMA	✓	✓	✓	✓
		For Landslide, Cyclone, Heatwave, Marine, Drought, Extreme Weather.		NDMA	PDMAs / GBDMA / SDMA	✓	✓	✓	✓
	Prepare Emergency Response	EW Dissemination System b/w PMD & DMAs	Priority 2	PMD	PDMAs / GBDMA / SDMA, DDMAs	✓	✓	✓	✓
		Develop National Plan, Guidelines & SOPs		NHSRC	NDMA, PDMAs / GBDMA / SDMA	✓	✓	✓	✓
Anticipatory Actions (AA)	AA Framework	Establishment of Tech Wing.	Priority 4	NDMA	PDMAs / GBDMA / SDMA / UN	✓	✓	✓	✓
		Development of National AA Strategy.	Priority 4	NDMA	PDMAs / GBDMA / SDMA / UN	✓	✓		

81. **Operational Readiness**. NDMA's readiness involves the process of organizing and managing available resources and assigning responsibilities for dealing with all aspects of disaster preparedness from contingency planning, coordination, information sharing, community awareness, early warming, disaster risk mitigation and the actual response measures to disaster. It involves a systematic approach to preventing, preparing for, responding to, and recovering from disasters. The process is outlined below: -



82. **National Emergencies Operation Centre (NEOC)**. NEOC functions 24/7 and staffed by requisite technical and operational staff of NDMA. Functioning of NEOC is regulated through different Alert Conditions, referred as AlertCons. These are a system of gradual, dynamic, proactive and disaster threat conformed alertness states of NOEC which streamline disaster management architecture in order to enable disaster management responders, stakeholders and partners to conduct synergised, well-coordinated and effective response in face of any natural / man-made disaster.



83. On receipt of Disasters Early warning (DEW) generated by NDMA Tech Team – the response process gets initiated. Ideally it gives preparation time for 6 months; which is then used for reference by all in response wing. Long term preparations, trainings and risk comm is led by DRR wing. Close to impact mobilisation actions are led by Operation Wing, though round the year preparations continue.

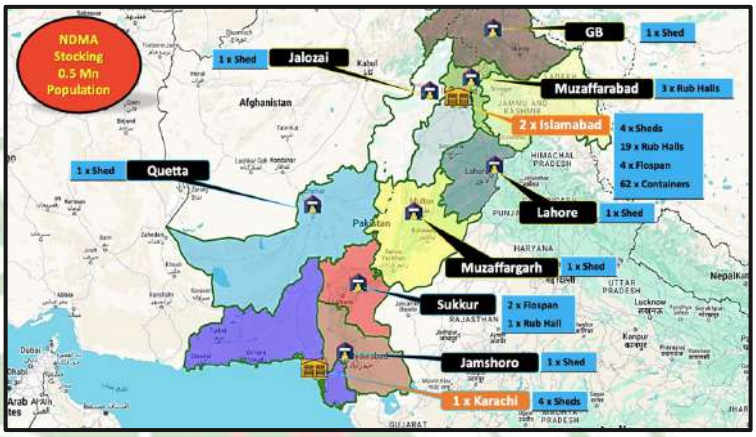
84. **Coordination Partners**. On receipt of DEW, response directorate issue advisories to all stakeholders. Advisories prepare all responders like Ministries, Military HQs, Diplomatic community, NGOs, private sector. Pre-coordination generate right level of optimized synergy between various departments of government, local responders, technical organizations and humanitarian efforts. During manifested disaster, all these departments will be represented in NEOC to coordinate for any mid-course application of variant, as required

85. **Disaster Contingency Planning**. To ensure timely and streamlined readiness for disasters, proactive multi-hazard contingency planning is undertaken by NDMA, the hazards as per their likely occurrences are divided into specific seasons throughout the year. These contingency plans were based on specific events or known risks at local, national, regional or even global levels (e.g. earthquakes, floods or disease outbreaks) & established operational procedures for response, based on anticipated resource requirements and capacity. This is accomplished by undertaking contingency planning for summer hazards, monsoon hazards, winter hazards and non-seasonal hazards. Detailed guidelines are developed and published for all perceived hazards. This is an ongoing and regular process whereby annual new editions are issued and these updated versions include lessons learnt in last year and are available online on the NDMA website.

April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar

Summer Contingencies	Monsoon Contingencies	Winter Contingencies	Non-seasonal
• Locust • Heatwaves • Glacier Melt / GLOF • ***Landslides*** • ***Avalanches*** • Local Riverine Flood • ***Forest Fires*** • Drought	• Heavy / Extreme Rains • ***Riverine Floods*** • ***Flash Floods*** • Hill Torrents • ***GLOF*** • Urban Floods • ***Landslides***	• Winter Rains • Urban Flooding • ***Heavy Snow*** • ***Blizzards*** • Avalanche	• ***Earthquakes*** • Tsunami • Industrial • Pandemics

86. **Logistics**. NDMA prepares itself for rationalized response. Normal maintenance of stocks as per annual disaster management calendar. It shows seasonal disasters peculiar to all geographical zone of Pakistan. Accordingly, NDMA warehouses, which are located and placed in close proximity of most vulnerable zones. Comprehensive archived system for logistic management and clear delineation of responsibilities has been formulized. Local area governments are 1st & 2nd Tier Responders, directed by NDMA to raise and maintain logistic stocks ***mostly non-perishable***. NDMA would come in as 3rd Tier Responder for national reserve stocks and coordinated from global resource providers.



87. **Revision of Stocking Policy**. NDMA revised the National Stocking policy in 2023 and ensured its implementation for increasing the efficacy of relief efforts and reduced response time. This policy outlines the necessary stock levels for various relief items that NDMA must maintain to ensure effective disaster response and preparedness. Analysis of past experiences, lessons learnt, projected weather / disaster scenarios along with other aspects were considered to formulate policy.

88. **Determining Relief Stock Levels**. Determining the Stock levels is the most basic and critical step for any stocking policy, following facets determined the stocking levels of relief goods: -

a. Vulnerability of the areas and degree of exposure to multiple hazards as defined in NDMP; as amended from time to time.
b. Historical evidence / record of hazards at district / sub district level.
c. Optimum case load of each warehouse and PDMAs / GBDMA / SDMA based on worst hazards faced and recurring frequency of hazards.
d. Accessibility to the area communication infrastructure.
e. Weather conditions that may preclude relief operation by air / sea in case of emergency.
f. Reaction time in provision of relief from nearest warehouse of district / province.

89. ***Pre-identified and pre-coordinated*** logistics requirements have been templated for ***4 million affected population*** needs: -

a. For ***2 million***: Districts & respective Provinces would maintain and arrange stocks.

b. ***0.5 million*** people needs are held by NDMA warehouses.

c. ***1 million*** would be raised through ***emergency procurement*** during disasters.

d. Left over ***0.5 million needs will be distributed*** amongst UN organizations, NGOs, International assistance, private sector, Pak diaspora and philanthropists.

90. **Overview of Stock Status**. NDMA maintains the stock levels with an aim to ensure a rapid and coordinated response to emergencies, both within Pakistan and for international assistance efforts. The replenished stock aligns with the organization's commitment to providing efficient and effective disaster relief. NDMA's current stocking status has been shown though a summarized table and formulation of stock table is explained below: -

a. **Planned Stock**. The target quantities for each relief item as outlined in the Stocking Policy 2023. These targets are based on anticipated needs during emergency.

b. **Held Stock**. The current quantities of each item that are physically available in NDMA's warehouses which reflects the NDMA readiness to deploy these resources quickly during disasters.

c. **Stock for International Relief Assistance**. A reserve of specific items earmarked for international assistance, should NDMA need to respond to regional crises or provide support to neighbouring countries in need. These reserves ensure that NDMA can extend its support beyond national borders when required.

d. **Donation Stock**. Depicts the items that were received from international donations and kept in stock for future utilization.

91. **Provision of Ex-Gratia Assistance**. As per Section 11 of National Disaster Management Act, 2010, stipulates National Disaster Management Authority (NDMA) to lay down Guidelines for '**minimum standards of relief to be provided to persons affected by disaster'**. Whereas, Sub-Section (c) of Section 11 Mandates "NDMA to

lay down guidelines for Ex-Gratia assistance on account of loss of life and also assistance on account of damage to houses and for restoration of means of livelihood".

92. **Criteria for Provision of Ex- Gratia Assistance**. Applicant's fulfilling's the following criteria are eligible for provision of Ex- Gratia Assistance: -

a. Affectee must be legal citizen of Pakistan.

b. In case of death affectees NoK/ Legal heir of affectees may receive compensation: spouse(s) and parents, legitimate children, unmarried and below 21 years of age brothers or sisters, residing with and wholly dependent upon the deceased or the lawful legal inheritor as per respective religion/relation.

c. Must be from affected area declared by districts/ local administration.

d. Any directive issued by Honourable Prime Minister/ Government of Pakistan.

93. **Analysis of Disasters in 2024**. A number of disaster events occurred throughout 2024 during spring, summer, monsoon and winter seasons, prompting NDMA to take proactive measures in addressing these challenges as the primary federal entity responsible for disaster management. Engaging district and provincial bodies, as well as relevant stakeholders, remained a priority through a series of coordination meetings, consultations and coordinating response efforts. The ensuing paragraphs detail the specific calamities, their impacts and the corresponding response efforts undertaken in each instance. The following events occurred during the year: -

a. **Spring (Feb-Mar Heavy) Rains**. Three heavy rainfall systems were forecasted to impact various parts of the country from 17 to 21 February 2024, 26 February to 2 March 2024 and from 5 to 8 March 2024. NDMA issued 6 x Weather Advisories during the period, providing early warning to at-risk communities and relevant govt depts to undertake necessary mitigative and preparedness actions. Subsequently, due to the weather systems, torrential rainfall was received in various areas of Balochistan leading to flash & urban flooding whereas heavy rainfall and snowfall occurred throughout Khyber Pakhtunkhwa and State of Azad Jammu & Kashmir leading to flash flooding and landslides. NDMA proactively coordinated with respective PDMAs / GBDMA / SDMA, Rescue Services,

NHA, NGOs and Armed Forces in order to ensure timely and holistic response. Summary of losses and damages shared below: -

Provinces / State	Deaths				Injured				Houses Damaged			Livestock Perished	Bridges Damaged
	Male	Female	Child	Total	Male	Female	Child	Total	Fully	Partially	Total		
Balochistan	1	1	3	**5**	1	0	0	**1**	82	155	**237**	0	1
Khyber Pakhtunkhwa	5	8	27	**40**	24	11	27	**62**	80	555	**635**	99	0
Punjab	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0	0
Sindh	0	0	0	**0**	0	0	0	**0**	0	0	**0**	0	0
Gilgit Baltistan	1	0	0	**1**	0	0	0	**0**	0	3	**3**	0	1
State of AJ&K	6	2	0	**8**	0	0	0	**0**	71	220	**291**	4	0
Total	**13**	**11**	**30**	**54**	**25**	**11**	**27**	**63**	**233**	**933**	**1,166**	**103**	**2**

b. **Spring (Apr) Heavy Rains**. Additional heavy rains occurred during the April 2024. Three weather systems affected the country from 10 to 15 April 2024, 16 to 22 April 2024, 25 to 30 April 2024, furthermore, due to the inclement weather conditions, medium to high level flood flows were received at River Kabul at Nowshera from 15 to 19 April 2024 and 26 to 29 April 2024. NDMA issued 3 x Weather Advisories and 2 x Flood Alerts during the period, providing timely early warning to at-risk communities and relevant government departments to undertake necessary mitigative and preparedness actions. Subsequently, due to the weather systems, heavy rainfall and hailstorms occurred areas of Balochistan, Khyber Pakhtunkhwa, Punjab and State of AJ&K leading to flash flooding, riverine flooding and landslides in vulnerable areas, causing loss of life and damage to public and private infrastructure & properties. NDMA undertook timely and proactive coordination with respective PDMAs / GBDMA / SDMA, Rescue Services, Federal Ministries / Departments, NGOs and Armed Forces in

Prov / State	Deaths					Injured					Houses Damaged		
	Lightning	Structure Collapse	Flash Flood	Landslide	Total	Lightning	Structure Collapse	Flash Flood	Landslide	Total	Fully	Partially	Total
Bln	6	4	5	-	**15**	1	8	1	-	**10**	80	265	**345**
KP	-	55	6	3	**64**	-	82	4	2	**88**	510	2863	**3373**
Punjab	23	3	-	-	**26**	5	3	-	-	**8**	-	7	**7**
GB	-	-	-	-	**-**	-	-	-	-	**-**	2	-	**2**
AJ&K	-	5	6	-	**11**	-	5	6	-	**11**	27	107	**134**
Total	**29**	**67**	**17**	**3**	**116**	**6**	**98**	**11**	**2**	**117**	**619**	**3242**	**3861**

order to ensure timely and holistic response. Summary of relief shared below: -

April Heavy Rains - Relief Efforts Coordinated By NDMA						
Districts	Tents	Blankets	Plastic Mats	Kitchen Sets	Solar Lights	Solar Panels
Balochistan						
District Gwadar	1,000	1,000	1,000	1,000	2,000	1,000
District Chaghi	1,000	1,000	1,000	1,000	2,000	1,000
District Pishin	1,000	1,000	1,000	1,000	2,000	1,000
Total	3,000	3,000	3,000	3,000	6,000	3,000
Khyber Pakhtunkhwa						
District Lower Chitral	1,200	1,200	1,200	1,200	2,200	1,100
District Upper Dir	1,200	1,200	1,200	1,200	2,200	1,100
District Swat	1,200	1,200	1,200	1,200	2,200	1,100
District Charsadda	1,200	1,200	1,200	1,200	2,200	1,100
District DI Khan	1,200	1,200	1,200	1,200	2,200	1,100
Total	6,000	6,000	6,000	6,000	11,000	5,500
G. TOTAL	9,000	9,000	9,000	9,000	17,000	8,500

c. **Monsoon Rains**. Monsoon season commenced from 1 July to 30 September 2024, punctuated by many torrential rainfall spells, leading to numerous events of flash floods, hill torrents, riverine floods, glacial lake outburst floods, urban floods and landslides throughout the country in vulnerable areas of Balochistan, Khyber Pakhtunkhwa, Punjab, Sindh, Gilgit Baltistan and State of AJ&K. Monsoon Season 2024 saw approx. 51% above average rainfall through the country, with heaviest falls occurring in respectively in Balochistan and Sindh. In order to ensure timely awareness, NDMA issued 13 x Weather Advisories, 9 x Flood Alerts and 2 x Cyclone Advisories during the period, providing early warning to at-risk communities and relevant government departments in order to undertake all necessary mitigate and preparedness actions. NDMA undertook prompt and proactive coordination with respective PDMAs / GBDMA / SDMA, Rescue Services, Federal Ministries / Departments, NGOs and Armed Forces in order to ensure concise, timely and holistic response throughout the monsoon season in the various vulnerable

1 July to 30 Sep 2024 Rainfall			
Areas	Normal (mm)	Actual (mm)	Deviation (%)
Pakistan	140.9	212.1	+ 51
Balochistan	58.3	122.9	+ 111
Khyber Pakhtunkhwa	256.3	242.6	- 5
Punjab	231.9	344.0	+ 48
Sindh	133.7	278.4	+ 108
Gilgit Baltistan	39.7	40.5	+ 2
State of AJ&K	389.5	306.5	- 21
Data Source: PMD			

areas. The Summary of losses and damages occurred during the season are below: -

Monsoon 2024 - Cumulative Losses / Damages Jul to Sep 2024														
Loc	Deaths				Injured				Infra Damage					Livestock Perished
	Male	Female	Child	Total	Male	Female	Child	Total	Houses FD	Houses PD	Total	Schools	Bridges (All Types)	
Bln	15	3	24	42	3	2	14	19	1591	15797	17388	0	7	799
KP	40	21	51	112	45	34	67	146	263	716	979	7	14	152
Punjab	43	18	62	123	122	90	105	317	100	192	292	0	0	107
Sindh	25	13	39	77	66	27	66	159	12893	26252	39145	0	3	1125
GB	1	0	3	4	0	0	1	1	65	109	174	0	14	80
AJ&K	3	0	7	10	12	7	7	26	159	62	221	1	4	20
Total	127	55	186	368	248	160	260	668	14974	43225	58199	8	42	2283

94. **International Relief Ops to Palestine, Lebanon & Syria**. NDMA has always been on forefront for provision of relief assistance to friendly countries and upholding its commitment, NDMA has dispatched relief assistance to Palestine in response to the ongoing humanitarian crisis caused by conflicts and violence in the region. This aid was part of Pakistan's diplomatic efforts to stand in solidarity with Palestine. Pakistan has historically been a vocal advocate for Palestinian rights in international forums, and this relief effort accentuated that commitment. Recently NDMA has extended its relief operation and provided relief assistance to Lebanon and Syria. NDMA has sent aid in two phases; **Phase-1** from October 2023 to September 2024 and **Phase-2** started from October 2024, which is on-going. In 1st phase NDMA has dispatched **11 consignments**, weighing **1,178 tons** to Palestine and **3 Tons** to Lebanon through **Chartered Flights** & **PAF Aircrafts**, **Pakistan Navy Vessels** and **Civil Cargo Ships**. In **Phase-2**, NDMA has dispatched **9 consignments**, weighing **558 tons** of relief assistance; Palestine (95 Tons), Lebanon (369 Tons) and Syria (94 Tons) using Chartered Flights, Road Convoy and Civil Cargo Ships. Summary of NDMA's assistance to Palestine, Lebanon and Syria is as following: -

Tranche	Mode	Date	From	To
1st	Chartered Flight	8 Oct 23	Islamabad	Al Arish
2nd	Chartered Flight	7 Nov 23	Islamabad	Al Arish
3rd	PAF (IL-78)	1 Jan 24	Islamabad	Amman
4th	PAF (IL-78)	13 Jan 24	Islamabad	Amman
5th	PAF (C-130)	4 Feb 24	Islamabad	Al Arish
6th	Chartered Flight	6 Feb 24	Karachi	Amman
7th	Ship Container	26 Feb 24	Karachi	Port Said

Tranche	Mode	Date	From	To
8th	Ship Container	22 Apr 24	Karachi	Port Said
9th	Ship Container	4 Jul 24	Karachi	Aqaba
10th	Chartered Flight	2 Oct 24	Karachi	Amman
11th	Chartered Flight	9 Oct 24	Karachi	Damascus
12th	Chartered Flight	17 Oct 24	Karachi	Beirut
13th	Chartered Flight	26 Oct 24	Islamabad	Amman
14th	Chartered Flight	27 Oct 24	Karachi	Beirut
15th	NLC Road / Ship Convoy	27 Oct 24	Islamabad	Beirut
16th	NLC Road Convoy	27 Oct 24	Islamabad	Damascus
17th	Chartered Flight	29 Oct 24	Islamabad	Beirut
18th	Chartered Flight	29 Oct 24	Islamabad	Beirut
19th	Chartered Flight	17 Nov 24	Islamabad	Damascus
20th	Chartered Flight	19 Nov 24	Islamabad	Damascus

95. **Ex-Gratia Assistance Provided during 2024**. During heavy rains spell in February/ March 2024, in pursuance to directive issued by Honourable Prime Minister of Pakistan: **963 x** compensation cheques issued to the affected persons in Balochistan, Azad Jammu & Kashmir (AJ&K), and Khyber Pakhtunkhwa.

96. **Applications for Redressal of Grievance**. A total of 50 applications of affectees were received for grievances. In order to ensure provision of relief and timely redressal of grievance NDMA referred these applications to concerned PDMAs / GBDMA / SDMA, Federal and Provincial departments for necessary action as per policy/ rules.

97. **Key Lessons from Disasters 2024**. During the course of the year, a **number of challenges** were faced by stakeholders at respective levels due to which **valuable lessons** were **learnt** by all concerned. Key **lessons** are **outlined below**: -

a. Current network of weather monitoring stations does not adequately cover far flung or isolated areas of the country; areas of Balochistan, Khyber Pakhtunkhwa, Gilgit Baltistan and State of AJ&K.

b. Lack of gauges / sensors/ monitoring mechanism in areas of rain induced hazards; flash floods, hill torrents, landslides, catchment areas of reservoirs/ barrages, near bridges and for monitoring of drainage system of major urban cities.

c. Shifting / erratic behaviour of weather patterns from areas of traditional downpours.

d. No micro level multi-hazard vulnerability and risk mapping of the country.

e. Timely and advanced early warning of weather systems and foreseen adverse impacts enabled majority of stakeholders to undertake timely evacuation of vulnerable areas and save lives.

f. Siting of housing societies / construction near or in path of water flow from nullahs / check dams / reservoirs caused undue risk to life.

g. Lack of implementation of River Act in letter and spirit by all Provinces to expedite clearance of encroachments in water ways.

h. Improper / lack of effective maintenance flood protective works, especially bunds led to premature breach leading to unwarranted damages to private and public infrastructure.

i. Majority of deaths and injuries which occurred throughout the year were due to roof / wall collapse of homes, due to lack of preventative maintenance of structures.

j. Lack of redundancy in communications infrastructure left many affected areas without mobile cellular or landline telephone services and disrupted road access for extended periods of time.

k. Non-availability of LEA personnel for diverting / halting traffic in timely fashion on disrupted roadways led to extensive traffic jams in affected areas and caused un-due suffering of travellers stuck on roadways.

l. Local Government system does not have adequate capacity to handle multiple hazards which are likely in their respective areas.

m. Illegal / unauthorised bund construction and breaches caused undue flooding in some rural areas, exposing villages to flood water.

n. Lack of written operations record, i.e. rescue and relief operations which were undertaken by rescue services and armed forces were not fully or properly documented.

o. **Importance of Pre-Positioning Relief Stocks**. Replenishment of stocks based on the revised policy ensures that NDMA is prepared for disaster scenarios. This proactive approach is crucial in mitigating delays in disaster response and minimizing the impact on affected populations.

p. **Local Sourcing for Efficiency**. By sourcing low-cost items locally, NDMA not only reduces reliance on external assistance but also supports

the local economy. This strategy enhances the speed of response and reduces logistical costs.

q. **Targeted International Coordination**. The differentiation between low-cost and high-cost items allows NDMA to efficiently allocate resources, utilizing diplomatic channels for high-value items and reserving local resources for less expensive, more immediately needed supplies. This ensures effective / balanced disaster response.

r. **Data-Driven Decision Making**. **e-Logistics Calculator** enhances real-time decision-making, helping to identify stock gaps and logistical needs more accurately. This tool ensures that disaster management efforts are based on actual data, leading to a more targeted and effective response.

s. **Regional and International Solidarity**. NDMA's ability to mobilize resources not just for national needs but also for international aid (e.g., to Palestine) underscores the importance of global cooperation and humanitarian support. It demonstrates the value of having both domestic and international relief capacities to respond to crises across borders.

5 Risk Communication

98. Risk communication is a fundamental component of the disaster risk management and NDMP, facilitating the timely and accurate dissemination of information before, during, and after disasters. Effective risk communication not only empowers communities to make informed decisions but also enhances the overall resilience of society against disasters. This chapter aims to explore the various facets of risk communication drawing on Pakistan's experiences and emphasizing innovative strategies for effective disaster management.

99. **Historical Context**. One of the most significant incidents in Pakistan's recent history was the 2005 Kashmir Earthquake, a catastrophic event that not only devastated the region but also profoundly impacted the entire nation. The earthquake, which struck with a magnitude of 7.6, resulted in the tragic loss of over 86,000 lives and left millions more homeless. Entire communities were obliterated, and vital infrastructure, including schools, hospitals, and roads, was severely damaged or destroyed. This disaster was considered a turning point in Pakistan and impetus for establishing its disaster management system.

100. In the aftermath of this disaster, it became painfully clear that critical flaws existed within the country's disaster response framework. One of the most glaring issues was the **inadequacy of risk communication strategies**, which played a pivotal role in **hindering effective relief operations**. The **failure to disseminate** timely and accurate information about the earthquake's impact, the needs of affected populations, and available assistance options created confusion and delayed the delivery of aid.

101. This was followed by the 2010 Floods, which represented one of the most devastating natural disasters in Pakistan's history. Triggered by an unprecedented series of heavy monsoon rains, the Indus River overflowed, resulting in widespread flooding that affected approximately 20 million people across the country. Entire communities were submerged, crops were destroyed, and infrastructure was severely damaged, leading to significant humanitarian needs.

102. In the face of this catastrophe, NDMA encountered substantial challenges in effectively communicating the scale of the disaster to the public and coordinating the necessary evacuation measures. The sheer magnitude of the flooding overwhelmed

local resources and complicated rescue operations, as many affected populations were cut off from communication and aid. This communication gap created confusion and uncertainty among those in affected areas, leading to delays in evacuations and relief efforts. Many communities were unaware of the impending dangers and did not receive adequate guidance on how to protect themselves and their families.

103. Moreover, the flooding highlighted the importance of developing a more robust communication strategy that can swiftly convey crucial information during emergencies. This includes establishing clear channels for disseminating warnings, updates, and evacuation instructions, especially in areas prone to natural disasters. The lessons learned from the 2010 floods emphasized the need for enhanced preparedness and a proactive approach to disaster risk communication. By improving the mechanisms for sharing information and coordinating responses.

104. **Utility of Multi-Domain Communication Strategies**. These strategies encompass a diverse array of channels and methods utilized to effectively convey information to varied audiences, particularly during emergencies. In the context of disaster management, these strategies are crucial for ensuring that critical information reaches affected populations in a timely manner. By employing multiple communication avenues, authorities can enhance their outreach and ensure that vital messages are understood and acted upon. Incorporating a multi-domain approach to communication ensures that information is not only disseminated widely but is also tailored to meet the needs of various audiences. By leveraging the strengths of traditional media, digital platforms, and community-based methods, disaster management efforts can achieve a more comprehensive and effective communication strategy. Ultimately, this enhances the ability to inform, prepare, and protect populations during emergencies, significantly contributing to a more resilient society. These are outlined below: -

a. **Traditional Media**. This category includes newspapers, television, and radio, which remain powerful tools for broad coverage and public awareness.

Traditional media has a significant reach, particularly in rural areas where digital access may be limited. These

platforms can disseminate essential information about impending disasters, evacuation routes, and safety measures to large audiences quickly, providing updates as situations evolve. In times of crisis, the reliability of traditional media can help build trust among communities, making it a vital component of disaster communication.

b. **Digital Platforms**. The rise of social media and mobile applications has transformed the landscape of communication, particularly in engaging younger audiences. These digital channels allow for real-time updates, interactive engagement, and immediate feedback from users. Social media platforms such as Twitter, Facebook, and Instagram can be instrumental in disseminating urgent alerts and safety information rapidly. Mobile applications can provide users with personalized alerts based on their location, ensuring that they receive critical updates specific to their situation. The agility and reach of digital platforms enable authorities to communicate effectively with diverse demographic groups, enhancing overall disaster preparedness.

c. **Community Based**. Engaging communities through local meetings, workshops, and training sessions fosters direct interaction and trust between disaster management authorities and the public. These approaches empower local communities to take ownership of their safety and preparedness by facilitating dialogue about risks and response strategies. By involving community members in planning and decision-making processes, authorities can tailor their communication efforts to address the specific needs and concerns of local populations. This grassroots involvement not only enhances the effectiveness of communication strategies but also strengthens community resilience in the face of disasters.

105. **Successful Examples**. There are a number of examples which showcase the success of risk communication utilising multiple channels of engagement, as outlined in preceding paragraph, which includes: -

a. **Social Media**. These platforms have emerged as vital tools for risk communication, particularly during disasters when the need for timely and accurate information is paramount. These platforms enable agencies to quickly disseminate information and updates, allowing them to reach a vast audience in real time. The immediacy and accessibility of platforms like Twitter and Facebook make them essential for effective disaster communication. For instance, during the 2019 monsoon season, the National Disaster Management Authority (NDMA) effectively utilized social media to share critical alerts about impending floods, demonstrating the power of these channels in enhancing public awareness and safety. This has been successfully leveraged by NDMA in order to: -

(1) **Regular Updates**. One of the most effective tactics was to post frequent updates that kept the public informed of changing conditions. By providing real-time information about weather forecasts, flood alerts, and safety measures, the NDMA ensured that communities were aware of the evolving situation. Regular posts served to reinforce the importance of preparedness and encouraged individuals to take necessary precautions. This consistent flow of information helped mitigate confusion and allowed people to make informed decisions regarding their safety and evacuation plans.

(2) **Engagement with Influencers**. Recognizing the potential of social media influencers to broaden outreach, the NDMA collaborated with key figures who have a substantial following on various platforms. By leveraging the influence of these individuals, the NDMA was able to amplify its messages and reach younger and more diverse audiences. Influencers can create relatable content that resonates with their followers, making critical information more accessible and engaging. This strategy not only expanded the reach of the NDMA's

communication efforts but also fostered a sense of community support and collective action among the public.

b. **Community Engagement**. Community engagement initiatives, such as local workshops and training sessions, empower citizens to understand disaster risks and respond effectively. Engaging local leaders and community groups fosters trust and enhances information dissemination, ensuring that messages resonate with target audiences. Successful community engagement strategies have included:

(1) Participatory Training Programmes involving community members in disaster preparedness drills.

(2) Local Communication Networks for establishing grassroots networks to facilitate information sharing during disasters.

106. **Benefits of Implementing Multi-domain Channels**. The integration of multiple communication domains ensures a more comprehensive approach to risk communication, enabling disaster management agencies to effectively reach and inform the public during crises. By combining traditional media, digital platforms, and community engagement strategies, these agencies can significantly enhance public awareness and preparedness. The benefits of this integrated approach are substantial and multifaceted: -

a. **Enhanced Reach**. One of the primary advantages of utilizing multiple communication channels is the broader dissemination of information across various demographics. Different segments of the population engage with different media; for example, older adults may rely more on traditional media like television and newspapers, while younger individuals often turn to social media and mobile applications for updates. By employing a multi-channel strategy, disaster management agencies can ensure that critical information reaches all sectors of society, regardless of age, location, or technological access. This inclusivity is essential for effective risk communication, particularly in diverse communities that may have varying levels of access to information.

b. **Increased Credibility**. Consistent messaging through multiple channels reinforces trust in the information provided. When individuals receive the same messages from various sources—such as news broadcasts, social

media updates, and community meetings—they are more likely to view the information as credible and reliable. This consistency is crucial during a disaster, as it helps to dispel rumours and misinformation that can lead to panic or confusion. By establishing a unified communication strategy, agencies can foster a sense of trust among the public, encouraging them to act on the information provided and follow safety recommendations. Increased credibility ultimately contributes to better preparedness and response efforts.

c. **Improved Engagement**. An integrated communication approach also enhances opportunities for public engagement. By utilizing various platforms, agencies can create interactive and participatory communication experiences, allowing community members to ask questions, share concerns, and provide feedback. This two-way communication fosters a sense of community involvement and empowers individuals to take an active role in disaster preparedness and response.

d. **Tailored Messaging**. Different audiences may have distinct needs and preferences regarding how they receive information. An integrated approach allows agencies to tailor messages for specific groups, ensuring that the content is relevant and accessible. For example, visual content may be more effective for younger audiences, while detailed written reports might be better suited for local government officials. By customizing messages to meet the needs of different demographics, disaster management agencies can enhance the effectiveness of their communication strategies.

107. The integration of multiple communication domains creates a robust framework for risk communication in disaster management. By enhancing reach, increasing credibility, improving engagement, and allowing for tailored messaging, agencies can significantly improve public awareness and preparedness. This comprehensive approach not only facilitates timely information dissemination but also strengthens community resilience in the face of natural disasters.

108. **Establishing DM Experts in Media**. Creating a network of disaster management experts within the media is a strategic initiative that can significantly enhance collaboration and information sharing between media professionals and disaster management agencies. In an age where accurate and timely communication is critical during emergencies, establishing strong relationships between these two sectors is essential for ensuring that the public receives consistent and reliable information.

109. Facilitating Collaboration by fostering a network of disaster management experts within the media, agencies can facilitate more effective collaboration between journalists and disaster response teams. This collaboration can lead to the development of clear communication protocols that outline how information should be shared during crises. When media professionals are well-informed about the operations and challenges faced by disaster management agencies, they can better report on incidents and provide the public with accurate updates. This mutual understanding helps to minimize the spread of misinformation and ensures that essential messages are communicated effectively.

110. Organizing regular forums, workshops, and training sessions can play a pivotal role in nurturing relationships between media professionals and disaster management agencies. These gatherings provide opportunities for stakeholders to discuss best practices, share insights, and explore new communication technologies. They can also serve as platforms for training media personnel on the specifics of disaster management, including response protocols, risk assessment, and the importance of accurate reporting.

111. Establishing a network of experts helps to build trust and credibility within the media landscape. When journalists have direct access to disaster management professionals, they can obtain firsthand information and expert opinions, which enhances the quality and reliability of their reporting. This credibility is crucial in times of crisis when the public relies heavily on media coverage to navigate emergencies. Trustworthy reporting not only informs

citizens but also encourages them to heed warnings and follow guidance from authorities.

112. A well-connected network of media and disaster management experts can significantly enhance preparedness and response efforts. By working together, both sectors can develop comprehensive communication strategies that outline how information will be disseminated before, during, and after disasters. This proactive approach can lead to faster dissemination of vital information, improved public compliance with safety measures, and ultimately, a more effective overall response to emergencies.

113. Through collaborative efforts and utilising multiple domains, the media can play a crucial role in promoting community awareness about disaster preparedness and resilience. By partnering with disaster management agencies, media outlets can produce informative content, campaigns, and public service announcements that educate communities on how to prepare for and respond to disasters. This outreach not only enhances public knowledge but also fosters a culture of preparedness within communities, making them more resilient to future disasters.

6 International Engagement for Enhanced Disaster Risk Management

114. Foreign pre-coordination is a critical component of disaster management that involves early engagement with friendly countries / international development partners before a disaster strikes. This proactive approach ensures that the mechanisms for collaboration, resource mobilization, and operational readiness are in place, thus streamlining response efforts once a disaster occurs. Foreign pre-coordination involves the systematic planning and interaction with foreign governments through Pakistan missions abroad as well as through foreign missions based in Pakistan. This pre-disaster coordination is crucial in the face of Pakistan's vulnerability to various natural hazards, including floods, earthquakes, landslides, Glacial Lake Outburst Floods (GLOF), heatwaves, droughts, and storms.

115. Given Pakistan's diverse disaster risks, which vary seasonally and geographically, this foreign pre-coordination is vital for minimizing response delays and ensuring that aid reaches the most affected areas in a timely manner. By fostering this level of pre-disaster coordination, Pakistan is better prepared to respond efficiently to crises, minimizing loss of life and property. This approach significantly strengthens the country's disaster preparedness regime.

116. The need for effective foreign pre-coordination becomes especially important in preparing for large-scale disasters that can overwhelm national response capabilities. For instance, ensuring access to specialized rapid deployment of humanitarian assistance, and access to DRR knowledge from global experts. Pre-coordination also allows for the pre-positioning of essential supplies, such as equipment/ material and humanitarian relief items, through international collaboration, ensuring that aid is deployed quickly and effectively in areas in the event of a disaster.

117. Pakistan’s active engagement with regional and national bodies like SAARC, ASEAN, Türkiye’s AFAD and United States’ FEMA etc. plays a pivotal role in strengthening disaster preparedness in South Asia and Southeast Asia, regions that are prone to similar risks. By engaging in regional disaster management frameworks, Pakistan can both share its expertise and learn from the experiences of neighbouring countries. This collaboration helps in creating a unified regional approach to disaster preparedness, enhancing collective resilience. Similarly, participation in global initiatives like the Sendai Framework for Disaster Risk Reduction facilitates the

adoption of international best practices in managing disaster risk, mitigation, and response.

118. The effectiveness of foreign pre-coordination in disaster management for Pakistan has been demonstrated in several major events, with the 2022 floods standing out as a prominent example. The 2022 floods were one of the most catastrophic events in Pakistan's history, displacing millions of people and causing widespread destruction across the country. The scale of the disaster far exceeded Pakistan's response capacity, but thanks to pre-established relationships with international bodies, immediate and large-scale humanitarian aid was mobilized.

7 Hazard Specific International Best Practices

119. Hazard-Specific International Best Practices refer to the globally recognized and effective methods for managing and mitigating risks associated with particular hazards. These practices are developed and refined through international collaboration, research, and experience sharing among experts, organizations, and governments. This chapter will provide details on some of the best practices for various hazards faced in the country. These hazards include: -

a. **Floods**. Flooding in the plain zones of Punjab and in Khyber Pakhtunkhwa is an annual hazard which is managed by a multifaceted approach and essential management. Engaging in responsible waste disposal, enhance local plantation, and install permeable surfaces to improve water absorption. Collaboration with local authorities for drainage system maintenance and early warning systems is crucial. Provincial governments should focus on upgrading infrastructure, promoting green spaces, and developing comprehensive flood management plans. The private sector can contribute by creating flood monitoring apps and introducing the concept of elevating structures to mitigate risk. NGOs and academia can enhance community resilience through education on flood preparedness and sustainable practices. Together, these efforts foster a proactive response to flooding challenges, promoting safer and more resilient environments.

b. **GLOF**. Glacial Lake Outburst Floods (GLOF) resilience is based on early warnings that are essential, Governance role in enforcing construction regulations in high-risk zones and investing in infrastructure like flood protection walls, continued discharge from moraine dam, creating falls and pits for drawing down intensity of tail water. Collaborative efforts between governments and NGOs are crucial for fostering resilient communities, while continuous education and training ensure that all stakeholders are prepared for potential GLOF through adhering to cautions and early warning.

c. **Landslides**. Landslide risk is higher in all high mountain zones and exacerbated during monsoon, rains, snow and earthquakes especially in Gilgit Baltistan and Upper Khyber Pakhtunkhwa. National and International academia emphasizes the importance of assessment surveys, planned development and infrastructural reinforcements during development. Other studies for landslides risk preparedness suggest that community engagement, early warning systems, and sustainable land management may be considered for impact mitigation. Key strategies include conducting risk assessments through LiDAR surveys, improving infrastructure resilience, and providing training for emergency preparedness. Collaboration among local communities, NGOs, and District Disaster Management Officers is crucial for effective response and recovery. Real-time monitoring through satellite, UAVs images during inclement weather and after earthquakes. Public education campaigns and drills for identifying potential hazards and measures to take right after first signs or early warning further strengthen community readiness for landslides.

d. **Earthquakes**. To enhance earthquake preparedness in Pakistan, individuals and communities should adopt practices such as constructing earthquake-resistant buildings, developing family emergency plans, and participating in educational programs about risks and preparedness. Federal organizations through provincial government should ensure and enforce building codes and collaborate with local authorities for warning, risk management and emergency response plans. The private sector can contribute by producing specialized building materials, while NGOs should focus on community engagement and developing clear procedures for search, rescue and relief operations. Establishing a robust seismic monitoring network and conducting regular drills will further strengthen the nation's resilience to earthquakes.

e. **Heatwaves**. Rising temperatures and extreme heat are potentially the aftermath of urban heat sinks and attributed to an increase in greenhouse gases. This causes sudden increase in ambient temperature of an area which may persist for days. A range of strategies

are suggested through studies involving foremost plantation and rooftop gardening. Suitable foods, clothing, remaining hydrated and avoiding unnecessary travel during afternoon. Early warning systems can notify communities of heat risks, while afforestation and green urban planning can mitigate urban heat effects. Effective governance involves regulations for sustainable practices and renewable energy adoption. Additionally, federal organizations should coordinate disaster responses, promote climate resilience, and support climate adaptation initiatives to protect vulnerable populations and enhance overall community preparedness.

f. **Drought & Water Scarcity**. To address drought and water scarcity a multifaceted approach is essential. This includes promoting indigenous water management practices, implementing efficient irrigation systems, and enhancing rainwater harvesting techniques. Both national and international efforts should focus on innovative agricultural practices such as hydroponics and agri-voltaic systems, alongside developing drought-resistant crop varieties. Governance strategies must emphasize sustainable water resource management, while NGOs and private sectors can play crucial roles in community support and infrastructure development. Effective early warning systems and public awareness campaigns are vital for timely responses to potential drought conditions.

g. **Wildfires / Forest Fires**. Wildfires or forest fires often are started due to human activities (66% of the reported incidents). Best practices for wildfire management include promoting community engagement for removal of biomass before dry season from the forest floor. Awareness initiatives and encouraging cooperation within Joint Forest Management Committees to report and possibly extinguish forest fire on observation. Effective governance is crucial for placing rapid response firefighting teams; implementing a proactive and robust reporting system to analyze fire trends and reinforcing compliance with fire regulations are essential. Federal organizations should support sustainable forest management and ensure the presence of qualified fire safety staff. Additionally, the private sector can contribute by developing

advanced fire detection technologies and sustainable practices, while NGOs should focus on integrating science-based methods for wildfire control. Furthermore, collaboration across all sectors including media is essential for communication and early warning.

h. **Tropical Cyclones**. Cyclonic storms are a hazard from which communities in the coastal zones of Sindh and Balochistan are most prone. The best practices adopted include staying informed through update and early warning from National Emergencies Operations Centre (NEOC) and through weather updates, planting mangroves and trees for wind resistance, and participating in community preparedness efforts. Governance should focus on strengthening disaster management capacities of local government for evacuation to safe areas as well as water discharge from impacted zones, launching public awareness campaigns, and enforcing building codes for cyclone resilience. Federal agencies must conduct risk assessments and encourage investment in climate adaptation. The private sector should develop robust infrastructure and early warning systems, while NGOs can enhance community awareness and support emergency shelters. Academia should promote nature-based solutions and integrate technology for better impact forecasting, and local media must ensure effective communication of warnings. Finally, coordinated search and rescue efforts are essential for ensuring the safety of affected populations.

i. **Sand / Dust Storms**. In desert zones like Punjab, Sindh, Balochistan, best practices for mitigating the impacts of dust and sandstorms involve both individual and community actions as well as governance strategies. Individuals can safeguard themselves by keeping doors and windows sealed, using air filtration systems, and planting drought-resistant vegetation. Communities should engage in afforestation, establish protective structures, and conduct public awareness campaigns on storm safety. At the governance level, local authorities must implement desert land reclamation, disaster preparedness plans, designate emergency shelters, and support sustainable land management practices. Federal organizations should

promote vegetation growth, enhance meteorological monitoring, and facilitate collaboration with neighboring countries for comprehensive dust storm management. Additionally, the private sector can bolster infrastructure resilience and educate communities, while NGOs can provide resources and training for effective storm response.

j. **Vector Borne Diseases**. Effective management of vector-borne diseases (VBDs) requires a multi-faceted approach at various levels. At the individual and community level, key interventions include the use of Insecticide-Treated Nets (ITNs), Indoor Residual Spraying (IRS), and Larval Source Management (LSM). Engaging local communities through awareness campaigns and forums enhances understanding of disease transmission and prevention. Area governance should focus on ensuring 100% vaccination coverage, regular maintenance of water supply lines, and disinfection of public spaces to prevent outbreaks. Federal organizations need to strengthen malaria control programs and facilitate regional data sharing for effective response strategies. Private sector involvement is essential for funding mechanisms and training health professionals in multidisciplinary approaches to VBDs. NGOs and humanitarian organizations should collaborate to enhance healthcare infrastructure and establish robust disease surveillance systems for early detection and response. Lastly, local media and early warning centers can play a crucial role in disseminating information and creating awareness to mitigate health impacts. Integrating these practices will foster a comprehensive response to vector-borne disease epidemics in both high mountain and desert zones.

k. **Smog / Air Pollution**. Best practices for mitigating air pollution in Punjab, Sindh, Balochistan include promoting eco-friendly practices at the individual and community level, such as tree planting and awareness campaigns. Area governance should focus on enforcing strict emission regulations for vehicle health and developing sustainable land use plans. Federal / Provincial organizations such as Environment Protection Agencies (EPA) must enhance air quality monitoring and incentivize renewable energy research. The private sector should adopt cleaner

technologies and sustainable practices, while NGOs can engage communities and advocate for stronger environmental policies. Academia should conduct interdisciplinary research and provide essential data, and local media must raise public awareness and offer real-time air quality updates. Lastly, search and rescue and law enforcement agencies should ensure swift responses to pollution-related incidents and engage in community education about air pollution risks.

l. **Industrial / Urban Disasters**. Disaster preparedness and response in industrial and urban areas across Pakistan and industrial areas of Punjab, Sindh and Balochistan, could be enhanced by following best practices including following safety regulations, participating in emergency drills, and raising fire safety awareness within communities. There should be a focus on comprehensive risk assessments and the establishment of a Daily Reporting System for industrial fires, alongside environmental monitoring to enforce safety standards. Federal organizations must implement effective waste management and foster partnerships for early warning, resource sharing during emergencies and containing the devastation. The private sector should conduct hazard analyses and invest in advanced monitoring and safety systems like EHS standards of safety for industry, while NGOs can train community members to assist in emergency response. Academia should design fire-safe structures and conduct regular drills for poisonous gas leakages, while local media should ensure timely dissemination of alerts. Finally, search and rescue operations must develop tailored preparedness plans and enhance collaboration among emergency services to effectively address urban and industrial risks.

8 Annexures

Annexure-I: List of Concerned Organisations

Department	Contact Number
Pakistan Meteorological Department (PMD)	051-9250367 051-9250368 051-9250364
Flood Forecasting Division, Lahore	042-99200208
Army Flood Control Centre, Engineers Directorate	051-5202059 051-5202060 203525 (DEFCOM) 8000-30855 (PASCOM)
DG NHEPRN	051-9255708-9
Federal Flood Commission	051-9244604 051-9244616
IRSA, Islamabad	051-9244600 051-9244599
SUPARCO Islamabad	051-9075265
Nullah Lai Control Room	051-9250566
Rescue 1122 Punjab	042-37423372
Rescue 1122 Rawalpindi	051-9291185
Rescue 1122 Khyber Pakhtunkhwa	091-9222483-4
Rescue 1122 Gilgit Baltistan	05811-922137
Rescue 1122 Azad Jammu & Kashmir (SDMA)	0333-3331122
Geological Survey of Pakistan, Islamabad	051-9269579 051-9255141
COMKAR Karachi	021-48506113 021-48501705
Pakistan Maritime Security Agency, Karachi	021-99214624 021-99214625
PCIW (Pakistan Commission for Indus Water) Lahore	042-99212783-86
GM, Pakistan Railway Lahore	042-99201700
Punjab Irrigation Department	042-99212117-8
Balochistan Irrigation Department	081-9201074
Sindh Irrigation Department	021-99222949 021-99222950
Azad Jammu & Kashmir Irrigation Department	05822-921596 05822-921157
KP Irrigation Department	091-9210845 091-9212116
Civil Defence Punjab	042-99212109 042-99212111
Civil Defence Sindh	021-99243765
Civil Defence KP	091-9212176 091-2263158-59

Annexure-II: List of Emergency Operations Centres

Emergency Operation Centres	Contact Number
National Emergency Operation Centre (NDMA) Islamabad	UAN-051-111-157-157 051-9205037
Provincial Emergency Operation Centre (PEOC) Punjab	042-99204408 042-99203163
Provincial Emergency Operation Centre (PEOC) Sindh	021-99332005 021-99332003
Provincial Emergency Operation Centre (PEOC) Balochistan	081-9241133 081-9241118
Provincial Emergency Operation Centre (PEOC) Khyber Pakhtunkhwa	091-9213867 091-9213845 091-9213855
State Emergency Operation Centre (SDMA) SDMA AJ&K	05822-921536 05822-921643 05822-921101
GBDMA Emergency Operation Centre, Gilgit	05811-922030 920874-75

Annexure-III: Basic Concepts used in this Plan

1. **Capacity.** The combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience.
2. **Disaster.** A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.
3. **Disaster Management.** The organization, planning and application of measures preparing for, responding to and recovering from disasters.
4. **Disaster Management Planning.** Participatory disaster management planning is process in which the community members are involved in analyzing the participatory disaster risk assessment information, towards developing an action plan for disaster risk reduction measures that will help in reducing the prioritized risk of the target communities.
5. **Disaster Risk.** The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.
6. **Disaster Risk Assessment.** A qualitative or quantitative approach to determine the nature and extent of disaster risk by analyzing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend.
7. **Disaster Risk Management.** Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.
8. **Disaster Risk Reduction.** Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.
9. **Emergency.** Emergency is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.
10. **Hazard.** A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.
11. **Mitigation.** Lessening or minimizing of the adverse impact of a hazardous event. Mitigation include undertaking both structural and non-structural measures aimed at reducing the risk from disasters. Structural measures are any physical

construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems. Non-structural measures are measures not involving physical construction that uses knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education.

12. **Preparedness.** The knowledge and capacities developed by the governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters

13. **Prevention.** Activities and measures to avoid existing and future disaster risks.

14. **Reconstruction**. The medium- and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities and livelihoods required for the full functioning of a community or a society affected by a disaster, aligning with the principles of sustainable development and "build back better", to avoid or reduce future disaster risks. Permanent measures to repair or replace damaged dwellings and infrastructure and to set the economy back on course.

15. **Recovery**. The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster affected community or society, aligning with the principles of sustainable development and "build back better", to avoid or reduce future disaster risk.

16. **Rehabilitation.** The restoration of basic services and facilities for the functioning of a community or a society affected by a disaster.

17. **Relief.** Measures that are required in search and rescue of survivors, as well to meet the basic needs for shelter, water, food & health care. Intervention aimed at meeting the immediate needs of the victims of a disastrous event.

18. **Resilience.** The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

19. **Response.** Actions taken directly during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

20. **Risk.** The combination of the probability of an event and its negative consequences.

21. **Vulnerability.** The conditions determined by physical, social, economic and environmental factors or processes that increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

Annexure-IV – Prioritised Hazard Prone Districts of Pakistan

Districts	Divisions	Provinces	Flood	Landslide	Earthquake	Tsunami	Cyclone	Drought	Forest Fire	Smog	Avalanche	GLOF	Total Hazard
Chitral	Malakand	KP	5	5	5	0	0	1	2	0	5	5	28
Swat	Malakand	KP	5	4	4	0	0	1	4	1	4	3	26
Neelam Valley	Muzaffarabad	AJ&K	4	5	5	0	0	0	3	1	4	3	25
Gwadar	Makran	Balochistan	4	1	4	5	4	5	0	1	0	0	24
Mansehra	Hazara	KP	4	5	5	0	0	1	3	1	4	1	24
Nagar	Gilgit	Gilgit Baltistan	4	4	4	0	0	0	2	0	5	5	24
Quetta	Quetta	Balochistan	4	2	5	0	0	4	3	3	2	0	23
Sujawal	Bhanbore	Sindh	4	0	2	5	5	4	0	3	0	0	23
Thatta	Bhanbore	Sindh	4	0	2	5	5	4	0	3	0	0	23
Upper Dir	Malakand	KP	4	4	4	0	0	1	3	0	3	4	23
Gilgit	Gilgit	Gilgit Baltistan	4	4	4	0	0	0	2	0	3	5	22
Korangi	Karachi	Sindh	4	0	3	5	3	4	0	3	0	0	22
Skardu	Baltistan	Gilgit Baltistan	3	4	4	0	0	0	2	0	4	5	22
South Karachi	Karachi	Sindh	4	0	3	5	3	4	0	3	0	0	22
Ziarat	Sibi	Balochistan	4	3	5	0	0	5	2	1	2	0	22
Darel	Diamer	Gilgit Baltistan	4	4	4	0	0	0	2	0	4	3	21
Diamer	Diamer	Gilgit Baltistan	4	4	4	0	0	0	1	0	5	3	21
Ghizer	Gilgit	Gilgit Baltistan	3	4	4	0	0	0	1	0	4	5	21
Sherani	Zhob	Balochistan	3	4	4	0	0	3	5	2	0	0	21
Shigar	Baltistan	Gilgit Baltistan	3	4	4	0	0	0	2	0	5	3	21
Tangir	Diamer	Gilgit Baltistan	4	4	4	0	0	0	2	0	4	3	21
Astore	Diamer	Gilgit Baltistan	3	4	4	0	0	0	1	0	5	3	20
Badin	Bhanbore	Sindh	3	0	2	5	5	2	0	3	0	0	20
Bagh	Poonch	AJ&K	4	5	5	0	0	1	3	1	1	0	20
Hattian	Poonch	AJ&K	4	5	5	0	0	1	2	2	1	0	20
Hunza	Gilgit	Gilgit Baltistan	4	3	3	0	0	0	1	0	4	5	20
Gupis-Yasin	Gilgit	Gilgit Baltistan	3	3	3	0	0	0	1	0	4	5	19
Harnai	Sibi	Balochistan	3	3	5	0	0	3	4	1	0	0	19
Kharmang	Baltistan	Gilgit Baltistan	3	4	4	0	0	0	1	0	4	3	19
Lower Dir	Malakand	KP	4	4	4	0	0	1	2	1	2	1	19
Muzaffarabad	Muzaffarabad	AJ&K	4	5	5	0	0	0	2	2	1	0	19
Poonch	Poonch	AJ&K	4	5	5	0	0	1	3	0	1	0	19
Shangla	Malakand	KP	4	4	4	0	0	1	3	1	2	0	19
West Karachi	Karachi	Sindh	4	0	3	3	3	4	0	2	0	0	19
Chaman	Quetta	Balochistan	3	2	5	0	0	4	2	1	1	0	18
Ghanche	Baltistan	Gilgit Baltistan	3	4	4	0	0	0	1	0	3	3	18
Haveli	Poonch	AJ&K	3	5	5	0	0	1	2	1	1	0	18
Keamari	Karachi	Sindh	3	0	3	4	2	4	0	2	0	0	18
Killa Saifullah	Zhob	Balochistan	3	3	4	0	0	4	3	1	0	0	18
Lasbela	Kalat	Balochistan	4	1	3	1	4	3	1	1	0	0	18
Malir	Karachi	Sindh	4	0	2	1	5	4	0	2	0	0	18
Rondu	Baltistan	Gilgit Baltistan	3	3	3	0	0	1	1	0	4	3	18
South Waziristan	D.I. Khan	KP	4	3	3	0	0	2	4	2	0	0	18
Awaran	Kalat	Balochistan	4	3	4	0	0	4	1	1	0	0	17
Bajaur	Malakand	KP	5	4	4	0	0	1	2	1	0	0	17
Battagram	Hazara	KP	3	4	5	0	0	1	2	1	1	0	17
Central Karachi	Karachi	Sindh	4	0	3	1	2	4	0	3	0	0	17
Duki	Loralai	Balochistan	3	3	4	0	0	3	2	2	0	0	17
East Karachi	Karachi	Sindh	4	0	3	1	2	4	0	3	0	0	17
Hub	Kalat	Balochistan	4	0	3	1	4	3	1	1	0	0	17
Islamabad	I.C.T.	I.C.T.	4	3	3	0	0	1	3	3	0	0	17

Districts	Divisions	Provinces	Flood	Landslide	Earthquake	Tsunami	Cyclone	Drought	Forest Fire	Smog	Avalanche	GLOF	Total Hazard
Jhal Magsi	Naseerabad	Balochistan	5	3	3	0	0	3	1	2	0	0	17
Kohlu	Sibi	Balochistan	3	2	4	0	0	3	3	2	0	0	17
Kolai Palas	Hazara	KP	3	4	4	0	0	1	2	1	2	0	17
Kurram	Kohat	KP	4	3	3	0	0	3	3	1	0	0	17
Pishin	Quetta	Balochistan	3	2	5	0	0	4	2	0	1	0	17
Rawalpindi	Rawalpindi	Punjab	4	3	3	0	0	0	4	3	0	0	17
Tor Ghar	Hazara	KP	4	4	4	0	0	2	2	1	0	0	17
Upper Kohistan	Hazara	KP	4	4	4	0	0	1	3	0	1	0	17
Usta Muhammad	Naseerabad	Balochistan	5	1	3	0	0	3	2	3	0	0	17
Washuk	Rakhshan	Balochistan	3	1	4	0	0	5	2	2	0	0	17
Zhob	Zhob	Balochistan	3	3	4	0	0	3	3	1	0	0	17
Abbottabad	Hazara	KP	3	4	4	0	0	1	2	1	1	0	16
Bannu	Bannu	KP	4	2	3	0	0	2	2	3	0	0	16
Khuzdar	Kalat	Balochistan	3	4	4	0	0	3	1	1	0	0	16
Killa Abdullah	Quetta	Balochistan	3	2	4	0	0	5	2	0	0	0	16
Kotli	Mirpur	AJ&K	3	4	4	0	0	1	3	1	0	0	16
Mastung	Kalat	Balochistan	3	2	4	0	0	4	2	0	1	0	16
Nushki	Rakhshan	Balochistan	3	1	5	0	0	5	1	1	0	0	16
Sh. Benazirabad	Sh. Benazirabad	Sindh	4	0	2	1	2	1	2	4	0	0	16
Tank	D.I. Khan	KP	5	2	3	0	0	2	2	2	0	0	16
Tharparkar	Mirpurkhas	Sindh	3	0	2	0	4	4	0	3	0	0	16
Barkhan	Loralai	Balochistan	2	2	4	0	0	2	3	2	0	0	15
D.I. Khan	D.I. Khan	KP	5	1	2	0	0	2	2	3	0	0	15
Kharan	Rakhshan	Balochistan	3	1	4	0	0	4	2	1	0	0	15
Khyber	Peshawar	KP	4	3	3	0	0	1	3	1	0	0	15
Loralai	Loralai	Balochistan	3	2	4	0	0	3	1	2	0	0	15
Mirpur	Mirpur	AJ&K	2	4	4	0	0	1	2	2	0	0	15
Musakhel	Loralai	Balochistan	3	2	4	0	0	3	2	1	0	0	15
North Waziristan	Bannu	KP	3	3	3	0	0	2	2	2	0	0	15
Nowshera	Peshawar	KP	5	2	3	0	0	1	1	3	0	0	15
Sudhnoti	Poonch	AJ&K	2	4	4	0	0	1	2	1	1	0	15
Attock	Rawalpindi	Punjab	3	2	3	0	0	1	2	3	0	0	14
Chagai	Rakhshan	Balochistan	1	2	4	0	0	5	1	1	0	0	14
Dera Bugti	Sibi	Balochistan	3	2	4	0	0	2	1	2	0	0	14
Haripur	Hazara	KP	2	2	4	0	0	1	2	2	1	0	14
Hyderabad	Hyderabad	Sindh	4	0	2	0	2	2	0	4	0	0	14
Jaffarabad	Naseerabad	Balochistan	5	0	3	0	0	2	1	3	0	0	14
Kachhi	Naseerabad	Balochistan	3	1	4	0	0	3	1	2	0	0	14
Kalat	Kalat	Balochistan	3	2	4	0	0	4	1	0	0	0	14
Karak	Kohat	KP	3	2	3	0	0	2	2	2	0	0	14
Lehri	Sibi	Balochistan	4	1	4	0	0	2	1	2	0	0	14
Lower Kohistan	Hazara	KP	4	3	4	0	0	1	2	0	0	0	14
Malakand	Malakand	KP	3	2	3	0	0	2	1	1	1	1	14
Mohmand	Peshawar	KP	3	3	4	0	0	2	1	1	0	0	14
Naseerabad	Naseerabad	Balochistan	5	0	3	0	0	2	1	3	0	0	14
Panjgur	Makran	Balochistan	3	1	3	0	0	5	1	1	0	0	14
Sibi	Sibi	Balochistan	3	2	4	0	0	3	1	1	0	0	14
Sohbatpur	Naseerabad	Balochistan	5	0	3	0	0	2	1	3	0	0	14
Surab	Kalat	Balochistan	3	2	4	0	0	4	1	0	0	0	14
Swabi	Mardan	KP	4	2	3	0	0	1	1	3	0	0	14
Chakwal	Rawalpindi	Punjab	3	2	3	0	0	0	2	3	0	0	13
Hangu	Kohat	KP	3	2	3	0	0	2	1	2	0	0	13
Kech	Makran	Balochistan	3	1	3	0	0	4	1	1	0	0	13

Districts	Divisions	Provinces	Flood	Landslide	Earthquake	Tsunami	Cyclone	Drought	Forest Fire	Smog	Avalanche	GLOF	Total Hazard
Khushab	Sargodha	Punjab	3	3	3	0	0	0	0	4	0	0	13
Kohat	Kohat	KP	3	1	3	0	0	2	1	3	0	0	13
Lakki Marwat	Bannu	KP	3	2	3	0	0	2	1	2	0	0	13
Larkana	Sukkur	Sindh	5	0	2	0	0	2	0	4	0	0	13
Mianwali	Sargodha	Punjab	5	1	2	0	0	0	1	4	0	0	13
Mirpur Khas	Mirpur Khas	Sindh	3	0	2	0	3	2	0	3	0	0	13
Naushero Feroze	Sh. Benazirabad	Sindh	5	0	2	0	0	2	0	4	0	0	13
Tando Allahyar	Hyderabad	Sindh	3	0	2	0	2	2	0	4	0	0	13
T.M. Khan	Hyderabad	Sindh	4	0	2	0	2	2	0	3	0	0	13
Bhakkar	Sargodha	Punjab	4	0	2	0	0	0	2	4	0	0	12
Bhimber	Mirpur	AJ&K	2	3	3	0	0	1	2	1	0	0	12
Buner	Malakand	KP	2	3	3	0	0	1	2	1	0	0	12
Dadu	Hyderabad	Sindh	5	0	2	0	0	2	0	3	0	0	12
Ghotki	Sukkur	Sindh	5	0	2	0	0	1	0	4	0	0	12
Jacobabad	Sukkur	Sindh	4	0	2	0	0	2	0	4	0	0	12
Jhang	Faisalabad	Punjab	5	0	2	0	0	0	0	5	0	0	12
Kashmore	Sukkur	Sindh	5	0	2	0	0	1	0	4	0	0	12
Lahore	Lahore	Punjab	4	0	2	0	0	1	0	5	0	0	12
Matiari	Hyderabad	Sindh	4	0	2	0	0	2	0	4	0	0	12
Muzaffargarh	D.G. Khan	Punjab	5	0	2	0	0	0	0	5	0	0	12
Orakzai	Kohat	KP	3	2	3	0	0	2	1	1	0	0	12
Peshawar	Peshawar	KP	5	0	3	0	0	1	0	3	0	0	12
Shikarpur	Larkana	Sindh	5	0	2	0	0	1	0	4	0	0	12
Sukkur	Sukkur	Sindh	5	0	2	0	0	1	0	4	0	0	12
Charsadda	Peshawar	KP	4	0	3	0	0	1	1	2	0	0	11
Chiniot	Faisalabad	Punjab	5	0	2	0	0	0	0	4	0	0	11
Faisalabad	Faisalabad	Punjab	4	0	2	0	0	0	0	5	0	0	11
Gujranwala	Gujranwala	Punjab	5	0	2	0	0	0	0	4	0	0	11
Kasur	Lahore	Punjab	3	0	2	0	0	1	0	5	0	0	11
Multan	Multan	Punjab	4	0	2	0	0	0	0	5	0	0	11
Okara	Sahiwal	Punjab	3	0	2	0	0	1	0	5	0	0	11
Pakpattan	Sahiwal	Punjab	3	0	2	0	0	1	0	5	0	0	11
Qambar Shahdadkot	Larkana	Sindh	5	0	2	0	0	1	0	3	0	0	11
Rahim Yar Khan	Bahawalpur	Punjab	5	0	2	0	0	0	0	4	0	0	11
Rajanpur	D.G. Khan	Punjab	5	0	2	0	0	0	0	4	0	0	11
Sanghar	Sh. Benazirabad	Sindh	3	0	2	0	1	2	0	3	0	0	11
Sheikhupura	Lahore	Punjab	4	0	2	0	0	0	0	5	0	0	11
Toba Tek Singh	Faisalabad	Punjab	4	0	2	0	0	0	0	5	0	0	11
Umerkot	Mirpurkhas	Sindh	3	0	2	0	2	1	0	3	0	0	11
Bahawalnagar	Bahawalpur	Punjab	3	0	1	0	0	1	0	5	0	0	10
D.G. Khan	D.G. Khan	Punjab	5	0	2	0	0	0	0	3	0	0	10
Hafizabad	Gujranwala	Punjab	4	0	2	0	0	0	0	4	0	0	10
Jamshoro	Hyderabad	Sindh	4	0	2	0	0	2	0	2	0	0	10
Jhelum	Rawalpindi	Punjab	4	0	3	0	0	0	0	3	0	0	10
Khairpur	Sukkur	Sindh	4	0	2	0	0	0	0	4	0	0	10
Khanewal	Multan	Punjab	3	0	2	0	0	0	0	5	0	0	10
Layyah	D.G. Khan	Punjab	4	0	2	0	0	0	0	4	0	0	10
Lodhran	Multan	Punjab	3	0	2	0	0	0	0	5	0	0	10
Mandi Bahauddin	Gujranwala	Punjab	4	0	2	0	0	0	0	4	0	0	10
Mardan	Mardan	KP	4	0	3	0	0	1	0	2	0	0	10
Nankana Sahib	Lahore	Punjab	3	0	2	0	0	0	0	5	0	0	10
Narowal	Gujranwala	Punjab	4	0	2	0	0	0	0	4	0	0	10
Sahiwal	Sahiwal	Punjab	3	0	2	0	0	0	0	5	0	0	10

Districts	Divisions	Provinces	Flood	Landslide	Earthquake	Tsunami	Cyclone	Drought	Forest Fire	Smog	Avalanche	GLOF	Total Hazard
Sargodha	Sargodha	Punjab	3	0	3	0	0	0	0	4	0	0	**10**
Sialkot	Gujranwala	Punjab	4	0	2	0	0	0	0	4	0	0	**10**
Vehari	Multan	Punjab	3	0	2	0	0	0	0	5	0	0	**10**
Gujrat	Gujranwala	Punjab	4	0	2	0	0	0	0	3	0	0	**9**
Bahawalpur	Bahawalpur	Punjab	3	0	1	0	0	0	0	4	0	0	**8**

Annexure-V: NEOC Weather Projections for 2025

Scenario Riverine Flooding In Nowshera (2025)

1. Nowshera, located along the Kabul River in Khyber Pakhtunkhwa, Pakistan, is particularly vulnerable to riverine flooding. The Kabul River, a major tributary of the Indus, often experiences significant surges during the monsoon season. These surges can lead to overflowing banks and inundation of nearby settlements and agricultural fields. The impact of riverine flooding in Nowshera can be severe, resulting in damage to infrastructure, displacement of residents, and disruption of essential services. The region's topography, combined with the river's unpredictable behaviour, makes it susceptible to such natural disasters. NDMA, NEOC as a proactive approach has issued the following scenario for the Sukkar keeping in view the Climate Conditions, Global Oscillations, Historical: -

a. **Seasonal Projection (10 Jan 2025) D-6 months**. The seasonal outlook for 2025 indicates a negative phase of ENSO, specifically La Niña, with a positive Indian Ocean Dipole (IOD). This situation, coupled with intensified western disturbances, is expected to result in above-average precipitation in the catchment areas of the Kabul River Basin and its tributaries, including the Panjkora, Kalpani, Swat, and Shahalam Rivers. Additionally, higher temperatures are anticipated to cause significant glacial melt, leading to increased water flow in the first half of July. It is advisable for the concerned provincial and district administrations to take necessary precautions and remain vigilant in preparation for the summer monsoon of 2025.

b. **Advisory (02 May 2025) D-2 months**.

A heatwave with temperatures exceeding normal levels by 4-5 degrees Celsius is anticipated in May 2025, coinciding with the maturation of La Niña. The sea surface temperature anomaly in the Arabian Sea is reported to be 2 degrees Celsius higher than normal, while a higher evaporation index, indicating increased moisture content in the Mediterranean Sea, suggests a strong monsoon system. The combined with western disturbances (low-pressure systems originating in the west) and increased glacial melt, is expected to put stress on the Kabul River Basin and its tributaries. Communities located near the Kabul River Basin, particularly in Nowshera district, should remain on alert during the first half of the monsoon season.

July, in particular, is expected to receive heavier rainfall. Additionally, the anticipated higher flow in the Kabul and Indus Rivers, along with backflow from Khairabad may further stress the Nowshera area. It is essential for the concerned provincial and district administrations to take necessary precautions and measures.

c. **Confirmatory Alert (01 July 2025) D-2 weeks.**

The monsoon of 2025 began on June 27, which is three days earlier than expected due to favourable atmospheric conditions. The situation is anticipated to be particularly alarming for upper catchment areas particularly district Nowshera, as previously indicated in the advisory and seasonal projections. Additionally, a western disturbance is expected to bring heavy rainfall from July 15 to 20 in Kabul River Basin. Precipitation exceeding 300 mm is anticipated in isolated areas near Nowshera and Risalpur within the Kabul River Basin during above mentioned time. Higher flows in the Kabul River, its tributaries, and backflow from Khairabad are likely to cause riverine flooding in the Kabul River specifically in district Nowshera. A peak flow of 250,000 cubic feet per second (cusecs) is expected at Nowshera from 17-18 July 2025.

2. Based on the above issued Weather outlook, weather forecast and Advisory following are the Exposure Calculations, Hazards details and Impacts: -

a. **Time Frame of Disaster Early Warnings**: -

Scenario 2 (Riverine Flooding in District Nowshera)	
Type of Hazard	Riverine Flood
Intensity of Flows in Sukkur Barrage	Very High Flows (250,000 Cusec)
Duration of disaster event and Intensity	17 July 2025
Exposure and Risk	Refer Para 3(b)

b. **Exposure Calculation**: -

Very High Flood Nowshera	Infra & Pop
Estimated Settlements	17
Education Facilities	22
Airports	0
Communication Towers	8
Motorways & Highways	313 km
Health Facilities	2
Railway Stations	0
Dams	0
Bridges	9
Exposed Population	237,451

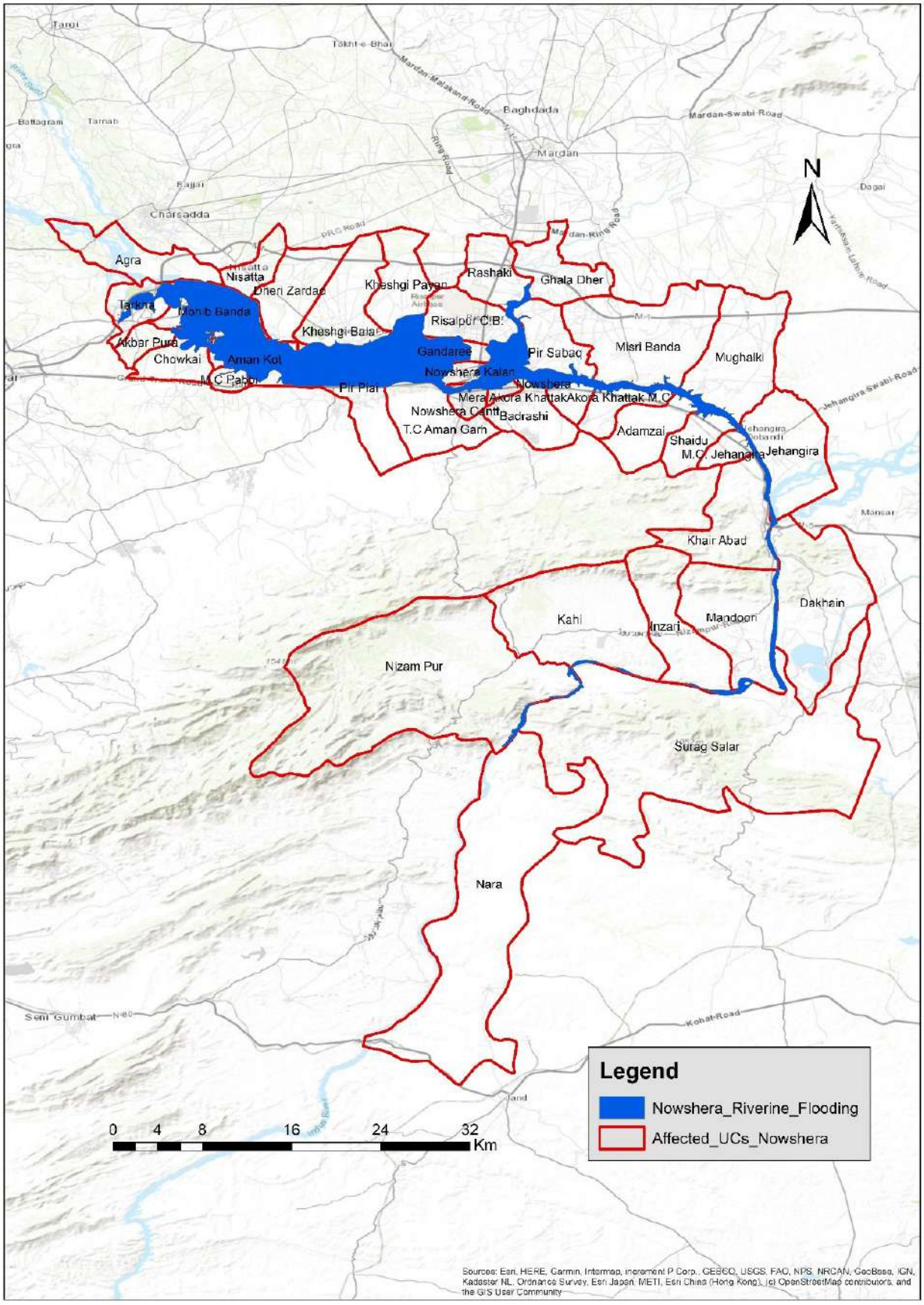
c. **Losses and Damages: -**

Description	Numbers
Population Affected	101,147
Total Number of Deaths	5
Male	5
Female	0
Children	0
Total Number of Injured	8
Male	3
Female	2
Children	3
House Damage Partially	795
House Damage Fully	108
House Damage Total	903
Crop Area Affected (Acre)	9,502

d. **Exposed Areas: -**

Exposed UCs Nowshera Flooding
Dakhain
Misri Banda
Mughalki
Pir Sabaq
Akora Khattak M.C
Adamzai
Khairabad
Inzari
Mandoori
Nizampur
Agra
Ghala Dher
Jehangira
Chowkai
Kheshgi Bala
Kheshgi Payan
Rashaki
Kahi
Amankot
Pir Piai
T.C Aman Garh
Mera Akora Khattak
Badrashi
Gandaree
Risalpur C.B.
Mohib Banda
Akbarpura
Tarkha
Nowshera Kalan
Nowshera

e. **Vulnerability Map: -**



Scenario Riverine Flooding In Sukkur (2025)

1. Sukkur is situated along the Indus River in Sindh, Pakistan, is prone to riverine flooding. The Indus, a major river system in the region, often swells during the monsoon season, leading to overflow and inundation of low-lying areas. This flooding can cause significant damage to infrastructure, agricultural lands, and residential areas, displacing thousands of people. The impact of riverine flooding in Sukkur can be devastating, resulting in loss of lives, property damage, and disruption of essential services. Additionally, the flooding can lead to waterborne diseases and other health hazards, further exacerbating the challenges faced by affected communities.

2. NDMA, NEOC as a proactive approach has issued the following scenario for the Sukkar keeping in view the Climate Conditions, Global Oscillations, Historical: -

a. **Seasonal Projection (10 Jan 2025) D-6 months**. The seasonal outlook for 2025 indicates a negative phase of ENSO, specifically La Niña, along with a positive Indian Ocean Dipole (IOD). This situation, combined with intensified western disturbances, is expected to result in above-average precipitation in the north-eastern and southern parts of the province, including the Kirthar Ranges and coastal areas. Additionally, higher temperatures/ significant low pressures/ high humidity and moisture content are anticipated to cause convective cloud formation, leading to isolated very heavy rainfall/ heavy falls and significant weather events in various areas of the province, as well as hill torrents in the Kirthar Ranges. It is advisable for the concerned provincial and district administrations to take necessary precautions and remain vigilant in preparation for the summer monsoon of 2025.

b. **Advisory (02 May 2025) D-2 months**. A heatwave with temperatures deviating by 3-7 degrees Celsius is anticipated in May, coinciding with the maturation of La Niña. The sea surface temperature anomaly in the Arabian Sea is reported to be 2 degrees Celsius higher than normal, while a higher evaporation index in the Mediterranean Sea suggests a strong monsoon current. Communities located in northeastern, and southern areas of the province should remain on alert during the first half of the monsoon season. July, in particular, is expected to receive heavier rainfall. It is essential for the concerned provincial and district administrations to take necessary precautions.

c. **Confirmatory Alert (27 July 2025) D- 2 weeks**. The monsoon of 2025 began on June 27, which is three days earlier than expected due to favourable atmospheric conditions. The situation is anticipated to be particularly alarming for northeastern areas specifically Sukkur, as previously indicated in the advisory and seasonal projections. Additionally, southwestern monsoon system is expected to bring heavy rainfall from 01 to 10 August 2025. Currently at 0600 hrs 27 July 2025 the flows at Sukkar barrage are in Medium Flood Limit. Higher precipitations exceeding 150mm in Rajanpur & D.G khan Hill torrents are also anticipated in next two weeks that will further increase the flows in river Indus particularly Guddu & Sukkur Barrages. High Flows at Sukkur Barrage is expected to reach on August 10, 2025 with a flood peak of approximately 500,000 Cusecs. This is a confirmatory alert, and it is crucial for the concerned district and provincial administrations to make necessary preparations and responses.

3. Based on the above issued Weather outlook, weather forecast and Advisory following are the Exposure Calculations, Hazards details and Impacts: -

a. **Time Frame of Disaster Early Warnings: -**

Scenario 1 (Riverine Flooding in District Sukkur)	
Type of Hazard	Riverine Flood
Intensity of Flows in Sukkur Barrage	High Flood (500,000 Cusec)
Duration of disaster event and Intensity	10-Aug-25
Exposure and Risk	Refer Para 3(b)

b. **Exposure Calculation: -**

High Flood Sukkur	Infra & Pop
Estimated Settlements	103
Education Facilities	2
Airports	0
Communication Towers	3
Motorways & Highways	256 km
Health Facilities	5
Railway Stations	0
Dams	0
Bridges	6
Exposed Population	261,684

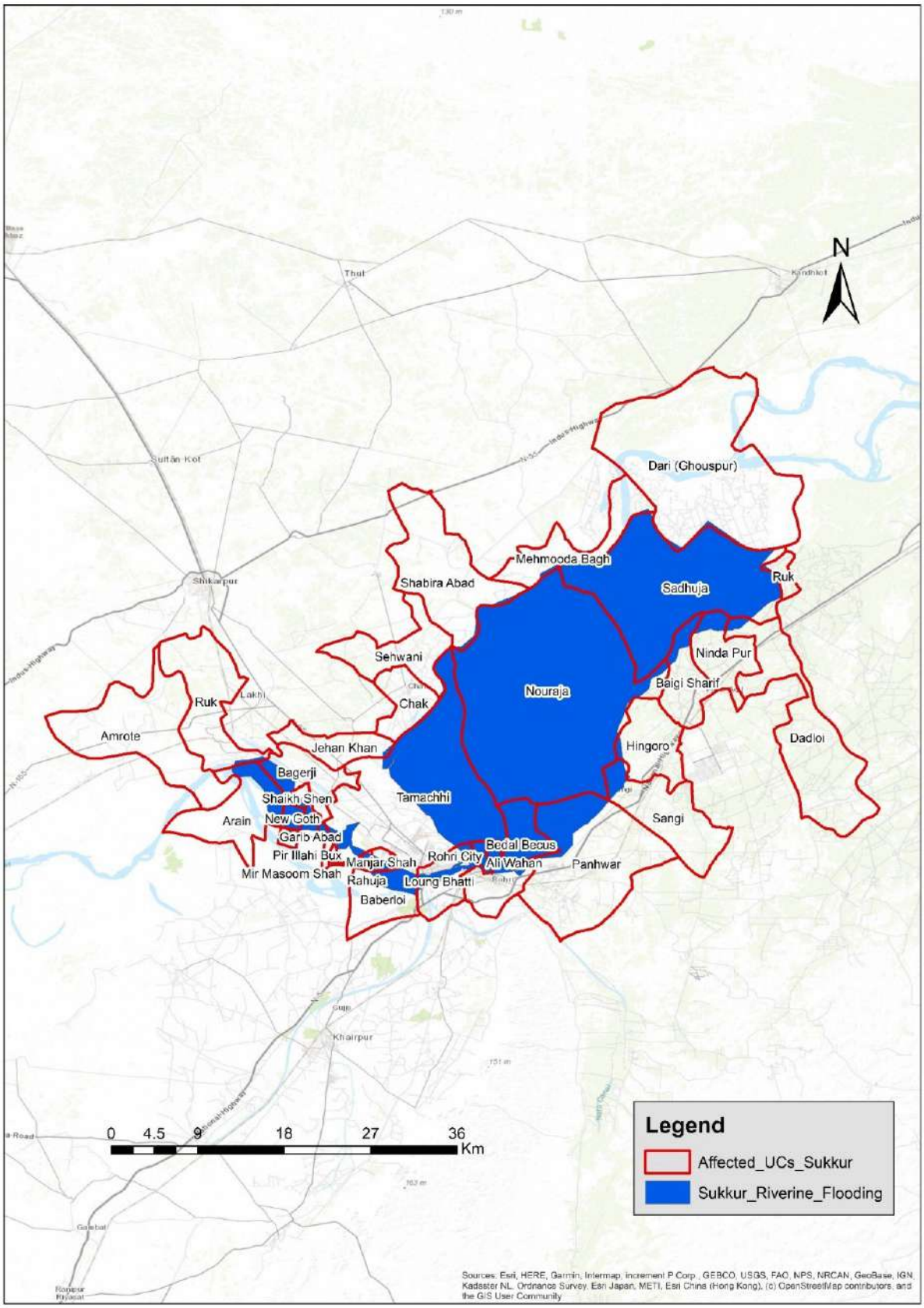
c. **Losses and Damages: -**

Description	Numbers
Population Affected	119,726
Total Number of Deaths	19
Male	5
Female	7
Children	7
Total Number of Injured	33
Male	9
Female	11
Children	13
House Damage Partially	9,270
House Damage Fully	5,150
House Damage Total	14,420
Crop Area Affected (Acres)	60,255
Road KMs	82
No of Road	9
Culverts	11
Livestock	12,011

d. **Exposed Areas: -**

Exposed Districts	Exposed Tehsils	Exposed UCs
Shikarpur	Garhi Yasin	Amrote
Shikarpur	Khanpur	Garhi Tegho
Shikarpur	Khanpur	Mehmooda Bagh
Shikarpur	Lakhi	Chak
Shikarpur	Lakhi	Lakhi
Shikarpur	Lakhi	Ruk
Shikarpur	Lakhi	Sehwani
Sukkur	Pano Aqil	Baiji
Sukkur	Pano Aqil	Hingoro
Sukkur	Pano Aqil	Nauraja
Sukkur	Pano Aqil	Nindapur
Sukkur	Pano Aqil	Sadhuja
Sukkur	Pano Aqil	Sangi
Sukkur	Pano Aqil	Tamachani
Sukkur	Rohri	Ali Wahan
Sukkur	Rohri	Arore
Sukkur	Rohri	Loung Bhatti
Sukkur	Rohri	Panhwar
Sukkur	Sukkur	01 Bagerji
Sukkur	Sukkur	Arain
Sukkur	Sukkur	Loung Bhatti
Sukkur	Sukkur	Tamachani

e. **Vulnerability Map: -**

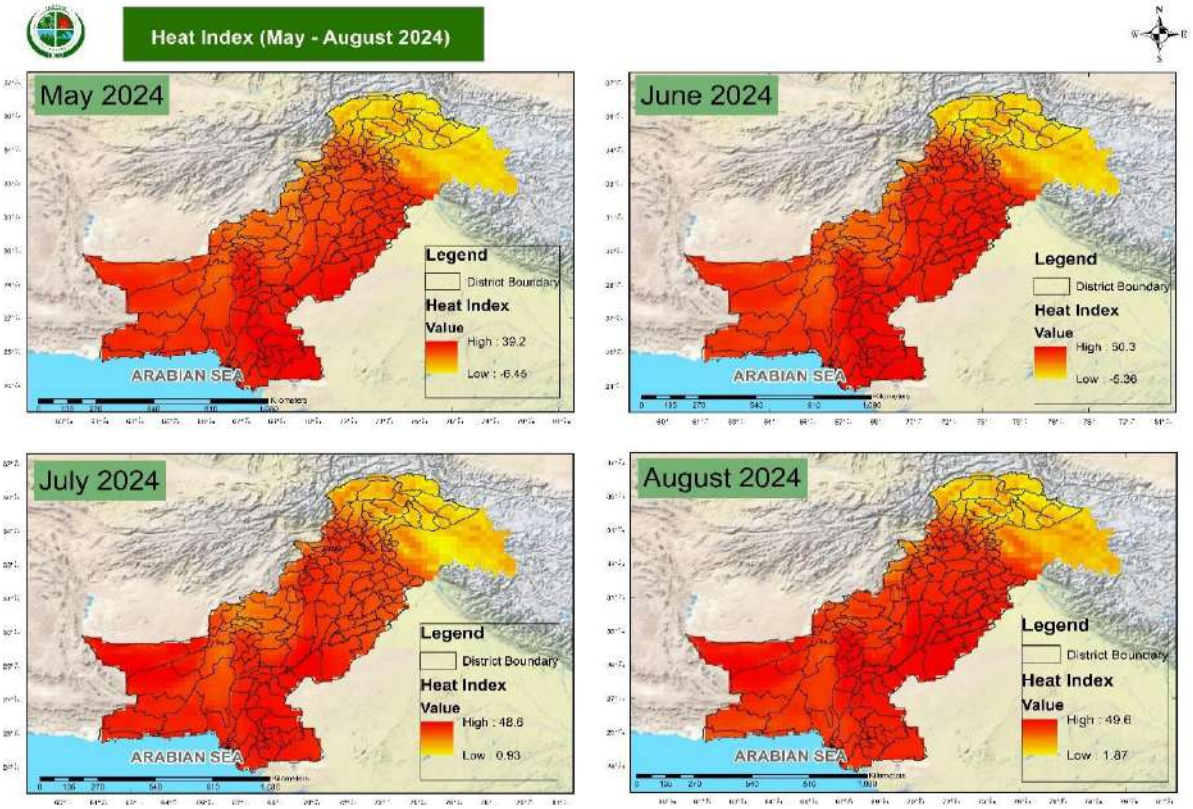


Scenario Heatwave 2025

1. In recent years, Pakistan has increasingly been vulnerable to the impacts of climate change, particularly evident in the rising frequency and intensity of heatwaves. The climate is primarily influenced by its geographical location and topography, with diverse climatic conditions. However, most parts of the country, particularly southern and central Pakistan, are susceptible to heatwaves, which further gets worse due to rapid-urbanization, deforestation and air pollution. The meteorological parameters relevant to heatwaves include temperature, humidity, wind speed, and air quality.

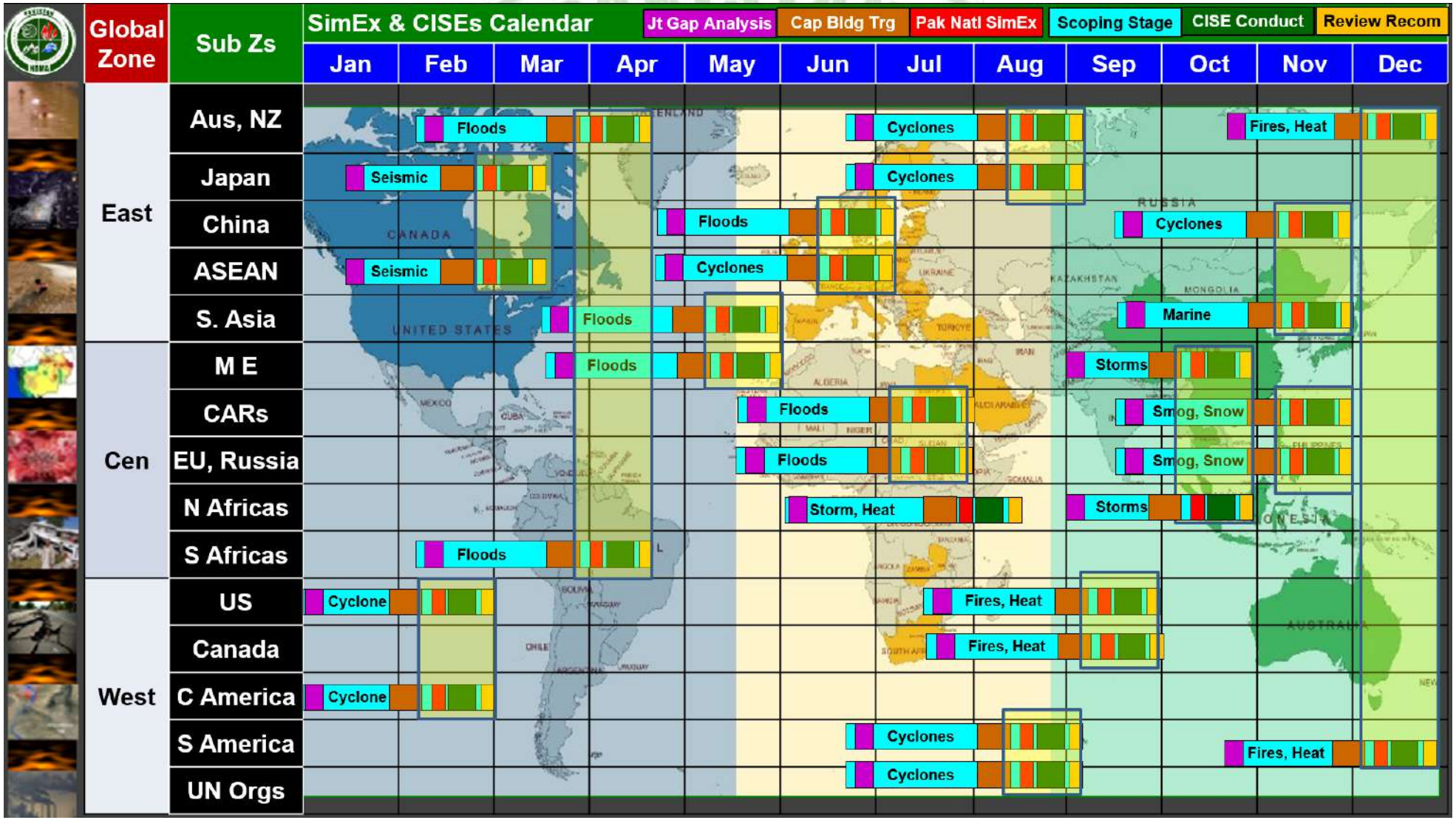
2. Climate change exacerbates the intensity and frequency of heatwaves. Rising temperatures not only increase the risk of heat-related illnesses and fatalities but also contribute to secondary hazards such as drought, wildfires, and degraded air quality.

3. Heat Index is the measure of how hot it is actually felt when the effect of relative humidity is coupled with actual temperature. The above table describes various scenarios taking into account, the actual temperature and relative humidity.



Annexure-VI: Annual Calendars

SIMEXs Calendar

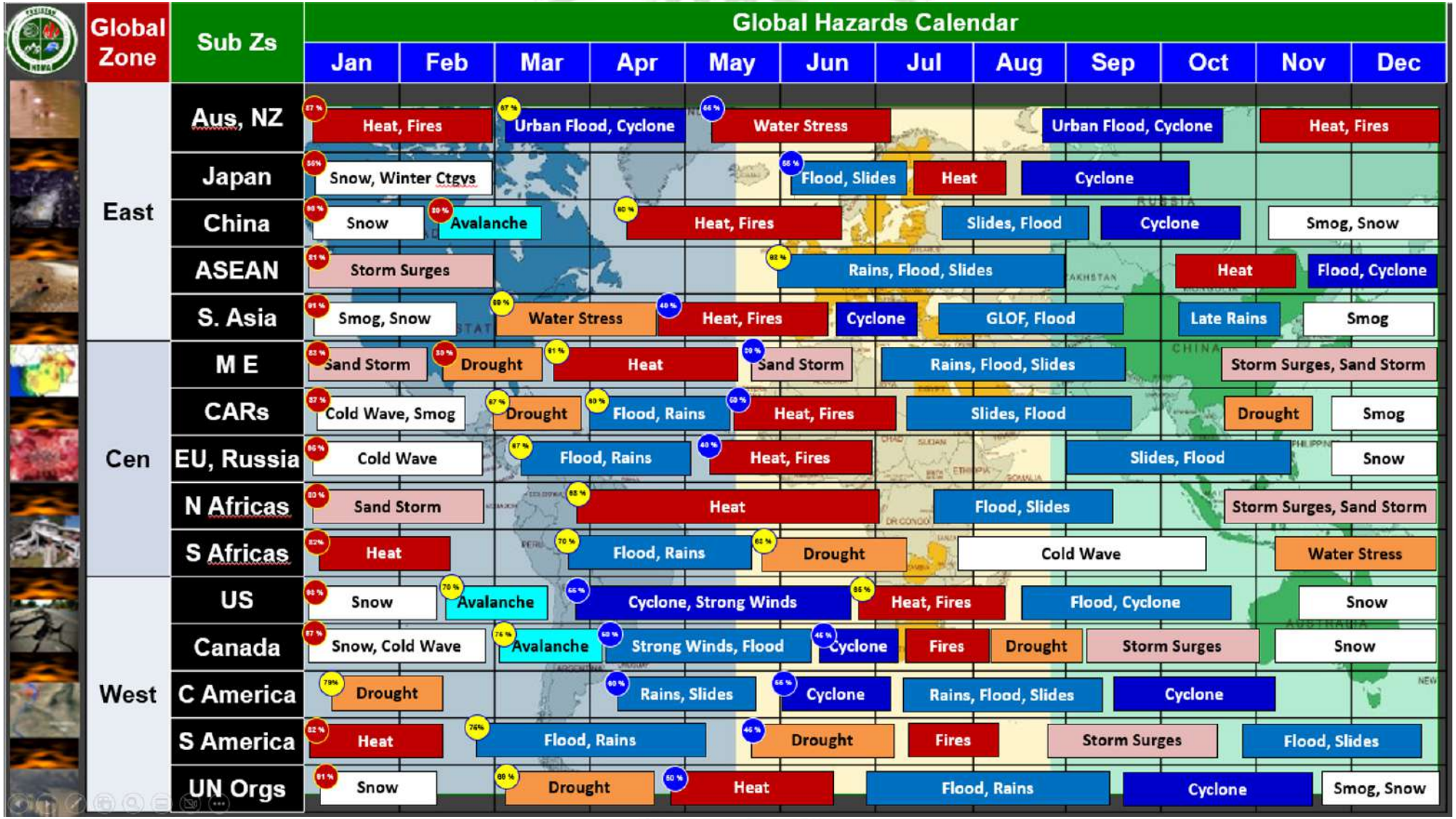


Annual Activity Calendar

Pak NDMA - Annual Activity Calendar	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tech EW	Issue DEW 1	New Scenarios	2 x inland trg	Issue DEW 2	Add 5 Portals & at CoE		Tech Simex	Issue DEW 3	Pak Narrative for global confs		Intl Expo CoE	Hz Calendars
	Update Portals	Winter Ctgys Audit & Review		Tech Conf 1	Industry Event	CoE Event	2 x intl tech trg	Summer Ctgys Audit		Tech Conf 2	Intl Seminar	Annual Audit
NIDM	Fd Trg - Sindh	Winters Eval	Fd Trg : KP, GB	Trg: Pb, Bln	Trg : Mil & ICT	CoE Fd Camps	Fd Trg Evals	NIDM Expo	Winters Pracs	DM Trg - Sindh	Best Pracs Plan	Issue Journal
	Unis' Review	Natl Academia Audit & Plans		Intl Input Audit	NIDM Seminar 1	Regional Op 1	Regional Op 2	Intl Event	Summers Eval	NIDM Seminar 2	3 x intl DM Trg	Yearly Review
DRR	Annual NDP AA	1st Half NCF AAs	Natl CBDRM	GCC Seminar	2nd Qtr NCF AAs	Orgs Safety	2nd Half NCF AAs	DRR Expo	PCC Natl Event	PCC Trgs Audit	Intl Event DRR	PCC Review
	Regional Conf	Global Forum	NDMCF – 1	PSSF - Punjab	UN Event	PCC Seminar	Regional Conf	GCC Event	Local DRR Event	PCC Simex	COP Event	Review
Tech App	Svcs Review	Compliance 1	Svcs Add On	Maint Audit 1	Zonal Insp 1	Security Trg 1	App Web Op	Cap Simex 2	Add 2 x MEOC	Security Trg 2	External Audit	Intl Tech Expo
	Cap Simex 1	SW Upgrd 1	Add 2 x MEOC	Global SW 1	Audit CoE	AI Interface	Zonal Insp 2	SW Upgrd 2	Interface with intl apps		Maint Audit 2	Review
Media	Online Wksp	Pak DM Media	Global Summary	Summers' Conf	Provincial Event 1	Natl DM Reels	Provincial Event 2	Intl Media Conf	Risk Comm Ex 1	Winter's Conf	Risk Comm Ex 2	Event at CoE 2
	Year's Plans Conf	DM Media Event	Intl Media Brief	Media Ex 1	Provincial Fd Trg 1	Cap Bldg Conf	Provincial Fd Trg 2	DM Media Expo	Natl Media Ex 1	Event at CoE 1	Intl Media Expo	Annual Review
Infra	Infra Risk Atlas	Partners Event 1	Infra Seminar 1	Infra Audit KPK	Partners Event 2	Zonal Conf 1	Infra Seminar 2	Natl Infra Expo	Infra Audit GB	Zonal Conf 2	Infra Seminar 3	Stock take
	Infra Hubs Plans	Infra Audit Pb	Infra Audit Sindh	Infra Audit Bln	Prov Fd Visits	Zonal Fd Trg 1	Monsoon Prep	Annual Pubs	Infra Audit AJ&K	Zonal Fd Trg 2	Prov Fd Visits	Intl Infra Conf
Ops Log	Guidance 1	Ops Event 1	Log Ex 1	Guidance 2	Pvt Sec Conf	Mob Simex	Industry Ex	Ops Event 2	Monsoon Review	Guidance 4	Log Event 2	Mob Simex 2
	Log Audit	WHs Insps 1	Winter Report	EP Log Event	User Gps Conf	Intl Sp Conf	Guidance 3	WHs Insps 2	Summer Report	Log Ex 2	Intl Log Op 2	NDRP Review
Plans	Partner Conf 1	Simex-1	Simex-2	Simex-3	Simex-4	Simex-5	Simex-6	Simex-7	Simex-8	Simex-9	Simex-10	Simex-11
	Work Audit 1	MHVRAs	UN Event 1	InSaR Event 1	Natl Svy 1	NGO Conf 2	Work Audit 2	Partner Conf 2	Intl Seminar	InSaR Event 2	Natl Svy 2	Natl Seminar
IC (Dipl)	Work Audit	Conf : Z East	Conf : Z Centre	Conf : Z West	Pre Coord Conf	Visits Ambs	Arrange Visits	Facilitate Op 2	Fed Event 2	Pre Coord Conf	Facilitate Op 3	CoE Event 2
	Revised Log	Multi Laterals	Multi Laterals	Multi Laterals	Seminar 1	Diplo DM Expo	Fed Event 1	Seminar 2	CoE Event 1	Conf : Z East	Conf : Z Centre	Conf : Z West
IC (RM)	Plans Coord	CISE 1 Cyclone Z : West	CISE 2 Seismic Z : East	CISE 3 Floods Z : Cen & East	CISE 4 Floods Z : Cen & East	CISE 5 Floods Z : East	CISE 6 Floods Z : Cen	CISE 7 Cyclone Z : East & West	CISE 8 Fires, Heat Z : West	CISE 9 Storms Z : Cen	CISE 10 Marine, Smog Z : Cen & East	CISE 11 Fires, Heat Z : E & West
Fin	Budget Est 1		Audit 1			Annual Report	Budget Plan 1		Audit 2			
Estb	Scoping	Inventory 1	KPI Report 1	HR Conf 1	Excursion 1				KPI Report 2	Prom Bd	HR Conf 2	Excursion 2

Intl Event | Natl Event

Global Hazards Calendar




PAKISTAN
National Disaster Management Authority
NDMA