GREEN CLIMATE FUND

GLOF II PAKISTAN

MINISTRY OF CLIMATE CHANGE

UNDP

HANDBOOK FOR

DISASTER RISK MANAGEMENT

TRAINING OF GOVERNMENT OFFICIALS

October 2022

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Abbreviations

ADB	Asian Development Bank		GB	Gilgit Baltistan
AJ&K	Azad Jammu and Kashmir		GBDMA	Gilgit Baltistan Disaster Management Authority
AWS	Automatic Weather Stations		GBV	Gender-Based Violence
CBOs	Community-Based Organizations		GDP	Gross Domestic Product
CHW	Community Health Workers		GCF-IRM	Green Climate Fund- Independent Redress Mechanism
CBDRM	Community Based Disaster Risk Management		GLOFs	Glacial Lake Outburst Floods
CBDRMC	Community Based Disaster Risk Management Committee		GPR	Ground Penetrating Radar
CJCSC	Chairman Joint Chiefs of Staff Committee		GRC	Grievance Redress Mechanism
CP	Contingency Planning		GRM	Grievance Redress Mechanism
CRPP	Community Recovery Planning Processes		HFA	Hyogo Framework for Action
CSCMP	Council of Supply Chain Management Professionals		HVCA	Hazard Vulnerability and Capacity Analysis
CSOs	Civil Society Organizations		HRMP	Health Risk Management Plan
DC	Deputy Commissioner		IEC	Information, Education, and Communication
DDAC	District Damage Assessment Committee		HWGs	Hazard Watch Groups
DDMA/U	District Disaster Management Authorities/Units		IASC	Inter-Agency Standing Committee
DDMP	District Disaster Management Planning		ICIMOD	International Centre for Integrated Mountain Development
DEOC	District Emergency Operation Centre		ICTDMA	Islamabad Capital Territory Disaster Management Authority
DFPD	District Finance & Planning Department		INGOs	International Non-Government Organizations
DGA	District Government Authorities		IRCM	International Red Cross Movement
DMP	Disaster Management Planning		KPDMA	Khyber Pakhtunkhwa Disaster Management Authority
DNA	Damage and Need Assessment			
DRA	Disaster Risk Assessment		MCA	Municipal Civic Authorities
DRM	Disaster Risk Management		MHVRA	Multi Hazard Vulnerability and Risk Assessment
DRMC	Disaster Risk Management Cycle		MIRA	Multi-Sector Initial Rapid Assessment
DRMP	Disaster Risk Management Plan		MOF	Ministry of Finance
DRR	Disaster Risk Reduction		NDMA	National Disaster Management Authority
EAD	Economic Affairs Division		NDMC	National Disaster Management Commission
EDO	Executive District Officer		NDMP	National Disaster Management Plan
EIA	Environmental Impact Assessment		NDMO	National Disaster Management Ordinance
EHOC	Emergency Health Operation Centre		NDRP	National Disaster Response Plan
EM	Emergency Management		NDU	National Defense University
EOC	Emergency Operation Centre		NGOs	Non-Government Organizations
EPA	Environmental Protection Agency		NIDM	National Institute of Disaster Management
ERP	Emergency Response Plan		NWG	National Working Group
ESMP	Environmental and Social Management Plan		OLI	Operational Land Imager
EWS	Early Warning System		P/R/SDMC	Provincial/Region/State Disaster Management Commission
FCC	Flood Control Cell			

PMD	Pakistan Meteorological Department
PEOC	Provincial Emergency Operating Centre
PHED	Public Health Engineering Department
PODs	Points of Dispensations
PPRA	Public Procurement Regulatory Authority
PRCS	Pakistan Red Crescent Societies
PWD	Persons with Disabilities
RNA	Rapid Need Assessment
RNA	Recovery Need Assessment
SAR	Search and Rescue
SFDRR	Sendai Framework for Disaster Risk Reduction
SGBV	Sexual and Gender-Based Violence
SMUG	Seriousness, Manageability, Urgency, and Growth

SOPs	Standard Operating Procedures
UC	Union Council
UN	United Nations
UNDP	United Nations Development Program
UNDP-SRM	United Nations Development Programme - Stakeholder Response Mechanism
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
VCAM	Vulnerability and Capacity Assessment Matrix
WAPDA	Water and Power Development Authority
WB	World Bank
WMO	World Meteorological Organization

01

Key Disaster Risk Management
(DRM) Concepts & Terms

Key Disaster Risk Management (DRM) Concepts & Terms[1]

What is Hazard?

A dangerous phenomenon, substance, human activity, or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hazard can be single, sequential, or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency, and probability. Hazards have the following two types:

Types of Hazards

Natural: Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Examples: Earthquake, Flood, Glacial Lake Outburst Floods (GLOFs), Sediments/Landslides, Avalanches, Tsunami, Drought, Cyclone, etc.

Human-induced: Conditions that may have disastrous consequences for society. These are associated with industries or energy generation facilities and include explosions, leakage of toxic waste, pollution, dam failures. Complex Emergency is included in this category.

Examples: Industrial and Technological hazards, Urban and Forest Fires, Complex Emergency, Accidents, etc.

Categorization of Natural Hazards

Geological: Geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Geological hazards include internal earth processes, such as earthquakes, volcanic activity, and emissions, and related geophysical processes such as mass movements, landslides, rockslides, the surface collapses, and debris or mudflows.

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1.   https://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

Hydro-meteorological: Process or phenomenon of atmospheric, hydrological, or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Examples are landslides, wildland fires, locust plagues, epidemics, and the transport and dispersal of toxic substances and volcanic eruption material.

Climatological Hazards: A hazard caused by long-lived, meso- to macro-scale atmospheric processes. It is an outcome of intra-seasonal to multi-decadal climate variability. Examples are GLOF, drought, and wildfires[2].

What is a Disaster?

A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its resources.

What is Vulnerability?

The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard. Vulnerability can also be defined as the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community or society to the impact of hazards. It can also be termed as the extent to which an individual, community, subgroup, structure, service, or geographic area is likely to be damaged or disrupted by the impact of a particular hazard.

Types of Vulnerabilities[3]

Physical Vulnerabilities: Are the hazard-prone locations of settlement, insecure and risky sources of livelihood, lack of access to basic production resources (such as land, farm inputs, and capital), knowledge and information, access to basic services.

Social Vulnerabilities: Are reflected in the lack of institutional support structures and leadership, weak family and kinship relations, divisions and conflicts within communities, and the absence of decision-making powers.

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2. https://www.emdat.be/classification
3. ADPC: Training Manual-Disaster Risk Management for Pakistan

Attitudinal Vulnerabilities: Are seen in dependency, resistance towards change, and other negative beliefs. People who have low confidence in their ability to affect change or who feel defeated by events are harder hit by disasters than those who have a sense of their ability to bring the changes they desire.

Economic Vulnerabilities: Pertain to how people make their living and from where they get their livelihood. Determining which type of livelihood is easily affected by disasters (e.g., fishing, tricycle driving, etc.) is a key issue to be considered in determining the magnitude of economic vulnerability.

Vulnerable Groups: Women, especially pregnant and lactating mothers, children, old age people, persons with disabilities, refugees, minorities, and extremely poor people are more vulnerable in case of disaster.

What is Capacity?

The combination of all the strengths, attributes, and resources available within a community, society, or organization that can be used to achieve agreed goals. Capacity may include physical, institutional, social, or economic means as well as skilled personal or collective attributes such as leadership & management. Capacity may also be described as capability.

What is Resilience?

The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to 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.

What is Risk?

The combination of the probability of an event and its negative consequences. This definition closely follows the definition of the ISO/IEC Guide 73. The word "risk" has two distinctive connotations: in popular usage, the emphasis is usually placed on the concept of chance or possibility, such as in "the risk of an accident"; whereas in technical settings the emphasis is usually placed on the consequences, in terms of "potential losses" for some particular cause, place and period. It can be noted that people do not necessarily share the same perceptions of the significance and underlying causes of different risks.

Risk is expressed as Risk = Hazard x Vulnerability. Some experts also include the concept of exposure when referring to the physical aspect of vulnerability.

Risk Exposure

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses. Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.

Elements at Risk

The people, infrastructures, crops, and livelihoods are exposed and are likely to be adversely affected by the impact of hazards.

Figure 1: Elements at risk

In Figure 1, the rolling rock reflects a hazard where people, houses, and infrastructure are exposed to risk at different levels.

What is Disaster Risk?

The potential disaster losses, in lives, health status, livelihoods, assets, and services, that could occur to a particular community or a society over some specified future time.

The definition of disaster risk reflects the concept of disasters as the outcome of continuously present conditions of risk. Disaster risk comprises different types of potential losses which are often difficult to quantify. Nevertheless, with knowledge of the prevailing hazards and the patterns of population and socio-economic development, disaster risks can be assessed and mapped, in broad terms at least.

$$\text{Disaster Risk} = \frac{\text{Hazard x Vulnerability}}{\text{Capacity}}$$

Disaster Risk Reduction (DRR)

DRR 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.

Annotation: DRR is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans.

Disaster Risk Management (DRM)

The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies, and improved coping capacities to lessen the adverse impacts of hazards and the possibility of disasters. DRM aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.

Emergency Management (EM)

Emergency Management is also used, sometimes interchangeably, with the term Disaster Management (DM), particularly in the context of biological and technological hazards and for health emergencies. While there is a large degree of overlap, an emergency can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.

DRM Cycle

The spectrum of DM is generally divided into pre, during, and post-disaster interventions. The pre-disaster activities are risk assessment, preparedness, and early warning, whereas the post-disaster activities include relief, recovery, rehabilitation, and long-term reconstruction as per the needs of the affected populations under international standards. This cycle which covers the whole spectrum of DM is known as the Disaster Risk Management Cycle (DRMC).

DRMC cycle can be broadly divided into two categories namely preparedness and response. The main phases of DRM known are the pre-disaster, disaster, and post-disaster phases.

Phase I - Pre-disaster: Pre-disaster activities are those which are taken to reduce human and property losses caused by a potential hazard. It can also be term as the preparedness phase.

Phase II - During-disaster: These include initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimized. Activities taken under this stage are called emergency response activities.

Phase III - Post-disaster: There are initiatives taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strike. These are called response and recovery activities.
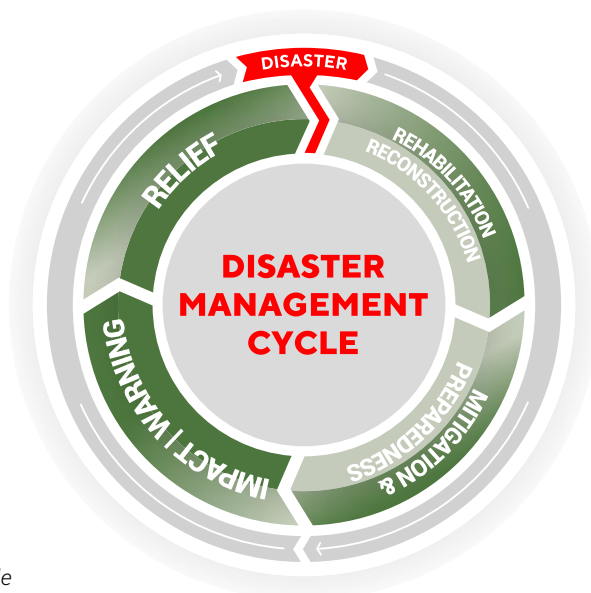
Figure 2: DRM Cycle

Components of Disaster Risk Management cycle[4]

Preparedness Phase: Following are the major activities undertaken under the preparedness phase:

I. Risk Assessment

Risk assessment is a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods, and the environment on which they depend. In Pakistan, Disaster Risk Assessment (DRA) is being conducted for multi-hazard affecting a particular area and is normally referred to as Multi-Hazard Vulnerability and Risk Assessment (MHVRA).

At the onset of developing a project/program, it is important to understand hazards, vulnerabilities, and capacities in more detail and to assess their relationship with each other and their impact on community risk levels. Different tools are used in the conduct of hazard, vulnerability, and capacity assessment.

4.   https://app.adpc.net/publications/training-manual-disaster-risk-management-drm-pakistan

II. Planning

Planning is a process to lay down an intended future course of action aimed at achieving specific goals/objectives within a specific timeframe. It explains in detail what needs to be done, when, how, and by whom, and often includes best case, expected case, and worst-case scenarios.

Disaster Management Planning (DMP) is done based on the risk assessment (hazards, vulnerabilities, and capacities), to reduce the risks. It is considered important because this will raise awareness among stakeholders about disaster risks and risk management. DRM plans have been developed at the district and provincial levels to set the course of action concerning the whole spectrum of disaster management. Contingency Planning (CP) at all levels is an annual process undertaken before the onset of the monsoon, which determines a course for all in case of disaster.

III. Prevention/Mitigation

It is the process of outright avoidance of adverse impacts of hazards and related disasters or lessening or limitation of the adverse impacts of hazards and related disasters. Mitigation measures to be taken are usually identified in the plan formulated by the district/province. The measures are categorized as structural or non-structural measures.

IV. Awareness and Capacity Building

Awareness and capacity building is a process of informing the general population, increasing levels of consciousness about risk, and how people can reduce their exposure to hazard. Can be achieved through the training and campaigning process.

Objectives of Public Awareness: Following are the main objectives of public awareness: -

- To increase the public knowledge about hazards, their nature, and the possible consequences of their impact.
- To increase knowledge about practical preparedness measures.
- To inform the public about the warning system that will be employed and what they should do when they receive it.
- To increase knowledge on how to respond to an emergency.
- To mobilize support for DRR plans or response activities.
- National Institute of Disaster Management (NIDM) is playing an important role in building the capacity of government officials and other stakeholders through training courses, workshops, and simulation exercises.

V. Early Warning

Method of giving timely and meaningful warning information to enable individuals, communities, and organizations threatened by a hazard to prepare and to act appropriately and in a sufficient time to reduce the possibility of harm or loss.

Why do we give a warning?

- To inform the community about hazards, elements at risk (who and what might be affected), and what are the risks.
- To advise on means of protection and preparedness; e.g., preventive evacuation, sandbagging to reinforce the flood dike or fire suppression, etc.
- To instruct the community who will do what to deal with the impending hazard.
- Ways/Form of warning. Different ways of giving warning and/or receiving warning include:
  - Radio/TV/Newspaper
  - Announcements
  - Sirens
  - Village community meetings
  - Hazard Watch Groups

Response Phase: Disaster response can be termed as the provision of emergency services and public assistance during or immediately after a disaster to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Following are the activities undertaken during the response phase:

I. Search & Rescue

It is the search for and provision of aid to people who are in distress or imminent danger. The general field of search and rescue includes many specialties sub-fields, typically determined by the type of terrain the search is conducted over. These include mountain, ground search, and rescue, including the use of search and rescue dogs, urban search and rescue in collapsed structures, combat search, and water rescue.

II. Relief

Relief is the provision of services and public assistance during or immediately after a disaster to save lives, reduce health impact and meet the basic subsistence needs of the people affected. During the relief phase, the focus is on the provision of food, shelter, health assistance and water, sanitation & hygiene.

III. Recovery

Recovery is the restoration and improvement where appropriate, of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. The main purpose is returning individuals and families, critical infrastructure, and essential government or commercial services back to a functional, if not pre-disaster state.

IV. Rehabilitation and Reconstruction

Post-disaster reconstruction is a complex process. It requires multi-sectoral involvement, very significant resources, and a wide range of skills. Primarily reconstruction is the responsibility of the government, however humanitarian agencies, donors, and countries can be engaged in reconstruction either by providing financial resources or undertaking the projects as per the government's priorities.

Checklist of recommended actions before, during, and after the GLOF

Before GLOF

- Identifying, assessing, and monitoring potential hazards, risks and vulnerabilities. The assessment should describe potential effects on the community, property, services, economy, and the environment and determine resource requirements accordingly.
- Identify and analyze available emergency transportation, rescue, evacuation routes, safe heavens, emergency health services, and warehouses.
- Prepare a GLOF response and contingency plan.
- Ensure formation of Community Based Disaster Risk Management Centers are established in communities and equipped with necessary hazard watch group equipment etc.
- Ensure District Emergency Operation Centre (DEOC) is notified and key stakeholders are aware of it and that DEOC has been equipped with all necessary gadgets and is operationalized.
- Coordinate with Pakistan Meteorological Department (PMD) and monitor the water level of glacial lakes on regular basis.

- Set up, maintain, review and upgrade the mechanism for GLOF early warnings, dissemination, and education of proper information to the public.

- Ensure effectiveness of GLOF forecasting and early warning dissemination system by educating people and conducting mock drills.

- Construction of GLOF protection, delay action structures like gabion walls, check dams, spill-ways, and diversion/dispersion infrastructure

- Develop responsibility framework of district line departments, partner departments, Non-Government Organizations (NGOs), and other stakeholders in post GLOF response and recovery activities.

- Organize and coordinate specialized GLOF preparedness and response training programs for different levels of officers, employees, students, and voluntary rescue workers in the district.

- Facilitate training(s) and awareness programs for HWGs on prevention of disaster or mitigation with the support of local authorities, government, and NGOs

- Coordinate with, and give guidelines to local authorities in the district to ensure that post-GLOF management activities in the district are carried out promptly and effectively.

- Identify buildings and places which could, in the event of a GLOF situation, be used as relief centers or camps and make arrangements for water, sanitation, and hygiene in such buildings or places.

- Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice during any emergency or disaster.

During GLOF

- Activate the district DEOC as early as possible after a disaster occurs.

- Engage the provincial administration and disaster risk management authorities.

- Arrange transportation for search and rescue and coordinate with relief and rescue organizations for evacuation operations (if necessary).

- Conduct search-and-rescue operations as necessary.

- Ensure appropriate coordination of resources and services.

- Send regular situation reports by the Pakistan Meteorological Department (PMD) / Gilgit Baltistan Disaster Management Authority (GBDMA).

- Ensure that consideration has been given to alert the community on the establishment of casualty management procedures.

- Carry out rapid damage and need assessment, identify immediate community

and individual needs and develop a flash report for assistance, and report to PDMA and other relevant stakeholders.

- Develop recovery plans based on community needs and priorities, implement agreed recovery management arrangements as required and prepare damage assessment reports.

- Close liaison with the Provincial Emergency Operating Centre (PEOC) and update with damage and needs.

- Mobilize neighborhood councils, HWGs, NGOs, and voluntary social welfare institutions for effective response. Extreme care to evacuate or take care of the highly vulnerable and socially excluded groups.

- Provide shelter (identify camping sites etc.), food, drinking water, and essential provisions, healthcare, temporary education, and services establish emergency communication systems in the affected area and at evacuation/shelter places established by the Revenue Department.

- Construct temporary bridges or other necessary structures and demolish structures that may be hazardous to the public or aggravate the effects of the disaster.

After GLOF

- Support DMAs for carrying out detailed damage and need assessment and develop a detailed report.

- Provide relief and recovery services as necessary.

- Provide restoration and rehabilitation assistance to the GLOF victims.

- Review and update development plans prepared by the departments of the government at the district level, statutory authorities, or local authorities to make necessary provisions therein for the prevention and mitigation of GLOF.

- Review the District Disaster Management Planning (DDMP) and contingency plans in light of a lesson learned and improve the response mechanism.

- Prepare evaluation reports and implement improvement strategies.

Golain Gol- a GLOF Story

Golain valley is situated 25 kilometers east of Chitral, covering an area of 528.93 km2. Golain Payeen, Chashma, Bubaka, Izghor, Birmogh, and Istoor are its main settlements. The valley is known for the Golain Gol Hydropower Plant Project (GGHPP), capable of generating 108 MW of electricity. The valley hosts over 50 glaciers originating from a minimum elevation of 3917m above sea level (asl) extending up to 6143m asl. The area is prone to the formation of glacial lakes, and as of now, 09 glacier lakes fall within the area, some of which overspill to provide water to communities downstream.

Since the late 1980s, the area has witnessed multiple glacial lake outburst floods. The topography of the valley is difficult and lacks access, where a minor flood incident at Golain stream can lead to the destruction of the link roads on the edges stranding the adjacent communities for days.

High up in Golain Valley resides Rogheli Gol, at an altitude of 8400 ft. asl in glaciers of Khundar, Hongyak Gol, Kakeli, and Payosadar. These feed two glacial lakes located at an average distance of 1 km below, towards Rogheli.

Khyber Pakhtunkhwa Disaster Management Authority (KPDMA) reported that on July 13th, 2020, a devastating GLOF event occurred in the region destroying 2 houses and damaging 14 other buildings including houses, shops, and mosques. Local media reported that over 500 homes were cut off because of the damage to bridges and roads in the area.

Fortunately, no human loss was reported. Part of this owes to communities receiving a timely warning of the risk of the GLOF event through the project Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan (GLOF-II Project).

As part of the project's ground-truthing activities for the assessment of vulnerable valleys, a team of experts consisting of representatives from the government line departments from the Pakistan Meteorological Department (PMD), KPDMA, Environment Protection Agency (EPA), and Forest and District Administration was present in the areas for an assessment of Jam Ashphar (glacier) between the 17th-18th of June 2020. The team discovered the GLOF event through an official warning and notification by PMD and communities were saved with relocation to save zones by KPDMA.

A similar glacial lake outburst flood occurred in the area a year ago on 07 July 2019, in Rogheli causing damage to 3 of Pakistan's hydel power stations including the

Disaster Response Golain Valley

headways of the Golain Gol Hydropower Plant and washing away bridges, roads, irrigation channels, water supply schemes, existing flood protection works, crops, houses, and livestock. More than 4,000 people in the region were directly affected, with another 98,000 estimated to be indirectly affected by damage to water and irrigation structures in the area. 5 suspensions, reinforced concrete bridges built by WAPDA swept away on the Golain valley road, leaving communities isolated.

Various activities carried out under the first phase of the project (2011-2015) played a major role in effective community preparedness and timely response. Focal persons and members of Golain's Community Based Disaster Risk Management Committee (CBDRMC) established under the GLOF Project were informed and alerted to help prepare community members and ensure their safety in proximity to incoming floods. District administrations were active in training the community and local police monitored surrounding glacier lakes for any unforeseen event.

Safe Havens and access routes established under the GLOF Project provided shelter and facilitated rescue operations following the occurrence of the GLOF event. Furthermore, through trainings, community members were sensitized on GLOF related hazards, preparedness, and adaptation. Waliur Rehman, the CBDRMC member, acknowledged the efforts put in by the project, "prior to interventions carried out under the GLOF-I project, Golain's community was not organized to pool resources and undertake collective measures, the lack of education in the area makes it difficult for the community to understand the risks associated with GLOF".

Disaster Response Golain Valley

Response

As the area after the GLOF incident became inaccessible from other parts of the District, District Government requested KPDMA for helicopter services for stranded people, providing food and other items to the community members. Hazard Watch Group Volunteers (established and registered under GLOF Project) along with rescue 1122, Levies force, Civil Defense, District Disaster Management Units (DDMU), District Emergency Relief Cells (DERC), CBDRMCs, and KPDMA responded to the disaster in a coordinated manner and provided relief to the local communities. District Administration, DDMU-PDMA, CBDRMC and the GLOF-II project assisted provincial Government line departments in immediately conducting a Damage Needs Assessment (DNA). Provincial Government in close coordination with National Disaster Management Authority (NDMA) and Federal Government developed an estimated cost for repairing, reconstruction, and rehabilitation of the damages in the valley and also approved the settlement allowance for the community members.

With the increased occurrence of GLOF events over the years, residents of Golain Valley are now seeking to migrate elsewhere to safer areas. "70 percent population of Isghzor and Baka villages in Golain valley want to migrate if the government provides them shelter in safer locations as both these villages are very vulnerable to GLOFs." – Waliur Rehman, CBDRMC member, Golain Valley.

Lessons Learnt

Even though the disaster was responded to on time, lack of resources such as heavy machinery, steel bridges, the flow of floodwater, and accessibility to the area remain key challenges.

To keep communities informed, more efforts need to be made in terms of setting up a widespread network of Early Warning Systems, comprising of Automatic Weather Stations (AWS), depth and discharge gauges with real-time data communication for effective monitoring of GLOF events for the protection of these communities and save the infrastructure.

It is a fact that climate change-induced disasters cannot be stopped but can be prevented and mitigated through empowering local communities, enabling them to be more vigilant and prepared to avoid such unforeseen disasters.

Data Sources

http://floodlist.com/asia/pakistan-glof-golen-valley-chitral-july-2020

https://reliefweb.int/sites/reliefweb.int/files/resources/Golain%20GLOF%20Report%20 09.07.2019%20.pdf

https://www.dawn.com/news/1496414

https://www.dawn.com/news/1578856

02

Glacial Lake Outburst Flood - A Climate Induced Disaster

Glacial Lake Outburst Flood- A Climate-Induced Disaster

Climate change refers to a change in the climate that persists for decades or longer, arising from either natural causes or human activity (adapted from IPCC, 2007 in UNISDR, 2009). Climate change is already modifying the frequency and intensity of many weather-related hazards (IPCC, 2014) as well as steadily increasing the vulnerability and eroding the resilience of exposed populations that depend on arable land, access to water, and stable mean temperatures and rainfall (UNISDR, 2015a). The risk of weather-related hazards is concentrated in low and middle-income countries (UNISDR, 2009). Although the precise impact of climate change is not certain, and it is important to be aware that not all areas will be impacted in the same way, projected impacts of climate change that will drive disaster risk include (UNISDR, 2009b).

The number of climate-related disasters has tripled in the last 30 years. Following are some of the climate change-induced disasters:

The glacial lacks are formed due to the melting of glaciers as a result of a consistent rise in temperature. The bursting of these glacial lakes in the upstream reaches of the Indus River basin due to heatwaves, a phenomenon termed GLOFs, is one of the natural disasters to be concerned about within Pakistan. As the country hosts the triple point (junction) of three world-famous mountain ranges Himalayas, Karakoram, and Hindukush in its north. More than 5000 glaciers are feeding the Indus from 10 sub-basins through different tributaries ranging from few tens of meters to more than 70 km long[5]. The GLOF events are catastrophic as huge loads of debris and mudflows downstream sweeping the infrastructure, houses, and croplands resulting in scores of life losses if it happens without any alert signal. For the mountain population, GLOF is the greatest hazard which is

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5. http://www.pmd.gov.pk/rnd/rnd_files/vol8_issue15/1_Glaciers%20and%20Glacial%20Lakes%20under%20 Changing%20Climate%20in%20Pakistan.pdf

being reinforced by climate change in terms of frequency and vulnerability. Booni Gol Glacier located near Chitral in the Hindukush Mountain range generated an outburst flood in July 2010 triggered by monsoon downpour and caused huge erosive damage to agricultural land and human settlements along the flow channel. It is used to store water under the terminus of the glacier and produce surges either by accelerated melting of snow/ice or by intense rainfall. Due to the steep slope downstream, the carried loads of mud, debris including heavy boulders gain momentum and cause heavy losses to land, settlements, and infrastructure. Passu lake outburst had also followed a similar mechanism in the past with the frequency of outburst at an irregular interval of 2 to 5 years. The scene of its damages is quite visible traveling from Karakoram Highway as Passu village is located along that highway. There is an increasing tendency of the formation of new lakes and expansion of existing ones near the glaciers of the Himalayas and Hindukush as confirmed by the temporal comparison of satellite imageries.

Global warming due to human activities has been affecting all aspects of life posing serious challenges to the availability and utilization of natural resources. A rise in temperature registered during the first decade of the 21st century has been two times higher than it was anticipated. According to the World Meteorological Organization (WMO, 2011) statement on the status of the climate, the first decade (2001-2010) is the warmest decade recorded over the globe, and 2010 ranked as the warmest year (+0.53°C) followed by 2005 (+0.52°C) and 1998 (0.52°C). Sixteen warmest years of the globe occurred during the last two decades.

In the case of GLOF, some slides and debris torrents are large enough to dam rivers, such as the landslides in 1841, which blocked the Indus River and formed a lake upstream. When the dam was breached, a catastrophic flood wave resulted. Similar events occurred from 1852 to 1858 on the Hunza River. In 1977, a landslide dam was formed, possibly in association with a glacier surge (Hewitt, 1968-1969).

A recent study on Indus River basin system flooding and flood mitigation by H. Rehman and A. Kamal found that out of the 2,420 glacial lakes in the Indus basin, 52 are potentially dangerous and could result in GLOFs with serious damage to life and property.

Case study

Surging Glacier creates a New Lake[6]

Shisper glacier is located in northern Pakistan sits near Mount Shisper, a 7,611-meter peak in the Hunza district. In April 2018, the debris-covered glacier started to accelerate, with certain parts moving as fast as 13 to 18 meters (43 to 59 feet) per day. Since the surge started, the front of Shishpar Glacier has advanced by about 1 kilometer. As the ice pushed south past an adjacent valley, it blocked a meltwater stream flowing from the neighboring Muchuhar Glacier. By autumn 2018, the water had pooled up and formed a sizable lake.

Following the first outburst, Shisper Glacier surged at an insignificant rate (total surge of 50 m) from early July 2019 to the end of November 2019. The glacier did not surge beyond its terminus, with no significant increase in the lake extent. By October that year, the lake level had started increasing again. Then, the lake partially drained out from mid-March to early April 2020 before increasing again from 0.245 sq. km on 5 April 2020 to 0.270 sq. km by 30 April. In an image derived from Sentinel-2 data on 25 May, the lake's water level had peaked at 0.340 sq. km – three days before the breach.[7]

It is important to note that the breach occurred when the lake level reached almost the same extent as in 2019. However, the extent of debris blocking the lake had increased by more than 100 m in length compared with that during the previous surge. The discharge below the debris as observed till November 2019 indicated that the blockage of the lake was partially due to the glacier's frontal surge.

April 1, 2019

6. https://earthobservatory.nasa.gov/images/145038/surging-glacier-creates-a-new-lake

7. https://reliefweb.int/report/pakistan/ice-dammed-lake-hunza-created-shisper-glacier-surge-breached-second-time-2020

Shishpar Glacier

Hunza Valley

April 5, 2018

Glacial lake

Hassan Abad
Village

April 1, 2019

2 km

These images, acquired by the Operational Land Imager (OLI) on Landsat 8, show the position of the glacier and lake on April 1, 2019 (right), compared to April 5, 2018. The ice appears gray because dust, soil, and other debris are piled on top of it.

Generally, ice-dammed lakes like this are unstable and do not last for more than one season; most drain slowly and do not cause any problems. But sometimes the ice dams collapse suddenly or lake water spills over the dam, causing fast-moving, dangerous floods. Because of this, scientists are conducting frequent ground surveys near Shishpar and analyzing satellite imagery daily.

In the case of a severe flood, a nearby section of the Karakoram Highway, large numbers of homes in the village of Hasanabad, important irrigation channels, and two power plants could all be affected.

The glacier's surge has already had some consequences. One nearby power station went offline due to a lack of incoming water. Also, a key pathway that miners and cattle once used to cross the glacier safely became impassable. In August 2018, that change trapped cattle in summer pastures and prevented miners from reaching a worksite, the Pamir Times reported.

Case study

Shisper Glacier Surge and its Impacts on Hasanabad Community

Taus Bibi aged 70 was tending her goats in the Sherabad hamlet of Hasanabad Hunza when one of her grandchildren came running from a crashing sound in the nearby water channel. In a state of distress, he asked his grandma to evacuate into a safe area as the floods have come down washing through the terrain next to their home. Alarmed by her grandson's advice, Taus rushed through the neighborhood and took shelter in an orchard, just a few houses away from her home. She rushed in a panic knowing that glacial lake outburst floods are a routine event recurring each year for the past 5 years with increasing intensity.

This is the story of the multiple families residing in the four hamlets of Hasanabad village in Hunza valley namely Sherabad, Harum, Roshanabad, and main Hasanabad. This village has been the epicenter of GLOFs since 2018 from the Shisper Glacier-one of the most active and significant glaciers impacting thousands of lives in the Hasanabad catchment.

Climate change-induced disasters such as GLOFs are mainly associated with the 5000 plus glaciers present in northern areas of Pakistan with the formation of over 3,044 glacial lakes. 7.1 million people are vulnerable to the corresponding risks.

The Shisper Glacier is 12-km long with a history of periodic surges since 2018. Its glacial mass and debris block the glacial melt stream of Muchuhar Glacier resulting in the formation of an ice-dammed lake. Satellite image projection shows the development of the lake during the winters of the year 2018. The continuous surge and antagonist decrease in water discharge and increase in volume resulted in its outburst in June 2019, and the

phenomenon repeated in January 2020 with water finally discharging in the adjacent nullah. However, with heavy melting in summers, a GLOF resulted in May 2020 more monstrous than the upsurge in 2019.

The villagers recall the onset of the flood as extremely disturbing with zero possibility of taking shelters in their homes for the fear of being wiped out. Families spent over 35 hours in orchards and fields till the flood water subsided.

It should be noted that Hasanabad has one of the major power generation complexes for the entire Hunza district. A 2 MW power station installed in the region was severely damaged in the 2020 floods depriving the village of electricity for days.

As per the current situation and recent lake development in February 2021, 21 households in Hasanabad are deemed at risk with emergency preparations undertaken by district administrations.

In order to safeguard the communities and their livelihoods, rigorous efforts have been made by GLOF-II Project in close collaboration with the Pakistan Meteorological Department (PMD). Authorities are closely monitoring lake developments and devising interventions to drain the water in a controlled manner. Due to the looming danger of a sudden GLOF, the GBDMA has declared a state of emergency for the surrounding areas of Hasanabad.

The glacier surge was monitored using state-of-the-art equipment like Differential Global Positioning System (DGPS) and stake form. The vulnerability of the lake was further measured using Ground Penetrating Radar (GPR). To measure the water

Top view Shisper Glacier and Lake

inflow and outflow in the lake, staff gauges have been installed at the inlet and outlet of the lake.

Out of 28 Automatic Weather Station (AWS) as part of the Early Warning Systems to be installed in various districts of GB under GLOF II, one has been installed in Shisper, to monitor the weather patterns for a better forecast of any unforeseen event in Hasanabad. AWS provides real-time data and can be accessed by anyone through the official website of PMD.

Ground truthing/ monitoring of lake situation

The precarious Khurdopin Glacier Upsurge in Shimshal, Hunza, Gilgit Baltistan

Introduction to Shimshal

Climate change is causing severe impacts globally on the glaciers and the people living in their surroundings. In Northern Pakistan, the climate change phenomenon has turned the country's climate severally volatile in past decades and this trend will continue in the future as well. The worst hit amongst these communities are those living high in the mountainous terrains of the Karakorum and the Himalayas. The snow in these mountains is melting at a higher pace, causing ice-dammed lakes and GLOFs downstream. Therefore, extreme weather events such as landslides, rock falls, flash floods, and GLOFs are common in fragile mountain ecosystems.

Shimshal is one of the remotest valleys and highest settlements of Upper Hunza in GB. It connects to the rest of Hunza through a 66 km long road which is carved into a sharp gorge. A jeep ride will take three and a half hours through a rough road, inaugurated in 2004, to reach Shimshal after passing through Karakorum Highway at the village of Passu. The road often has landslides and is mostly damaged. This far-flung valley is known for its yak-herders and mountain climbers, one example being, Samina Baig. The people living there as described by British mountaineer and explorer, Eric Shipton, living in the peak of "hardihood" and he wrote about the region:

"The community of Shimshal is remarkable for its isolation and independence of support from the outside world … They are a happy community leading an ideal existence in magnificent surroundings."

(Blank on The Map, 1938; reprint 1985, 296)

Khurdopin Glacier surge

In the Upper Shimshal valley, there are three glaciers present, stretching at a distance of 25 km: The Khurdopin/Yuskin Gardan, Yazghil, and Malungutti glaciers. According to the indigenous knowledge of locals, the Khurdopin glacier has a surge cycle of around 20 years. In May 2017, the formation of an ice-dammed lake was observed and reported by locals and endorsed by civil society institutions. Thereafter in August 2017, disaster struck when water was discharged from the dammed lake damaging Shimshal road at various locations, isolating the valley for almost 22 days. The lake was surging at a rate of roughly 20 meters (65 feet) per day by the winter of 2017. The erosion potential was quite visible in the form of movement of settlement areas of the villages Shimshal (3080 m) and Pasu (2450 m). In the past years, the lake formation was mainly attributed to the Khurdopin dam. In early November 2017, the surging glacier entirely choked the river and

the lake started to form behind the dam, and almost 1200m long lake formed on 21 November. Satellite images have projected that the lake is again showing movements as of April 2021.

Khurdopin Glacier is 41 km long, stretching in the South to North direction with an average width of 1.7 km, which changes at the snout, because of the adjoining Yukshin Gardan glacier. The junction of these two glaciers has caused disastrous GLOF events such as that in 2017, which has completely changed the landscape areas reaching the Gilgit River. When the lake drained out, its size reduced from 100,000 square meters to about 40,000 square meters in a matter of days, which testifies the magnitude of the flood and the extent of damages downstream, to livelihoods and infrastructure.

Due to the high frequency of extreme weather events and floods, the local villagers in the towns of Passu and Shimshal initiated a beacon warning system. With the onset of spring, around 30 outposts were established in the hillsides along a 90-kilometer (60-mile) range of the valley. When a flood was about to occur at night, the outposts would light a series of bonfires and even fire gunshots during the day to warn the villagers. This system has now been replaced with cell phones, even though the service is not that good and the floods can still add to the astonishment of the locals.

Government line departments with support from GLOF-II Project are working in close collaboration to reduce the impact of lake formation on the local communities of Shimshal. Community mobilization through the formation of Community-Based Disaster Risk Management Committees (CBDRMCs) and Hazard Watch Groups (HWGs) is being undertaken to enable communities to counter the effects of emergencies like GLOFs and other climate-induced disasters. In the future mitigation measures such as community preparedness, GLOF hazard mapping, vulnerability, risk assessment, identification of safe havens, construction of gabion walls, and installation of Early Warning Systems (EWS) will be ensured in the region.

Need for Improved Disaster Risk Management:

After revisiting the hazardous lake formation, the following recommendations and actions if taken by government authorities can save peoples livelihoods and local infrastructures:

- Frequent exercises of mock drills should be performed more frequently in communities and schools, to educate local villagers on disaster preparedness and mitigation.

- Pre-disaster planning should be done by government authorities and NGOs working on climate change resilience and protecting glaciers

- Stockpiling of basic foods items, medical items and emergency equipment such as bedding, tents, generators, fuel should be ensured by GBDMA

- Emergency heavy equipment should be deployed in the nearby valleys in case of an emergency in Shimshal valley

- Helicopter services should be asked to remain on standby to minimize damages to lives

- Medical teams should be kept on alert to engage them when the crisis strike

- The local mobile carrier SCO should be informed to install a tower in Shimshal or Passu for better coverage and reception during an emergency

- Local and international experts on climate change and glaciers should be engaged to study the vulnerability and risks associated with glacial floods and their impacts on the local communities.

Factors contributing to Vulnerabilities

Population Growth

The population of Pakistan has grown by 361 percent since 1947. The growth of population has negatively affected the Socioeconomic development of the country resultantly most of the population has settled in areas that are more vulnerable to various hazards like Floods (Riverine & Flash), Fires, GLOFs, Landslides, Avalanches, and Epidemics.

Poverty in Hazard-Prone Areas

Poverty is one of the major factors contributing to vulnerability, under development, and exposure of communities to disasters. Poverty reduces the capacities of the communities to resist, mitigate and respond to hazard. The absence of safety nets and limited access to assets shrinks the people's capacity to sustain the brunt of disasters. The poor living in hazard-prone areas is badly exposed to disaster effects in one way or the other.

Lack of Institutional Disaster Risk Management Capacity

The institutional capacity of different government departments/agencies is quite limited to deal with disasters, particularly at district levels. Lack of coordination between response agencies at the provincial/federal level and limited Early Warning Systems (EWS) are the main grey areas. There is a lack of focus on preparedness because of the capacity and scarcity of resources. All these factors ultimately increase the vulnerability of the local population to different disasters.

Climate Change and its Impacts

Global warming is causing severe damage to the natural environment. The impact

includes losses in biodiversity, rise in the sea level, frequent cyclones, drought, and abnormal shifts in the weather pattern. As a result, increased flooding changes the freshwater supply and increasingly severe weather events. This can also lead to the alteration of forest and crop yields.

Land Use Planning

In the flood plains, people have occupied river/nullah beds and blocked natural drainage systems (nullahs/ water channels) thus making themselves vulnerable to all types of floods. Moreover, communities occupying active seismological active zones are vulnerable to the effects of earthquakes. Furthermore, due to overpopulation, agricultural lands and green/ vegetated areas are being converted to residential areas (concrete jungles); thus, deforestation is causing river erosion, etc. which is further increasing vulnerability to floods.

03

Overview of Global Policies & Frameworks for DRR

Overview of Global Policies & Frameworks for DRR

Before the 1990s disaster management was mainly response-oriented and emphasis used to be on responding to any disaster through an event-triggered approach with no or least attention to prevention, mitigation, and preparedness. However, later due to post-disaster impacts, the world understood that a disaster management paradigm has to take into consideration the social and economic aspects of a disaster. Following are some of the DRR related important global policies and frameworks:

Yokohama Strategy and Plan of Action for a Safer World

In 1994, the first world conference on natural disaster reduction was held in Yokohama, Japan.   The conference adopted the Yokohama Strategy for a Safer World: guidelines for natural disaster prevention, preparedness, and mitigation. The word conference outlined Yokohama principles to prevent, mitigate and reduce disaster risks in developed and less developed countries.

Ten principles of the Yokohama Strategy for a Safer World[8]

- Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures.
- Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief.
- Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral, and international levels.
- The development and strengthening of capacities to prevent, reduce and mitigate disasters is a top priority area to be addressed during the decade to provide a strong basis for follow-up activities to the Decade.
- Early warnings of impending disasters and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness.

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8.   https://www.preventionweb.net/files/8241_doc6841contenido1.pdf

- Preventive measures are most effective when they involve participation at all levels, from the local community through the national government to the regional and international levels.

- Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups, by appropriate education and training of the whole community.

- The international community accepts the need to share the necessary technology to prevent, reduce and mitigate disaster; this should be made freely available and on time as an integral part of technical cooperation.

- Environmental protection as a component of sustainable development consistent with poverty alleviation is imperative in the prevention and mitigation of natural disasters.

- Each country bears the primary responsibility for protecting its people, infrastructure, and other national assets from the impact of natural disasters. The international community should demonstrate the strong political determination required to mobilize adequate and make efficient use of existing resources, including financial, scientific, and technological means, in the field of natural disaster reduction, bearing in mind the needs of the developing countries, particularly the least developed countries.

Hyogo Framework for Action 2005-2015

In 2005, 168 states attending the UN World Conference on Disaster Reduction held in Kobe, Hyogo, Japan adopted HFA 2005-2015. Endorsed by the UN General Assembly, HFA is a non-binding but politically authoritative obligation to building the resilience of the nations and communities to disasters by 2015. This was the first internationally accepted framework for DRR, which outlines three strategic goals and five broad priority areas for action plus general considerations, key activities under each priority area, and the role of states and other stakeholders involved in the implementation.

HFA Strategic Goals

- Integration of disaster risk considerations into sustainable development policies, planning, and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness, and vulnerability reduction.

- Development and strengthening of institutions, mechanisms, and capacities at all levels, in particular at the community level to build resilience.

- Incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response, and recovery programs in the reconstruction of affected communities.

HFA Priorities for Actions

Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.

Identify, assess and monitor disaster risks and enhance early warning.

Reduce the underlying risk factors

Ensure that DRR is a national and a local priority with a strong institutional basis for implementation

Strengthen disaster preparedness for effective response at all levels

HFA
PRIORITIES FOR ACTIONS

1 2 3 4 5

Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030

The Sendai Framework for DRR 2015-2030 was adopted at the Third UN World Conference in Sendai, Japan, in March 2015. The Sendai Framework also articulates the need for improved understanding of the disaster, vulnerability, and hazard characteristics; the strengthening of disaster risk governance, accountability for DRM; preparedness to "Build Back Better"; recognition of stakeholders and their roles; mobilization of risk-sensitive investment to avoid the creation of new risk; resilience of health infrastructure, cultural heritage, and work-places; strengthening of international cooperation and global partnership, and risk-informed donor policies and programs, including financial support and loans from international financial institutions. There is also a clear recognition of the global platform for DRR and the regional platforms for DRR as mechanisms for coherence across agendas, monitoring, and periodic reviews in support of UN governance bodies.

UNISDR has been tasked to support the implementation, follow-up, and review of the Sendai Framework.

Expected Goals

To support the assessment of global progress in achieving the goal of the present framework, seven global targets have been agreed upon. These targets will be measured at the global level and be complemented by work to develop appropriate indicators. National targets and indicators will contribute to the achievement of the outcome and goal of the present framework.

Targets

The seven global targets are:

- Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rates in the decade 2020-2030 compared to the period 2005-2015.

- Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020-2030 compared to the period 2005-2015.

- Reduce direct disaster economic loss with the global Gross Domestic Product (GDP) by 2030.

- Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

- Substantially increase the number of countries with national and local DRR strategies by 2020.

- Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present framework by 2030.

- Substantially increase the availability of and access to multi-hazard EWS and disaster risk information and assessments to people by 2030.

Priorities for Actions

Taking into account the experience gained through the implementation of the HFA, and in pursuance of the expected goal, there is a need for focused action within and across sectors by states at local, national, regional, and global levels in the following four priority areas:
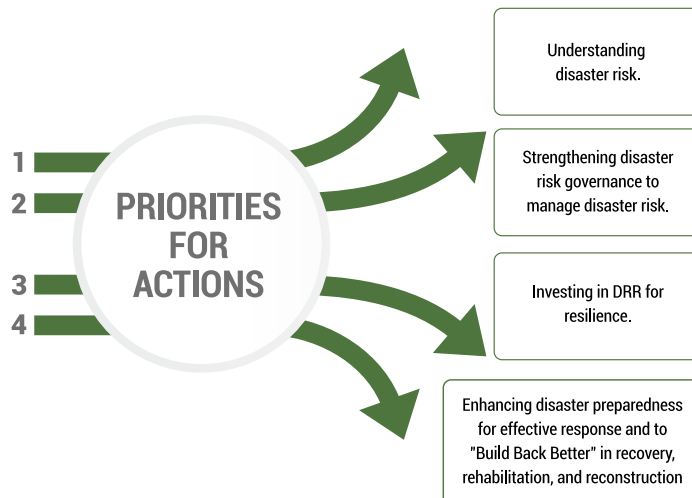
Pakistan Progress towards SFDRR[9]

Priority 1: Understanding disaster risk

Multi-hazard Vulnerability and Risk Assessment (MHVRA) is one of the main focus areas indicated in the Implementation Roadmap 2016-2030 of Pakistan's National Disaster Management Plan. While a nation-wide scale MHVRA is still to be developed. While recognizing the need to consolidate risk assessments, the National Working Group (NWG) has been established by the National Disaster Management Authority (NDMA)to provide strategic guidance and coordinate all activities related to vulnerability and risk assessments for guaranteeing uniformity of data, information, and the utilization of standard methodologies (NDMA, 2015).

Priority 2: Strengthening disaster risk governance to manage disaster risk.

Pakistan's DRM policy and plans have evolved over the years with the National Disaster Risk Management Framework (NDRMF) 2007-2012 outlining a comprehensive DRR agenda and a successive plan (National Disaster Management Plan (NDMP) 2012-2022), as a mechanism to manage the complete spectrum of disasters by developing disaster risk reduction policies, strategies, measures and actions in partnership with all stakeholders, having highlighted priority actions and costs for the ten years. The NDMP comprises the Master Plan, Human Resource Development Plan on Disaster Management, Multi-Hazard Early Warning System Plan, and Instructors' Guidelines on Community Based Disaster Risk Management, which is a tested model for CBDRM for possible replication (NDMA, 2012). Hazard-specific preparedness plans, contingency plans, and standard operating procedures are all in place to be used as a reference for all concerned agencies.

Also, Institutional capacity strengthening has been taken place by the National Institute of Disaster Management (NIDM) acting as a technical and training institute of NDMA, with funding support from international donors. Major programs include capacity building of disaster management bodies at the federal, provincial, and district levels.

Priority 3: Investing in DRR for resilience

To improve risk financing capacity and establish secured funding to actualize planned DRR interventions, the National Disaster Management Act of 2010 sets up a National Disaster Management Fund managed by the federal government, while separate disaster management funds are to be established by each of the provincial governments and district administration. At the sub-national level, PDMAs and DDMAs have varying financial capacity and have faced budget

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9. https://www.preventionweb.net/files/68260_682307pakistandrmstatusreport.pdf

constraints for DRM activities. Since the country has suffered recurrent flooding and other large-scale events which have caused accumulating financial impacts, international agencies have played a crucial role in strengthening financial resources for DRM including a US$ 200 million loan approved by the ADB in 2016 to support the establishment of a National Disaster Risk Management Fund, and support by the World Bank on the establishment of disaster risk financing strategies and DRM funds at the provincial level (ADB, 2019).

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

Attempts to strengthen emergency response and coordinating mechanisms for crisis management include the National Disaster Response Plan (NDRP-2019), an updated version of NDRP-2010, the Host Nation Support Guidelines for Foreign Assistance to Pakistan During Disasters (2018), and the National Monsoon Contingency Response Directive. Updated and issued annually before the monsoon period, the National Monsoon Contingency Response Directive presents the outlook of the monsoon situation for the upcoming year, visualizes monsoon contingencies, and provides response guidelines for three tiers of response level: Local Emergency Response by DDMAs, Provincial level and National level led by the NDMA. The directive guides phased actions and assign tasks for concerned agencies for hydro-met hazards including cyclone, flashfloods, GLOFs, landslides, and avalanches (NDMA, 2018).

The humanitarian coordination structure in Pakistan consists of various stakeholders and partners working in the field of disaster management. NDMA being the focal agency is mandated to coordinate with all agencies at the national level.

United Nations Framework Convention on Climate Change (UNFCCC)

UNFCCC is the first intergovernmental treaty on climate change developed to address the problem of climate change. The convention, which sets out an agreed framework for dealing with the issue, was opened for signature in the June 1992 UN conference on environment and development also known as the Rio Earth Summit. The UNFCCC entered into force on 21 March 1994, and by December 2007, it had been ratified by 192 countries.

Parties to the convention continue to meet regularly to take stock of progress in implementing their obligations under the treaty and to consider further actions to address the climate change threat. They have also negotiated a protocol for the convention.

04

Disaster Risk Management (DRM) in Pakistan

Disaster Risk Management (DRM) in Pakistan

Despite being prone to natural and human-induced hazards, no proper humanitarian structure existed in Pakistan until December 2006. The emergency relief cell in the Cabinet Division was responsible to deal with the post-disaster situation(s) as a national response agency, in collaboration with Relief Commissioners at the provincial level. However, in the backdrop of HFA and the response phase of the October 2005 Earthquake, the government, NGOs, and humanitarian response agencies felt a dire need for a national-level humanitarian structure in Pakistan.
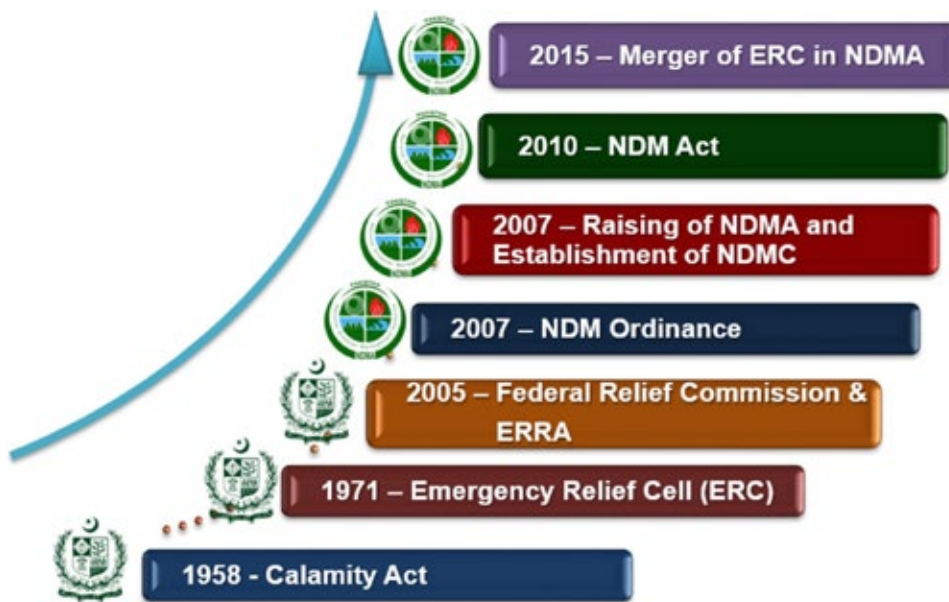
Source: NDMP 2019

To respond to the needs of the affected population government departments, UN agencies, NGOs, civil society/philanthropist organizations worked together to minimize the negative impact of the disasters and assisted those affected. This is achieved by close coordination of all stakeholders through an established framework. This humanitarian architecture allows an effective, coordinated response when disaster strikes.

Evolution of Disaster Risk Management Systems

The West Pakistan National Calamities Act of 1958 and Civil Defense Act-1952 provide for the maintenance and restoration of order in calamities affected areas, by relief against such calamities and focuses on emergency response. Based on the Act, an ERC was created within the Cabinet Division in 1971 and was responsible for disaster relief at the National level.   It assisted in cash and kind to supplement the resources of the provincial government and administered the Prime Minister's Flood Relief Fund (PMFRF).

In the backdrop of the earthquake of 2005, the National Disaster Management Ordinance (NDMO) was promulgated in 2006, was approved by the Parliament, and became the National Disaster Management Act (NDMA) in 2010. In line with the provisions of the National Disaster Management Ordinance-2006, the Government of Pakistan approved the following three-tiered structure at the national, provincial, and district levels.
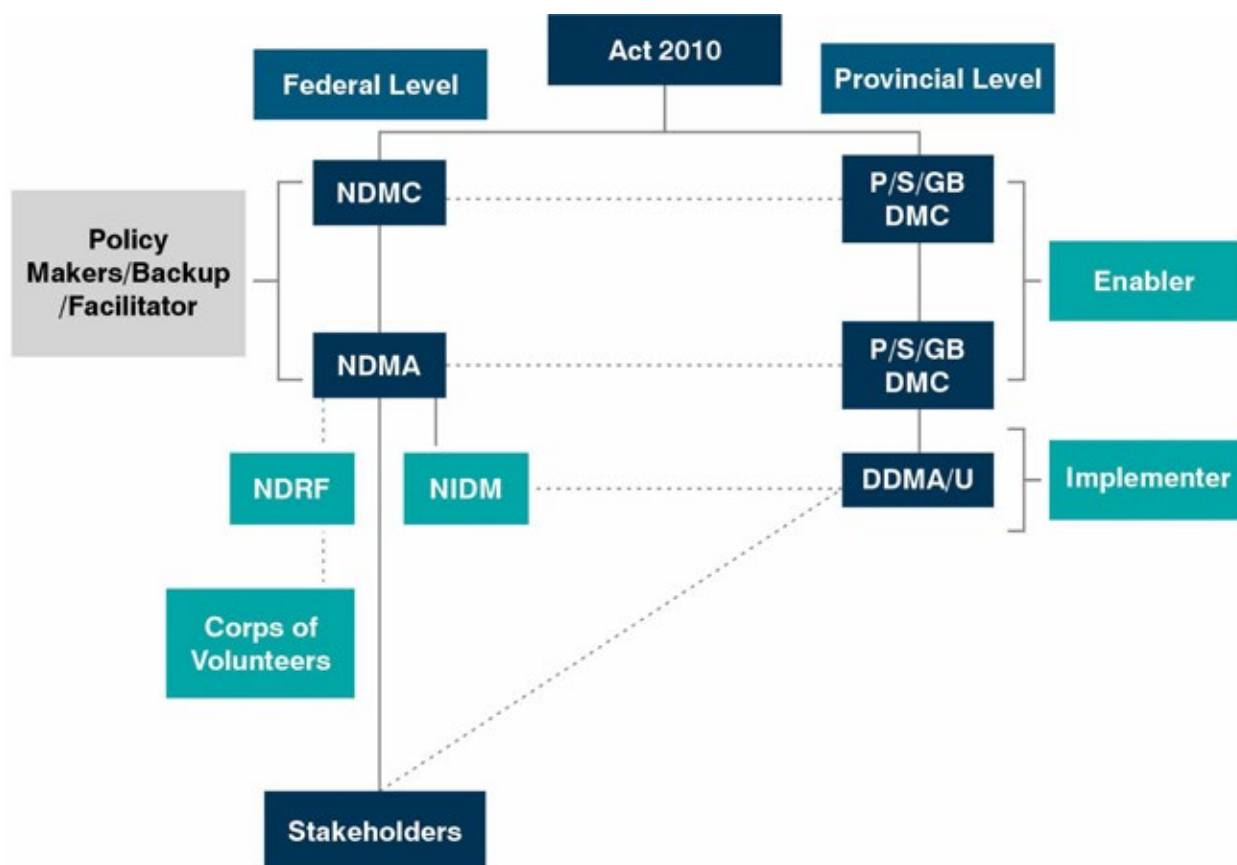
Source: NDMP 2019

National Disaster Management Commission (NDMC)

Headed by the Prime Minister as its chairperson, the NDMC is the highest policy and decision-making body for DRM. Other members include opposition leaders of both the houses; chief ministers of four provinces and Gilgit Baltistan (GB); Prime Minister Azad Jammu and Kashmir (AJ&K); Chairman Joint Chiefs of Staff Committee (CJCSC) or his nominee. Additionally, key federal ministers and civil society representatives are also part of the commission. Chairman NDMA acts as secretary of the commission.

The major functions of the commission are as follow:

• Lay down policies on DM.

• Approve the national plan.

• Approve plans prepared by the ministries or divisions of the federal government per the national plan.

• Lay down guidelines to be followed by the federal government and provincial authorities; arrange for, and oversee, the provision of funds for mitigation measures, preparedness and response.

• Provide such support to other countries affected by major disasters as the federal government may determine.

• Take such other measures for the prevention of disaster, or the mitigation thereof, or for preparedness and capacity building for dealing with disaster situations as it may consider necessary.

National Disaster Management Authority (NDMA)

NDMA was established in 2007 as a lead agency at the federal level to implement, coordinate and monitor the whole spectrum of DM including preparedness, prevention, mitigation, response, recovery, rehabilitation, and reconstruction program. As per the NDMA 2010, the Authority is headed by Chairman while it has three members heading three wings. The Chairman also acts as an ex-officio Secretary of the NDMC and NDMA serves as a secretariat of NDMC.

Functions of NDMA

• Act as the implementing, coordinating, and monitoring body for disaster management.

• Prepare the national plan to be approved by the National Commission.

• Implement, coordinate and monitor the implementation of the national policy.

• Lay down guidelines for preparing disaster management plans by different ministries or departments and the provincial authorities.

• Provide necessary technical assistance to the provincial governments and the provincial authorities for preparing their disaster management plans

following the guidelines laid down by the National Commission.

- Coordinate response in the event of any threatening disaster situation or disaster.

- Lay down guidelines for, or give directions to the concerned ministries or provincial governments and the provincial authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster.

- For any specific purpose or general assistance, requisition the services of any person and such person shall be a co-opted member and exercise such power as conferred upon him by the Authority in writing.

- Promote general education and awareness about disaster management.

- Perform such other functions as the National Commission may require.

National Institute of Disaster Management (NIDM)

To promote and strengthen DRR/DRM through research, training, and knowledge management, the NDMA, 2010, requires the establishment of the NIDM at the national level. It is the lead institute responsible for planning and promoting disaster management training. Moreover, the NIDM is required to assist research institutions, schools, and colleges and is responsible to assist provincial governments to develop policies, strategies, and DRR frameworks. The institute is functional since February 2010 in Islamabad.

Provincial/Region/State Disaster Management Commission (P/R/SDMC)

Chaired by the chief executive of the province/region/state, the members include a leader of the opposition and a member nominated by him. The chief executive has the power to nominate other members of PDMC. Similarly, he may designate one of the members to be the vice-chairperson. Have similar responsibilities that of NDMC i.e., policy formulation policies and develop guidelines on DRM at provincial/region/state level, approve DRM plans prepared by departments and oversee fund utilization by provincial/ region/state departments. Functions of these commissions are:

- Lay down the provincial/regional/state disaster management policy.

- Lay down the provincial/regional/state plan following the guidelines laid down by the National Commission.

- Approve the disaster management plans prepared by the departments of the provincial/regional/state government.

- Review the implementation of the plan.

- Oversee the provision of funds for mitigation and preparedness measures.

- Review the development plans of the different departments of the province/

region/state and ensure that prevention and mitigation measures are integrated therein.

- Review the measures being taken for mitigation, capacity building, and preparedness by the departments of the provincial/regional/state government and issue such guidelines or directions as may be necessary.

PDMA/SDMA/GBDMA/ICTDMA

The agency has to act as the planning, implementing, coordinating, and monitoring for disaster management at the provincial/region/state level. The organization varies from province to province depending upon the disaster situation in the respective province/region/state.

Functions

- Formulate the provincial/regional/state DM policy obtaining the approval of the Commission.
- Coordinate and monitor the implementation of the national policy, national plan, and provincial/regional/state plan.
- Examine the vulnerability of different parts of the province/region/state to different disasters and specify prevention or mitigation measures.
- Lay down guidelines to be followed for the preparation of disaster management plans by the departments and district authorities.
- Evaluate preparedness at all governmental and non-governmental levels to respond to disaster and to enhance preparedness.
- Coordinate response in the event of a disaster.
- Give directions to any department or authority regarding actions to be taken in response to a disaster.
- Promote general education, awareness, and community training in this regard.
- Provide necessary technical assistance or advise district authorities and local authorities to enable them to carry out their functions effectively.
- Advise the provincial/regional/state government regarding all financial matters to disaster management.
- Examine the construction in the area and if it believes that the standards laid down have not been followed, it may direct the owner and/ or builder to make such changes or repairs as are necessary to bring the constructs into compliance with such standards.
- Ensure that communication systems are in order and disaster management drills are being carried out regularly.
- Perform such other functions as may be assigned to it by the National or Provincial/Regional/State Authority.

District Disaster Management Authorities /Units

District Disaster Management Authorities/Units (DDMA/Us) that are established at the district level and are headed by district executive whereas respective deputy commissioners, district police officers, Executive District Officer (EDO) (Health), and any other district-level officer appointed by the District Government are its members. The organization varies from province to province depending upon the disaster situation in the respective province/region/state. Following are the functions of DDMA/Us:

- Prepare a DM plan including a district response plan for the district.
- Coordinate and monitor the implementation of the National Policy, Provincial Policy, National, Provincial Plan, and District Plan.
- Ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of their effects are undertaken by the departments of the government at the district level as well as by the local authorities.
- Ensure that the guidelines for prevention, mitigation, preparedness, and response measures as laid down by the National and the Provincial/ Regional/ State Authorities are followed by all departments of the government at the district level and the local authorities in the district.
- Give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary.
- Lay down guidelines for the preparation of disaster management plans by the departments at the district level and local authorities in the district.
- Monitor the implementation of disaster management plans prepared by the departments at the district level.
- Lay down guidelines to be followed by the departments at the district level.
- Organize and coordinate specialized training programs for different levels of officers, employees, and voluntary rescue workers in the district.
- Facilitate community training and awareness programs for the prevention of disaster or mitigation with the support of local authorities, governmental, and NGOs.
- Set up, maintain, review and upgrade the mechanisms for early warnings and dissemination of proper information to the public.
- Prepare, review and update district-level response plans and guidelines.
- Coordinate with, and give guidelines to, local authorities in the district to ensure that pre-disaster, during a disaster, and post-disaster management activities are carried out promptly and effectively.
- Review development plans prepared by the departments of the government at the district level, statutory authorities, or local authorities to make necessary provisions therein for the prevention or mitigation of disasters.
- Identify buildings and places that could, in the event of a disaster situation,

be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places.

- Establish stockpiles of relief and rescue materials and ensure preparedness to make such materials available on short notice.
- Provide information to the Provincial/Regional/State Authority relating to the different aspects of disaster management.
- Encourage the involvement of NGOs and voluntary organizations working at the grassroots level in the district for disaster management.
- Ensure communication systems are in order and disaster management drills are carried out periodically.
- Perform such other functions as the provincial government or provincial authority may assign to it or deem necessary for disaster management in the district.

To assist, protect, or providing relief to the community in response to any disaster, the District Authority may:

- Give directions for the release and use of resources available with any department of the government and the local authority in the district.
- Control and restrict vehicular traffic to, from and within, the vulnerable or affected area.
- Control and/or restrict the entry of any person into and/or his movement within a disaster area.
- Remove debris, conduct searches, and carry out rescue operations.
- Provide shelter, food, drinking water, and essential provisions, healthcare, and services.
- Establish emergency communication systems in the affected area.
- Make arrangements for the disposal of the unclaimed dead bodies.
- Direct any department of the government of the province, and/or any authority or body under that government at the district level to take such measures as are necessary for its opinion.
- Require experts and consultants in the relevant fields to advise and assist, as it may deem necessary.
- Procure exclusive or preferential use of amenities from any authority or person.
- Construct temporary bridges and/or other necessary structures and demolish structures that may be hazardous to the public or aggravate the effects of the disaster.
- Ensure that the NGOs carry out their activities in an equitable and non-discriminatory manner.
- Take such other steps as may be required or warranted to be taken in such a situation.

Humanitarian Coordination Architecture (HCA)

According to the guiding principle (e) of SFDRR, disaster risk reduction and management depend on coordination mechanisms within and across sectors and with relevant stakeholders at all levels, and it requires the full engagement of all State institutions of an executive and legislative nature at national and local levels and a clear articulation of responsibilities across public and private stakeholders, including business and academia, to ensure mutual outreach, partnership, complementarity in roles and accountability and follow-up.

The humanitarian coordination structure in Pakistan consists of various stakeholders and partners working in the field of disaster management. NDMA being the focal agency is mandated to coordinate with all agencies at the national level. At the provincial level, the Inacro (ICCM) is in Peshawar, KP, composed of provincial heads of agencies and provincial cluster coordinators, and chaired by OCHA; and the ICCMs in Hyderabad, Sindh, and Quetta, Baluchistan, co-chaired by OCHA and the Provincial Disaster Management Authority[10].

Source: NDMP 2019

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10. https://www.unocha.org/pakistan/about-ocha-pakistan

Government Departments and Organizations

In the light of Clause 7 of the NDMA 2010, NDMA is mandated to lay down guidelines for or give directions to all concerned Ministries/ Departments/ Authorities at all levels regarding measures to be taken by them in response to any threatening disaster situation or disaster. Details of responsibilities of these have been given in National Disaster Response Plan (NDRP). A list of, key Federal Ministries/ Departments/ Authorities having an important role in disaster response, is given below:

Federal Ministries	Federal Departments and Authorities
• Defense • Interior • Foreign Affairs • Communications • Climate Change • Finance, Revenue, and Economic Affairs • Planning, Development, and Reform • National Food Security and Research • Housing and Works • Human Rights • Industries and Production • Information, Broadcasting, National History, and Literary Heritage • Information Technology & Telecommunication • Law and Justice • Energy • Maritime Affairs • Railways • National Health Services, Regulations, and Coordination • Science and Technology • Water Resources	• Pakistan Armed Forces • Pakistan Meteorological Department • Civil Aviation Authority • Federal Flood Commission • Geological Survey of Pakistan • Survey of Pakistan • Indus River System Authority • National Database and Registration Authority • National Highway Authority • National Logistics Cell • Pakistan Coast Guard • Pakistan Commissioner for Indus Waters • Pakistan Housing Authority • Pakistan Public Works Department • Pakistan Railways • Police Service of Pakistan • Press Information Department • Space and Upper Atmosphere Research Commission • Water and Power Development Authority

Armed Forces

As per NDMA 2010, NDMA is empowered to call upon services of Armed Forces, Civil Armed Forces, or any other person for disaster response {chapter V, section 23 (c) read in conjunction with section 1 (f)}. The employment of Armed Forces including various assets will be determined by NDMA as per the requirement/ situation. The responsibilities which can be assigned to Armed Forces can be summarized as under:

• Support disaster management authority in preparing contingency plans.
• Conduct rescue, relief, and evacuation operations in conjunction with disaster management authorities.

- Provide available resources/ equipment like helicopters, airplanes, ships & machinery, etc. for disaster response.
- Assist the disaster management authorities in setting up camps/ tent villages and organize medical camps in close coordination with relevant Health Ministry/ Department.
- Support DM authorities in the conduct of assessment (situation/ damages etc.).
- Support DM authorities in the recovery and reconstruction phase or/and conduct recovery and reconstruction independently where necessary.
- Provide security during disasters, if required.

Armed Forces can also play a major role with regards to DRR by ensuring the implementation of rules/regulations with the Armed Forces system. Moreover, intuitions like National Defense University (NDU), Command & Staff College, and other respective training Institutes can also be utilized in educating armed forces personnel regarding DRR, DRM, and mitigation processes.

Provincial Relief Department

The Relief Commissioner is responsible for coping with any disaster situation in the province. Funds remain at the disposal of the Relief Commissioner which is released to the District Administration for provision of facilities to affected as per the rate of compensation for casualties, houses/ crop damages proposed by provincial technical committees headed by the Relief Commissioner. All relief items, goods, cash, and grants are distributed by the District Administration through the District Damage Assessment Committee (DDAC) which includes officers from the line agencies, representatives of district and tehsil councils, and members of local NGOs.

Fire Fighting Services

The main function of the firefighting services is to "extinguish the fire". The Municipal Civic Authorities (MCA) at the Tehsil level are responsible for the provision of firefighting services in the respective administrative boundary.

Emergency Services

Emergency Services are operational in all provinces and are responsible for responding to and handling various emergencies, including fire emergencies. These services are equipped with ambulance(s) and technical equipment.

Civil Defense

The main function of civil defense is to:

- Assist local administration/ army in rescue, relief, and evacuation measures.
- Form search & rescue teams and train them in each Province/ District of the Country.
- Organize training/ refresher training and simulation exercises for government departments, youth in colleges/ universities, and volunteers on the search and & rescue missions and first aid.
- Organize training on bomb disposal/ reconnaissance to the personnel of Armed Forces, Police, and all other concerned agencies.
- Develop a database of volunteers at District Headquarters, Tehsil, and Union Council (UC) levels and organize training(s) (search & rescue and first aid).
- Organize training(s) on firefighting for government staff and volunteers at district and tehsil levels.
- Create community awareness of public safety organizations.

Pakistan Metrological Department

The major functions of PMD are to provide information on meteorological and geophysical matters with the objective of disaster mitigation due to weather and geophysical phenomena, agriculture development based on the climatic potential of the country, prediction, and modification of weather forecasts[11]. The department is the main stakeholder to measure, monitor, and/or predict hazards like floods, droughts, GLOFs, etc.

United Nations (UN) Agencies/ Clusters

UN Agencies play a key role in disaster management, especially in assessment, planning, coordination, response, recovery, and longer-term disaster risk education program. UN takes a lead role in establishing the Inter-Agency Standing Committee (IASC) to organize and coordinate periodic meetings of UN and INGOs to monitor the response of various agencies. Moreover, the UN agencies play an important role in the capacity building of the public sector in policy formulation, providing technical support to provinces and districts for disaster management planning.

Clusters are activated by UN Agencies in the backdrop of national-level calamity. Clusters are groups of humanitarian organizations, both UN and non-UN, in each of the main sectors of humanitarian action, e.g., water, health, and logistics. They are designated by the IASC and have clear responsibilities for coordination. The cluster approach was applied for the first time following the 2005 earthquake in

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11.   https://www.adrc.asia/countryreport/PAK/2015/PAK_CR2015A.pdf
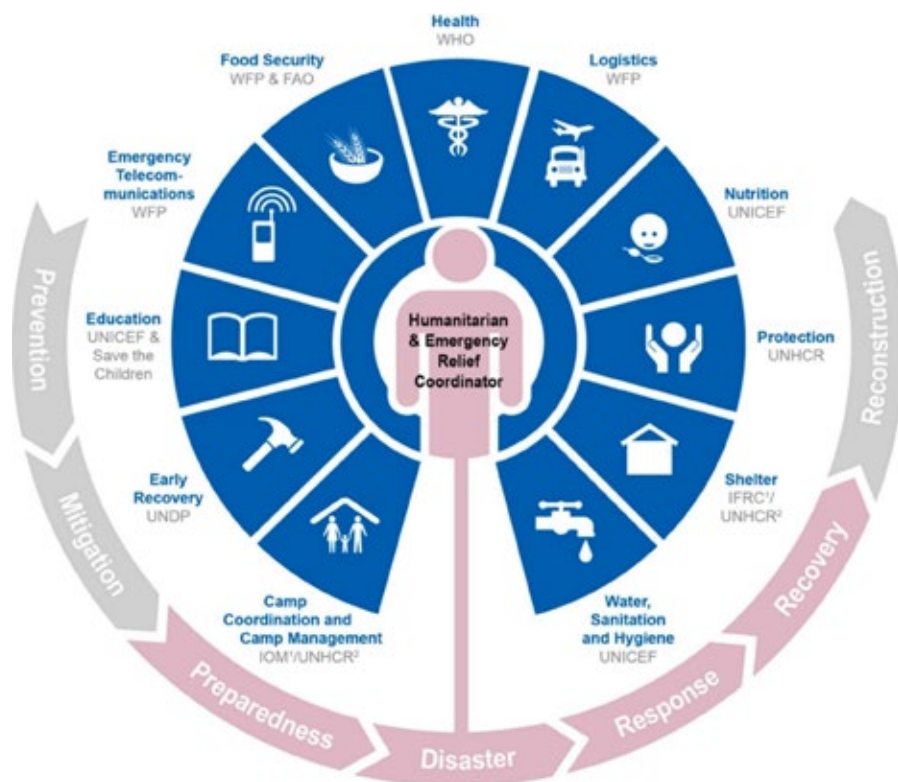
Source: National Disaster Response Plan 2019

Pakistan. Nine clusters were established within 24 hours of the earthquake. The cluster approach aims to strengthen system-wide preparedness and technical capacity to respond to humanitarian emergencies and provide clear leadership and accountability in the main areas of humanitarian response. At a country level, it aims to strengthen partnerships, and the predictability and accountability of international humanitarian action, by improving prioritization and clearly defining the roles and responsibilities of humanitarian organizations. The UN had launched a humanitarian response to help millions of people affected by torrential monsoon rains and flooding in southern Pakistan in 2011[12]. For disaster risk reduction in the context of GLOF, UNDP has implemented the GLOF-I project and GLOF-II is being implemented in KP and GB currently.

Civil Society Organizations (CSOs)

CSOs consist of International Red Cross Movement (IRCM) (Including PRCS), national and INGOs, charity organizations, philanthropist groups, Community-Based Organizations (CBOs), humanitarian networks, and media.

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12. https://www.unocha.org/story/pakistan-un-launches-response-help-millions-affected-monsoon-floods#:~:text=The%20UN%20has%20launched%20a,and%20flooding%20in%20southern%20Pakist-an.&text=The%20Government%20reports%202022%20out,some%20parts%20of%20Balochistan%20Province

05

Checklist of Roles of District Line
Departments in Disaster Management

Checklist of Roles of District Line Departments in Disaster Management[13]

District Disaster Management Authorities/Unit (DDMA/Us)

Before Disaster

- Prepare a Disaster Management Plan including district response and contingency plan for the whole district.

- Ensure District Emergency Operation Centre (DEOC) is notified and key stakeholders are aware of it. DEOC has been equipped with all necessary gadgets and operationalized.

- Coordinate, ensure, and monitor the implementation of National and Provincial level policies, National, Provincial, and District level plans.

- Ensure that the multi-hazard, vulnerabilities, and risk assessment have been done and maps have been developed, provided to the relevant people, emergency information/ guidelines displayed, and prioritized risk-prone areas in the district are identified.

- Disaster risk reduction measures are undertaken by the government departments, local authorities, and the general public. Ensure proposed DRR measures are focused on highly vulnerable and socially excluded groups. (Like women, Children, old, disabled, minorities, far-off areas low-income people, transgender, refugees, non-locals/settlers, etc.)

- Provide guidelines, prepare, review and update district level response and contingency plans at least annually.

- Ensure that the guidelines/PC-1 checklists for prevention, mitigation, preparedness, and response measures as laid down by the Planning Commission, NDMA, and the PDMA are followed by all government departments and the local authorities. The guidelines should also propose measures for highly vulnerable and socially excluded groups.

- Give directions to different departments/authorities at the district and local level to take other DRR measures for the prevention or mitigation of disasters as may be necessary.

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13. Roles and responsibilities were derived from DDMP, Peshawar

- Lay down guidelines for the preparation of disaster management plans by the government departments at the district level and local authorities.
- Monitor implementation of the disaster management plans prepared by the government departments and local authorities. Ensure that disaster management plans have also suggested and implement structural adjustments in construction for a socially excluded group.
- Organize and coordinate specialized DRR related training programs for different levels of officers, employees, students, and voluntary rescue workers in the district.
- Facilitate community-level DRR training(s) and awareness programs for the prevention of disaster or mitigation with the support of local authorities, government, and non-government organizations.
- Set up, maintain, review and upgrade the mechanism for multi-hazard early warnings, dissemination, and education of proper information to the public.
- Coordinate with, and give guidelines to, local authorities in the district to ensure that post-disaster management activities in the district are carried out promptly and effectively.
- Review development plans prepared by the government departments, statutory or local authorities with a view that DRR has been integrated into the development activities and projects of the plan.
- Identify buildings and places which could, in the event of a disaster situation, be used as relief centers or camps and make arrangements for water, sanitation, and hygiene in such buildings or places.
- Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice during any emergency or disaster.
- Encourage the involvement of PRCS, NGOs, and voluntary social welfare institutions working at the grassroots level for disaster management.
- Develop a pool of Master Trainers and Community Trainers in Community Based DRR (CBDRR) to develop a pool of trained volunteers for effective emergency response with the support of Civil Defense, Rescue 1122, PRCS, and NGOs working at the grassroots level for disaster management.
- Take the support of the Civil Defense, PRCS, and NGOs to establish a neighborhood and a village-level DRR committee and ensure that they are properly trained and selection criteria for the committees are in place.
- Develop a pool of volunteers and their database for effective emergency response with the support of PRCS, NGOs, and voluntary social welfare institutions working at the grassroots level for disaster management.
- Ensure communication systems are in order and disaster management drills are carried out periodically.

- Give directions for the functionality and maintenance of the resources available with any department of the government and the local authority in the district e.g., hydrants are installed/functional in a congested neighborhood, regularly maintained of de-watering pumps, suction pumps, cranes are available, first aid boxes are available, etc.

- Arrange (round the year) commemoration days of important past disaster events and use public gathering platforms like sports, cultural, recreational festivals, fairs, and shows.

- Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice during any emergency or disaster.

- Hire the services of experts and consultants in the relevant fields to advise and assist as it may deem necessary.

- Ensure that the non-governmental organizations carry out their activities in an equitable and non-discriminatory manner.

- Identify health facilities as Points of Dispensations (PODs) which can be activated in case of diarrhea, dengue, skin diseases, and/or other health epidemics.

During Disaster

- Activate the DEOC as early as possible after a disaster occurs.

- Carry out rapid damage and need assessment and develop a flash report for assistance and report to PDMA and other relevant stakeholders.

- Close liaison with the Provincial Emergency Operating Centre (PEOC) and update with damage and needs.

- Mobilize neighborhood councils, village-level DM Committees (DMCs), PRCS, non-governmental organizations, and voluntary social-welfare institutions for effective response. Extreme care to evacuate or take care of the highly vulnerable and socially excluded groups.

- Provide shelter (identify camping sites etc.), food, drinking water, and essential provisions, healthcare, temporary education, and services establish emergency communication systems in the affected area and at evacuation/shelter places established by the Revenue Department.

- Control and restrict vehicular traffic to, from and within, the vulnerable or affected area.

- Control and restrict the entry of any person into, his movement within and departure from, a vulnerable or affected area.

- Remove debris, conduct search, and carry out rescue operations. Make arrangements for the disposal of the unclaimed dead bodies.

- Direct any department of the government of the province or any authority or body under that government at the district level to take such measures as are necessary for its opinion.
- Construct temporary bridges or other necessary structures and demolish structures that may be hazardous to the public or aggravate the effects of the disaster.
- Ensure that the non-governmental organizations carry out their activities in an equitable and non-discriminatory manner.
- Take such other steps as may be required or warranted to be taken in such a situation.

After Disaster

- Support PDMA for carrying out detailed damage and need assessment and develop a detailed report.
- Close liaison with the PEOC and UN clusters for need assessment and effective response.
- Continue and monitor early recovery and rehabilitation activities with the support of I/NGOs, UN Clusters, and other stakeholders.
- Facilitate/cooperate in specialized and technical training(s) of the government stakeholders and I/NGOs for the reconstruction and recovery process.
- Build the capacities by providing training(s) to masons, carpenters, etc. for the reconstruction and recovery of the physical infrastructures.
- Review and update development plans prepared by the departments of the government at the district level, statutory authorities, or local authorities to make necessary provisions therein for the prevention of disaster or mitigation.
- Hire the services of experts and consultants in the relevant fields of recovery and rehabilitation to advise and assist as it may deem necessary.
- Review the DDMP and CP in light of lesson learn and improve the response mechanism.

Town Municipal Administration

Before Disaster

- Give technical inputs and approve bylaws related to disaster resilience practices in the local context through town councils.
- Suggest, prioritize, and approved budgetary requirements for disaster mitigation practices.
- Integrate DRR in short and long-term development plans within the municipality/town with a focus on embedding proper planning code and incorporating DRR measures design of different services for the highly vulnerable and socially excluded groups to improve their access.

- Ensure that the multi-hazard, vulnerabilities, and risk assessment have been done and maps have been developed/available with relevant people, and prioritized risk-prone areas in the municipality/town are identified.
- Land use planning and zoning within the municipality by preparing master planes while keeping the multi-hazard context of the municipality and town in mind.
- Ensure the implementation of bylaws related to encroachment at hazardous places, building codes, land use planning, and zonation, etc.
- Ensure the implementation of fines and penalties in place, related to DRR in the municipality/town.
- Identify evacuation/shelter places to face any disaster/emergency.
- Arrange commemoration days of important past disaster events and use public gathering platforms like sports, cultural, recreational festivals, fairs, and shows.
- Prepare contingency plan for the TMA and organize regular drills/simulation exercises.
- Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice during any emergency or disaster.
- Identified the frequent traffic congestion sites, disrupted sites of sewerages, water supply, and sanitation and hence highlighted for a durable solution.

During Disaster

- Coordinate with the village and neighborhood councils in case of emergency to get quick information about the severity and extent of a disaster impact and report it to the DDMU, PDMA, and higher district and provincial level authorities.
- Dissolve disputes related to private properties for public use like footpaths, tracks, streets, and roads, originating from the disruption due to disaster. In a way, grounds should be made to run the response and relief activities smoothly.
- Make arrangements for sanitation, cleanliness, disposal of garbage and carcasses, drainage and sewerage system caused and disrupted by a disastrous event
- Continue search and rescue activities and removal of debris.
- Ensure health facilities are operationalized and roads are open to having access to health services during the disaster.
- Facilitate the formation of voluntary organizations for assistance and help of the victims alongside the international and national humanitarian agencies.
- Conduct rapid damages and needs assessment of the survivors to start relief

activities accordingly. Prepare flash appeal and report to DDMU and PDMA and other relevant higher-level authorities.

• Report cases of handicapped, destitute, and socially excluded groups to district government and higher authorities to streamline their special needs in relief and response operation.

After Disaster

• Mobilize community (formation of CBOs, CBDRMCs, HWGs, etc.) for maintaining public ways, public streets, culverts, bridges, and public buildings, de-silting of canals, and other development activities.

• Facilitate the formation of co-operatives for improving economic returns and reduction of poverty and vulnerability.

• Dispose of debris from streets and houses and promote cleanliness and encourage plantation of trees in public places.

• Support in providing accurate and detailed information useful for preparing detailed damages and needs assessment reports by the DDMU/PDMA etc.

Agriculture Department

Pre Disaster

• Keeping in mind the most significant hazards in the district, undertake a field exercise of risk assessment to identify vulnerabilities and risks vis-à-vis food security, agriculture activities such as cropping patterns in the face of climate change, and the livestock/dairy/poultry. This exercise should also look into the possibility of likely damages/losses which might occur in the wake of any disaster to all the sub-sectors of the agriculture department. The outcome of the exercise will be an informed and practical DRR plan for the department.

• Establish and maintain farmers' groups to raise their level of awareness with regards to issues falling under the overall mandate of the department. The farmers' group may also be trained on basic disaster preparedness and response skills. They can potentially become extremely useful during disaster situations in their respective areas.

• Prepare departmental contingency plans and organize regular drills/ simulation exercises.

• Maintain emergency stock of vaccination, fodder, and seeds, etc.

• Creating community seed banks at the Union Council (UC) level is a very viable option to support the small farmers with minimum seed requirements after any disaster to enable them to resume and regenerate agriculture-based livelihood activities.

• Mass awareness regarding epidemics and diseases to livestock, poultry, and crops. Regular vaccination is an effective tool to prevent diseases.

- Regular surveillance of water sources, which may be damaged or cause flooding in monsoon.
- Close coordinating with Pakistan Meteorological Department (PMD)and media to ensure that early warning messages are appropriately relayed/ disseminated to hazard-prone communities. It will help people to plan for sowing/planting and harvesting crops accordingly.
- Arrange different training(s) on the impact of global warming and climate change and adaptability of agriculture crops and enhance the productivity for the formers
- Promote the adoption of flood and drought-resilient crops through research and dissemination to farmers with the help of agriculture extension workers.

During Disaster

- Immediately, start interacting with DDMU/DC office for coordinating emergency response activities.
- Make available all the technical and material resources to be made part of relief efforts.
- Carry out agriculture sector damages/losses and needs assessment and prepares a flash report for a response.
- Help other relevant departments in establishing relief camps in safe places.
- Arrange feed and fodder for surviving livestock.

Post Disaster

- Facilitation to institutions / NGOs/ INGOs which focus on rehabilitation activities
- Prepare detailed report of agriculture sector damages/losses and needs and submit it to DDMU/DCO office for onwards transmission to PDMA/NDMA.
- Repair and rehabilitation of water sources to ensure that agriculture activities are resumed as early as possible.
- Livestock vaccination.
- Ensure foods and fodders available.
- Provision of seeds, fertilizers, and other Agri-inputs/implements to farmers as disaster early recovery support.
- Document lessons learned and revise the departmental contingency and DRR plan accordingly.

Irrigation Department

Before Disaster

- Equip irrigation department to mitigate floods and droughts with technical & managerial capacity and modern gadgetry and practices.

- Ensure development & maintenance of flood protection systems in the pre-flood season.
- Inspect and ensure the proper functioning of all the irrigation installations in the district.
- Identify the most vulnerable points of irrigation canals & headworks in the district and take corrective measures.
- Forge inter and intradepartmental coordination mechanism, including close coordination with DC, DDMA, NGOs, and PMD district office and share the information/updates about the emergency with all the stakeholders.
- Demonstrate/assist & train local communities facing localized or regional droughts on cheaper rainwater harvesting and storage techniques.
- Educate and train the drought-affected communities on water use efficiency techniques/good irrigation practices.
- To establish a mechanism of early warning transmission, up and downstream across communities and establish special flood warning centers at the town level, with support of district administration and CSOs.
- Develop and regularly review the district-level plans on water management.
- Prepare departmental contingency plan and circulate it among stakeholders before the onset of monsoon.
- Identify and discourage encroachment(s) of various waterways, with the help of other district authorities.
- Closely monitor discharge rates in the major water bodies, passing through the district, and for this purpose and optimize the functionality of the installed gauges.
- Arrange protection material such as sandbags, stones, machinery, human resources and other material to be used at the time of need especially before the onset of monsoon.

During Disaster

- Ensure establishment and operationalization of Flood Control Cell (FCC) in proper order.
- Keep liaison with field staff, Provincial Irrigation Department, and district authorities
- Institutionalize regular patrolling of vulnerable points/ irrigation canals and breach sites to warn the potential victims on time.
- Create and disseminate flood situation reports among the stakeholders.

After Disaster

- Do stocktaking exercise of disaster-affected areas and examines all the existing flood protection systems like protection walls, spurs studs, and headworks of the irrigation canals.

- Estimate and collect damages data and do need assessment in terms of repair/maintenance, and disseminate the information to the relevant stakeholders for securing needed resources.
- Coordinate repair work of the damaged irrigation infrastructures.
- Prepare a sectorial-specific recovery plan.

Revenue Department

Before Disaster

- Being one of the key district departments, Revenue has to do a lot with disaster mitigation, preparedness and response. Keeping this in mind, carry out detailed multi-hazards vulnerabilities, capacity, and risk assessment. It will help in identifying and prioritizing the most vulnerable or hazard-prone areas for concerted efforts. Risk profiling of highly vulnerable and socially excluded groups should be given priority.
- Prepare a consolidated Departmental Contingency / DRM Plan based on the review of department-specific plans.
- Inform the office of the DC and DDMU about the available financial resources against the Contingency/DRM Plan and present a clear picture of gaps to be filled in either by the district government's funds or by the provincial funds through respective PDMA.
- Prepare and regularly update the contact list of Patwaris (revenue officials) to ensure that they are contacted and deployed in any looming emergency.
- Capacity building of the revenue official in DRR and formal training on damages and needs assessment would make them a very useful resource for accurate data collection for the district.
- Regular liaison with the neighborhood and village level DM committees and volunteers to take their help during any emergency.

During Disaster

- Wherever and whenever required, establish the evacuation/shelter places in coordination with other line departments, NGOs, and philanthropists and evacuate the affected people with priority to the highly vulnerable and socially excluded groups.
- Keep track of incoming relief support, develop a relief distribution mechanism, and start assisting disaster-affected populations.
- Coordinate with the District Finance & Planning Department (DFPD) to ensure timely release of required funds through the Deputy Commissioner (DC)/ Deputy Commissioner Operations (DCOs) office.
- Collect, verify and disseminate information about relief assistance being provided by the government and non-governmental actors.

- Assess relief needs on daily basis and prioritize them to meet the most urgent needs of the affected people. It is of vital importance to prepare a sheet of required assistance on weekly basis and gradually make it a fortnightly and then monthly exercise.
- Assess the overall situation and determine the likely timeframe of the evacuation/shelter places population return to their homes.

After Disaster

- Start carrying out detailed damages and losses and support DC and DDMU offices for detailed reports. This can be done in two ways: a) revenue officials make field visits and find out physically the exact nature and extent of damages and losses by filling in templates designed specifically for this very purpose; b) collect and collate department-specific information on damages and losses.
- Before the early recovery and rehabilitation activities take place, identify and prioritize areas of interventions by the government, non-governmental actors, and community-based organizations. Inform national and international NGOs and the UN agencies about the district priorities and facilitate their work.
- Regularly monitor and supervise Early Recovery and Rehabilitation activities.
- Prepare and provide a progress update to the district administration and other relevant stakeholders including local media.
- Prepare budgetary estimates for reconstruction activities if the damages are massive.

Education Department

Before Disaster

- Conduct MHVRA for all education facilities, map all the educational facilities and identify structural vulnerabilities such as hazard-prone location, dilapidated condition, risks involved, and other secondary threats that may cause severe problems to educational facilities in case of a disaster.
- During the construction of new school buildings or any other educational facility, proper designing keeping in view the need of People with Disabilities (PWD) should be incorporated in the structure.
- Information about the existing hazards and risks in the district and the mitigation measures can be compiled in simple language, and share with teachers and students at all levels (primary & secondary schools, colleges). The ultimate objective should be to incorporate inclusive DRR into the school curriculum.
- Prepare Emergency Response Plan (ERP) and DRR Plan for education facilities and arrange regular drills and exercises during a non-disaster phase.

- Gather information about I/NGOs working in the district in the education sector and make sure they mainstream the DRR aspect into their project activities.
- Identify educational facilities that can be used as temporary evacuation centers for displaced populations during or after any disaster. The identified facilities must have water, proper sanitation, and latrines facilities.
- Engage active students through Girls Guide, Scout Teams, Parent Teacher Council (PTC), and conduct regular training(s) on emergency response management for students, teachers, and parents.
- Identify safe evacuation places in the school and collaboration with other actors such as PTC, Civil Defense, and I/NGOs, organize regular emergency response and evacuation drills with students and teachers.
- Promote the spirit of volunteerism amongst students through awareness-raising and training sessions so that they become a useful resource for local communities in times of disaster.
- Build capacities of teachers in a way that they can prepare and implement disaster response plans for their respective educational facilities.
- Educational facilities-related data should be maintained and updated on regular basis along with data about those who are more vulnerable that include children under the age of 10 and special persons.
- Teachers can be used for mass awareness and capacity building of the vulnerable groups through education & training(s) and can disseminate messages by using students as a medium.

During Disaster

- Mobilize teachers and student volunteers to assist in the search & rescue operations to be followed by setting up emergency evacuation and relief camps at already identified educational facilities.
- In case of flood, inform teachers of those schools where the water can probably hit the school building and cause damages. This information will help teachers to take any emergency preparedness measures with support from local communities.
- Conduct preliminary damages and needs assessment and submit flash reports to higher authorities, DDMU, and DC office.
- Temporary shelters in the form of school buildings can be provided for the displaced population during a disaster, having water supply and latrine facilities available mostly in the buildings. Teachers can be used as a valuable working force for the smoothly running of the emergency operating centers established at evacuation sites.

After Disaster

- Undertake a detailed assessment of damages inflicted by disaster to the educational facilities. Based on this report, determine short, medium, and long-term needs of the education sector in the district.

- Plan and provide provisional assistance on education after a disaster to ensure continuity of learning.

- Rehabilitation and restoration of damaged educational facilities should be given high priority. PTC can be an effective bridge or communication channel for long-term rehabilitation and reconstruction activities.

- Non-structural activities including preparedness, training(s), drills, awareness campaigns, and celebrations of commemoration day in the schools should be continued.

Finance and Planning Department

Before Disaster

- Assess available resources and suggest a proportionate allocation of funds to each district department for DRM-related activities.

- Advise departments about resource mobilization for their proposed DRM activities.

- In line with the district contingency plan, prepare budget estimates that each department may require in a disaster situation.

- If the required amount of funds exceeds the available resources, prepare budget estimates for the provincial government so that it provides the requested funds. Such requests may be forwarded to the PDMA through DC's office.

During Disaster

- Gather statistical data regarding damages to different sectors and the needs vis-à-vis response, early recovery, rehabilitation, and reconstruction.

- Explore multiple options for required resources to meet the needs to a reasonable extent.

- Ensure timely allocation of funds to the affected area, if additional funds are required, can be arranged through the proper channel.

- Develop a detailed budget plan for disaster recovery, rehabilitation, and reconstruction activities.

After Disaster

- Provide requisite financial resources to district departments for the implementation of their department-specific post-disaster activities.
- Monitor and evaluate the utilization of funds by relevant departments on DRM.

Civil Defense Department

Before Disaster

- Render first aid, fire safety, and rescue training(s) to communities, individuals, and organizations in peacetime.
- Develop an emergency evacuation plan and conduct regular drills and exercises.
- Create community awareness on public safety.
- Recruit/induct operational staff for search and rescue teams with required specialized skills and equipment.
- Ensure provision of trained rescue workers/volunteers and first aid staff;
- Educate and train volunteers on DRR, emergency response management including first aid, search and rescue, emergency evacuations, and protection procedures against poisonous gases, chemical/biological/radiological explosions, or attacks.
- Participate in emergency drills with other stakeholders.
- The national assembly has passed a resolution about the inclusion of civil defense training for the students for 9th and 10th classes. The training(s) can be added as compulsory for the student securing 10 Marks in addition to their normal marks.

During Disaster

- Undertake search and rescue activities immediately after a disaster. To do it more efficiently, coordinate with other district departments to reach the needy and more appropriate places.
- Render first aid to injured persons and transport them to nearest hospitals/dispensaries.
- Ensure evacuation from damaged buildings/structures including demolition of damaged structures to avoid further loss of life and properties;
- Assist in debris clearance and restoration of essential services to the affected buildings;
- Search and defuse unexploded bombs in the affected areas;
- Work with the Fire Brigade in rescue and first aid operations related to fire and other rescue incidents.

After Disaster

- Based on the response activities that are performed, make a detailed assessment of the capacities of the department and identify gaps and requirements.
- Prepare a plan of action for the department and start resource mobilization accordingly.

Police Department

Before Disaster

- Prepare details of inventory available at each police station that may be used during any disaster or emergency.
- Prepare and update regularly the contact information of your staff, and always make sure that the main phone exchange and the wireless system works properly.
- Prepare Contingency and DRR plan for the department.
- Working with the Pakistan Meteorological Department (PMD) and DC office, support in the dissemination of warnings to the affected communities.
- Support District Government Authorities (DGA) in the process of evacuation to safer places.

During Disaster

- Ensure law and order during any disaster situation in the affected areas.
- Ensure security measures at evacuation points, in evacuated areas, at relief centers, and warehouses.
- Assist in emergency warning, rescue, relief, and evacuation operations.
- Ensure that over-loaded trucks are not coming/going to disaster-affected areas.
- Divert traffic where necessary to keep the emergency relief operations going smoothly.
- Ensure security of humanitarian workers who perform duties after any disaster.
- Prevent harassment of women and children during any emergency.

After Disaster

- Keep order and prevent obstruction in public places.
- Aid and cooperate with other agencies for the prevention of destruction of public property by violence, fire, or natural calamities.
- Assist victims of road accidents.
- Protect the life and property of citizens.
- Preserve and promote public peace.

Social Welfare & Community Development Department

Before Disaster

- Maintain an updated list of organizations of good repute and proven track record
- Develop a Disaster Risk Management Plan (DRMP) and contingency plan about the mandate of the department.
- Raise awareness of staff of the department about special vulnerabilities and capacities of women and children to disasters.
- Encourage involvement of women and PWD in disaster risk management activities.
- Promote awareness amongst women and PWDs in hazard-prone areas about disaster risks and disaster preparedness.
- Develop capacities of women, PWDs, and children-focused organizations on disaster risk and emergency management.
- Ensure that needs of children, women survivors are addressed in post-disaster situations during the relief rehabilitation and reconstruction phases.
- Properly plan and provide shelter to the affected women, beggars, drug rehabilitation, special education, blind institute, disable registration, child protector, and other socially excluded groups.
- Promote awareness regarding the protection of children and their rights.

During Disaster

- Facilitate participation of women, minorities, and PWDs in the management of relief, rehabilitation and reconstruction activities.
- Use of emergency phone number 1121 as a helpline for protection of children during a disaster.
- Provide shelter provision to affected women, support in damages and needs assessment of the affected area, service provision through formal shelter provision to missing unaccompanied children.

After Disaster

- Support post-disaster rehabilitation of livelihoods of women survivors, which is mostly in the informal sector and is usually overlooked
- Support the district government and PDMA for the reunification of missing unaccompanied children, women, People with Disabilities (PWDs), rehabilitation of families, psychosocial support provision.

Communication & Works Department

Before Disaster

- Develop district guidelines for safer construction of government buildings and infrastructure in hazard-prone areas multi-hazard approach.
- Ensure the DRR checklist of PC-1 has been seriously implemented in all new schemes.
- During the construction of any new buildings, proper designing keeping in view the need of People with Disabilities (PWDs) should be incorporated in the structure.
- Develop sample designs of government buildings, high-rise buildings, and infrastructure (bridges, roads) for safer construction in hazard-prone areas.
- Ensure environment impact assessment studies has been conducted for all new schemes
- Conduct training of builders, contractors, and masons on safer construction methods and guide adopting inclusive DRR measures during the construction.
- Monitor construction of government buildings and infrastructure in hazard-prone areas to ensure that safer construction techniques are followed.
- Incorporate disaster risk assessment in the planning process for the construction of new roads and bridges.
- Construct, maintain and repair district and rural roads, bridges, tunnels, and causeways, etc.
- Prepare a DRM plan and contingency plan with relation to departments' programs and mandates.
- Develop guidelines on the conduct of damage and loss assessment to infrastructure and government buildings in the wake of a disaster, and conduct assessments after disasters.

During Disaster

- Send information to other district departments on road conditions especially regarding blocked or impassable roads after a disaster.
- Ensure draining the floodwater from roads and remove debris from under the bridges for smooth flow of water.
- Monitor disaster situations (in case of flood and landslide) about roads and coordinate with other district departments for transporting relief items to affected areas.

After Disaster

- Undertake a detailed assessment of damages of government buildings, roads infrastructure including bridges, culverts, etc.
- Prepare a report of damages to be shared with the district and provincial authorities along with budget requirements for the rehabilitation and reconstruction of damaged/destroyed infrastructure.

Public Health Engineering Department (PHED)

Before Disaster

- Repair and maintenance of the structure in command areas.
- Prepare contingency plan highlighting resources available with the organization.

During Disaster

- Collect damages data and prepare a report for onward submission.

After Disaster

- Rehabilitation of the damaged infrastructure, including protection walls, retaining walls, check dams, water ponds, surface water tanks, land leveling, field terracing, small dams, spurs, etc. In case of flood, inform teachers of those schools where the water can probably hit the school building and cause damages. This information will help teachers to take any emergency preparedness measures with support from local communities.

Health Department

Before Disaster

- Develop a Health Risk Management Plan (HRMP) for the whole district to prevent or mitigate communicable diseases, injuries following mass causality accidents, and disasters with relation to the department's mandate and assets.
- Undertake multi-hazard, vulnerability, and risk assessment for health facilities and services and surroundings and propose the allocation of funds in the annual development budget. Also, conduct hazard and risk-based mapping of all health care facilities, including vulnerability assessment (infrastructure and organizational setup), and integrate hazard resilience measures.
- During the construction of a new health facility, proper designing keeping in view the need of PWD should be incorporated in the structure.
- Integrate disaster preparedness and response capacities into all existing and future health programs at the district level.
- Devise strategies for community involvement in all aspects of emergency preparedness, response, and recovery about the health sector. A pool of

Community Health Workers (CHWs) should be established or strengthen and can be linked to the neighborhood and village level DM Committees.

- Health-related data should be maintained and updated on a priority basis along with data of at-risk communities and elements that are available digitally.
- Identify safe evacuation places in the health facilities and conduct regular emergency response and evacuation drills with all health officials.
- With the support of DDMU, CHWs along with TDMC and VDMC can be engaged to collect at-risk population data especially marginalized and socially excluded groups can be identified.

During Disaster

- Establish District Emergency Health Operation Centre (EHOC) to ensure better coordination and mobilization in a disaster situation.
- Set up medical camps and mobilize emergency health teams including mobile hospitals, to be deployed in the event of a disaster and start providing immediate emergency medical assistance.
- Mobilize all available health resources and possible assets for emergency interventions.
- Inform the DC and DDMU if external support is needed in terms of doctors, paramedics, or medicines/surgical equipment from other districts or the provincial government.
- Provide a daily update on health response and highlight gaps/needs accordingly.
- Keep the disaster-hit communities posted about any likelihood of epidemics and the precautionary measures. CHW can be mobilized to gather data and report. This is very important to prevent the secondary wave of death in affected areas.
- Guide and facilitate the NGOs in addressing the priority health needs in the most vulnerable areas.
- Rapid damages/ losses and needs assessment of the health sector and prepare a flash report.

After Disaster

- Carrying out detailed damages and losses assessment in the health sector.
- Regular and vigilant health risk monitoring is immensely important to deal with post-disaster diseases/epidemics.
- With available resources, start repairing or retrofitting the damaged health infrastructure to cater health needs of the affected population during early recovery and rehabilitation stages.
- Health officials need to make sure that the drinking water is not contaminated.
- Similarly, proper dumping of hospital waste is necessary to be taken care of.
- Regularly monitor and supervise early recovery and rehabilitation activities in the health sector.

06

Prevention and Mitigation Measures

Prevention & Mitigation Measures

What is Mitigation?

The lessening or limitation of the adverse impacts of hazards and related disasters. The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction i.e., structural measures, as well as improved environmental policies and public awareness i.e., non-structural measures.

Types of Mitigations

The two types of mitigation measures are:
- Structural Mitigation
- Non-Structural Mitigation

Structural Mitigation

Structural mitigation is defined as risk reduction measures undertaken through the construction or altering of the physical environment through the application of engineered solutions. Structural mitigation measures may apply to both engineered and non-engineered structures.

Engineered Structures

Engineered structures involve architects and engineers during the planning, designing, and construction phases. They may include buildings ranging in scale from simple dwellings to multi-story office blocks, as well as infrastructures such as electricity pylons to dams, embankments, ports, roads, railways, and bridges. While professionals are trained to plan, design, and supervise the construction of buildings and infrastructure to achieve necessary structural safety standards, they may need additional training to incorporate mitigation practices into their design of structures resistant to seismic shock, storm winds, or floods. Application of sound technical principles is achieved through: -

Site planning:
- Assessment of forces created by the natural phenomena (earthquake, cyclone, or flood).
- The planning and analysis of structural measures to resist such forces.

- The design and proper detailing of structural components.
- Construction with suitable material.
- Good workmanship under adequate supervision.

Most countries have building codes for engineered construction. These codes provide general guidelines for the assessment of forces and further analysis, appropriate design methodologies, and construction techniques. The quality of construction is as important as good analysis and design. Good workmanship must be encouraged by appropriate training and supervision to achieve better performance.

Non-Engineered Structures

Non-engineered structures are those constructed by their owners themselves or by local carpenters and masons who generally lack formal training. Such structures mainly comprise simple dwellings and public buildings, built with local materials traditionally. In some disasters, high casualties and economic losses can be attributed to the failure of non-engineered structures. The improved designs vary according to the many different traditional ways of building that suit various cultures, climates, available skills, and building materials.

  Another important aspect of increasing the safety of non-engineered structures is to try to ensure that they are not built on hazardous sites such as steep slopes subject to landslides, floodplains subject to flash floods or riverbank erosion, or coastal areas exposed to storm surges. However, people often do not want to leave their traditional homes and the area in which they have been living for generations, even though the location may be hazard-prone. Economic pressures may also induce people to settle in hazardous areas. Wherever practical, incentives should be offered to attract people out of hazardous locations; alternatively, consideration may be given to substituting appropriately engineered structures where this might be practical and economic, or mitigation measures introduced in non-engineered constructions to enhance their safety.

Non-Structural Mitigation

Non-structural mitigation is defined as a measure that reduces risk through modification in human behavior or natural processes without requiring the use of an engineering structure. Following activities can be performed under non- structure mitigation:

Legal Framework

Generally speaking, existing disaster-related legislation tends not to place enough emphasis on mitigation. In establishing or reviewing such legislation,

therefore, it may be advantageous to ensure that mitigation requirements are adequately covered. Land-use planning and the application of building codes provide some legal basis for successful mitigation. However, both these aspects tend to fall short of full effectiveness unless they are rigidly enforced.

Incentives

Incentives can often provide better inducements for mitigation than legal impositions. Government grants or subsidies may help to persuade commercial and other institutions to include mitigation measures in their building or reconstruction activities. The provision of government technical assistance can help towards the same end. Insurance can also provide useful incentives, for instance, insurance companies may be persuaded to offer reduced premiums for buildings, once hazard-resistant measures have been incorporated.

Training and Education

If mitigation is to be successful, its requirements must be widely known and understood. Therefore, there is a need to train and educate all those involved, including DRM officials, construction specialists, and the general public. In this regard, public awareness programs can provide an important foundation by informing people generally of the need for and benefits of mitigation programs. In a more specific sense, programs of training and education are necessary to ensure that mitigation programs would be supported and properly implemented. Four target groups are especially important:

- Public officials, who play a vital role in DRM. Appropriate training modules should be incorporated in their career-path training programs and opportunities provided to them to attend specialist courses.
- Technical students whose professional education should include disaster mitigation courses.
- Small builders and craftsmen may be given on-the-job training in simple mitigation practices.
- School children, who should be introduced to simple mitigation measures in the context of environmental studies, natural science, or geography classes.

Public Awareness

In addition to general awareness, certain particular areas of public involvement are necessary for the effective implementation of mitigation programs. These include:

- Good public knowledge and understanding of local hazards and vulnerabilities.
- Public awareness of the kind of mitigation measures which can be applied.

- Public participation in community preparedness programs.

Governments can substantially assist public awareness of safe mitigation practices by ensuring that their public buildings (such as post offices, tools, hospitals, government offices) and services are built to high safety standards. This will also help to ensure that designers, builders, and engineers gain experience in safe construction and, at the same time, contribute to a safer environment.

Institution Building

The strengthening of a country's or community's social structure can enhance disaster mitigation capacity. Such strengthening is, however, difficult to achieve. Three possible ways are to extend normal development as follows:

- First, through institution building; organizations that serve as coping mechanisms can be identified and strengthened. A deliberate effort can be made to increase their institutional capacities and skills thus enhancing their ability to deal with a crisis.

- Second, through increasing the number of coping mechanisms within a country or community.

- Third, through encouraging actions that promote cooperation among different groups within society. Such cooperation can considerably reduce the social impact of disasters.

In their development activities, both government and non-government agencies should be careful to avoid actions that will further increase or institutionalize a society's vulnerability. It is especially important to identify institutional dependency relationships, particularly those that may be increased in a disaster situation, and work to eliminate them. By increasing self-sufficiency, agencies may improve the ability of families and communities to cope with disasters. This can be a mitigating factor and could help speed recovery. Strong institutions can play a vital role in various aspects of mitigation, such as promoting public awareness programs, training at community levels, and monitoring hazards and vulnerabilities.

Early Warning Systems (EWS)

Various modern developments have significantly improved the ability of disaster management authorities to provide effective warnings of impending disasters. Better EWS have, for instance, been instrumental in evacuating vulnerable groups, moving livestock to safety, and mobilizing emergency services and resources. In the particular context of mitigation, three matters are underlined here:

- The steps between the issuing of a warning and the taking of an action by relevant authorities or vulnerable people are critical.

- Evacuation should only be ordered when there is virtual certainty

of hazard impact; a false evacuation order for a hazard that does not materialize can destroy public confidence in the warning system and neutralize several years of preparedness planning.

- To the extent possible, the dissemination of warnings should use duplicate systems to ensure effectiveness. For example, radio messages backed up by siren warnings; warning flags backed up by house-to-house visits by local wardens.

- To generate information through EWS by Pakistan Meteorological Department (PMD) to conduct hydrological modeling to generate flood scenarios and calculate GLOF lead time. Automated weather stations measure all the important surface weather conditions and possess accurate forecasting options while able to provide real-time data[14].

Checklist for Early Warning System[15]

A. *Risk Knowledge*

1. *Organizational Arrangements Established*

- Key national government agencies involved in hazard and vulnerability assessments identified and roles clarified (e.g., agencies responsible for economic data, demographic data, land use planning, social data, etc.).

- Responsibility for coordinating hazard identification, vulnerability, and risk assessment assigned to one national organization.

- Legislation or government policy mandating the preparation of hazard and vulnerability maps for all communities in place.

- National standards for the systematic collection, sharing, and assessment of hazard and vulnerability data developed and standardized with neighboring or regional countries, where appropriate.

- Process for scientific and technical experts to assess and review the accuracy of risk data and information developed.

- Strategy to actively engage communities in local hazard and vulnerability analyses developed.

- The process to review and update risk data each year, and include information on any new or emerging vulnerabilities and hazards established.

2. *Natural Hazards Identification*

- Characteristics of key natural hazards (e.g., intensity, frequency, and probability) analyzed and historical data evaluated

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14. https://undp-pakistan.exposure.co/automated-weather-stations-in-gilgitbaltistan-where-modern-science-meets-the-unforgiving-nature

15. https://www.unisdr.org/2006/ppew/info-resources/ewc3/checklist/English.pdf

- Hazard maps were developed to identify the geographical areas and communities that could be affected by natural hazards
- An integrated hazard map developed (where possible) to assess the interaction of multiple natural hazards.

3. *Community Vulnerability Analyses*

- Community vulnerability assessments are conducted for all relevant natural hazards.
- Historical data sources and potential future hazard events are considered in vulnerability assessments.
- Factors such as gender, disability, access to infrastructure, economic diversity, and environmental sensitivities are considered.
- Vulnerabilities documented and mapped (e.g., people or communities along coastlines identified and mapped).

4. *Risks Assessed*

- Interaction of hazards and vulnerabilities is assessed to determine the risks faced by each region or community.
- Community and industry consultation conducted to ensure risk information is comprehensive and includes historical and indigenous knowledge, and local information, and national level data.
- Activities that increase risks are identified and evaluated.
- Results of risks assessment integrated into local risk management plans and warning messages.
- Information Stored and Accessible
- Central 'library' or GIS database established to store all disaster and natural hazard risk information.
- Hazard and vulnerability data available to the government, the public, and the international community (where appropriate).
- A maintenance plan developed to keep data current and updated.

B. *Monitoring and Warning Service*

1. *Institutional Mechanisms Established*

- Standardized process, and roles and responsibilities of all organizations generating and issuing warnings established and mandated by law
- Agreements and interagency protocols were established to ensure consistency of warning language and communication channels where different hazards are handled by different agencies
- An all-hazard plan to obtain mutual efficiencies and effectiveness among different warning systems established

- Warning system partners, including local authorities aware of which organizations are responsible for warnings
- Protocols are in place to define communication responsibilities and channels for technical warning services
- Communication arrangements with international and regional organizations are agreed, and operational
- Regional agreements, coordination mechanisms, and specialized centers are in place for regional concerns such as tropical cyclones, floods in shared basins, data exchange, and technical capacity building
- Warning system subjected to system-wide tests and exercises at least once each year
- A national all-hazards committee on technical warning systems in place and linked to national disaster management and reduction authorities, including the national platform for disaster risk reduction
- System established to verify that warnings have reached the intended recipients
- Warning centers are staffed at all times (24 hours per day, seven days per week)

2. *Monitoring Systems Developed*

- Measurement parameters and specifications are documented for each relevant hazard
- Plans and documents for monitoring networks available and agreed with experts and relevant authorities
- Technical equipment, suited to local conditions and circumstances, in place and personnel trained in its use and maintenance
- Applicable data and analysis from regional networks, adjacent territories, and international sources are accessible
- Data received, processed and available in meaningful formats in real-time, or near-real-time
- Strategy in place for obtaining, reviewing, and disseminating data on vulnerabilities associated with relevant hazards
- Data is routinely archived and accessible for verification and research purposes

3. *Forecasting and Warning Systems Established*

- Data analysis, prediction, and warning generation based on accepted scientific and technical methodologies
- Data and warning products are issued within international standards and protocols.
- Warning analysts trained to appropriate international standards

- Warning centers are equipped with appropriate equipment needed to handle data and run prediction models
- Fail-safe systems in place, such as power back-up, equipment redundancy, and on-call personnel systems
- Warnings are generated and disseminated in an efficient and timely manner and a within format suited to user needs
- Plan implemented to routinely monitor and evaluate operational processes, including data quality and warning performance

C. Dissemination and Communication

1. Organizational and Decision-making Processes Institutionalized

- Warning dissemination chain enforced through government policy or legislation (e.g., a message passed from government to emergency managers and communities, etc.)
- Recognized authorities empowered to disseminate warning messages (e.g., meteorological authorities to provide weather messages, health authorities to provide health warnings)
- Functions, roles, and responsibilities of each actor in the warning dissemination process specified in legislation or government policy (e.g., national meteorological and hydrological services, media, NGOs)
- Roles and responsibilities of the regional or cross-border early warning centers are defined, including the dissemination of warnings to neighboring countries
- Volunteer network trained and empowered to receive and widely disseminate hazard warnings to remote households and communities

2. Effective Communication Systems and Equipment Installed

- Communication and dissemination systems tailored to the needs of individual communities (e.g., radio or television for those with access; and sirens, warning flags, or messenger runners for remote communities)
- Warning communication technology reaches the entire population, including seasonal populations and remote locations
- International organizations or experts consulted to assist with the identification and procurement of appropriate equipment
- Use of multiple communication mediums for warning dissemination (e.g., mass media and informal communication)
- Agreements developed to utilize private sector resources where appropriate (e.g., amateur radios, safety shelters)
- Use of consistent warning dissemination and communication systems for all hazards

- Communication system- a two-way interaction allowing for verification that warnings have been received
- Equipment maintenance and upgrade programme implemented and redundancies enforced so backup systems are in place in the event of a failure

3. *Warning Messages Recognized and Understood*

- Warning alerts and messages tailored to the specific needs of those at risk (e.g., for diverse cultural, social, gender, linguistic, and educational backgrounds)
- Warning alerts and messages are geographically specific to ensure warnings are targeted to those at risk only
- Messages incorporate the understanding of the values, concerns, and interests of those who will need to take action (e.g., instructions for safeguarding livestock and pets)
- Warning alerts are plainly recognizable and consistent over time and include follow-up actions when required
- Warnings that are specific about the nature of the threat and its impacts
- Mechanisms are in place to inform the community when the threat has ended
- Study into how people access and interpret early warning messages undertaken and lessons learned incorporated into message formats and dissemination processes

D. **Response Capability**

1. *Warnings Respected*

- Warnings are generated and distributed to those at risk by credible sources (e.g., government, spiritual leaders, respected community organizations)
- Public perception of natural hazard risks and the warning service analyzed to predict community responses
- Strategies to build credibility and trust in warnings developed (e.g., understanding the difference between forecasts and warnings)
- False alarms minimized and improvements communicated to maintain trust in the warning system.

2. *Disaster Preparedness and Response Plans Established*

- Disaster preparedness and response plans empowered by law
- Disaster preparedness and response plans targeted to the individual needs of vulnerable communities
- Hazard and vulnerability maps utilized to develop emergency preparedness and response plans

- Up-to-date emergency preparedness and response plans developed, disseminated to the community, and practiced
- Previous disaster events and responses analyzed, and lessons learned incorporated into disaster management plans
- Strategies implemented to maintain preparedness for recurrent hazard events
- Regular tests and drills undertaken to test the effectiveness of the early warning dissemination processes and responses

3. *Community Response Capacity Assessed and Strengthened*

- Community ability to respond effectively to early warnings assessed
- Response to previous disasters analyzed and lessons learned incorporated into future capacity-building strategies
- Community-focused organizations are engaged to assist with capacity building
- Community and volunteer education and training programmes developed and implemented

4. *Public Awareness and Education Enhanced*

- Simple information on hazards, vulnerabilities, risks, and how to reduce disaster impacts disseminated to vulnerable communities and decision-makers
- Community educated on how warnings will be disseminated and which sources are reliable and how to respond to different types of hazards after an early warning message is received
- Community trained to recognize simple hydro-meteorological and geophysical hazard signals to allow immediate response
- On-going public awareness and education built into school curricula from primary schools to university
- Mass media and folk or alternative media are utilized to improve public awareness.
- Public awareness and education campaigns tailored to the specific need of each audience (e.g., children, emergency managers, media)
- Public awareness strategies and programmes are evaluated at least once per year and updated where required

Mitigation Checklist

Mitigation measures for risks associated with geo-hazards can broadly be classified into six categories; land use plans, enforcement of building codes and good construction practice, early warning systems, construction of physical protection barriers, a network of escape routes, and "safe" places and community preparedness and awareness building. Mitigation measures at various levels for different hazards could be as under:

Floods/GLOF

- Identification of GLOF prone areas (GLOF risk and vulnerability assessment)
- Land-use zoning, mapping, regulations, and implementation for flood safety
- Construction of water storage facilities
- Construction of flood protection and diversion/dispersion infrastructure
- Channelization of floodwaters
- Construction of delay action/check dams
- Construction of flood-prone buildings and infrastructure
- Effective flood forecasting and early warning dissemination system
- Solid waste management to reduce choking of the drains and rivers
- Bio sea wall to reduce the impact of coastal flooding
- Afforestation to reduce/eliminate chances of erosion
- Identification & development of safe evacuation sites and routes
- Capacity building, awareness

Earthquake

- Micro-zoning and vulnerability mapping
- Construction of earthquake-resistant buildings and infrastructures
- Enforcement of building codes including ruler area and decisions about the construction of structures with due approval from specified authorities
- Seismic retrofitting of weak structures in highly seismic zones to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes
- Monitoring faults activity and forecasting
- Formulation of guidelines both for earthquake-resistant constructions as well as for retrofitting with specifications about site selection, foundation, construction, materials, and workmanship making the involvement of specialist architects, trained engineers, and masons mandatory
- Promoting awareness and preparedness programs for the general public and involving them in the process of disaster mitigation through education and awareness
- Capacity building in mitigation measures at all levels

Landslides

- Construct breakwaters to provide a cushion against landslides
- Conduct hazard mapping and vulnerability assessment.
- Carry out land-use zonation
- Ensure slope drainage
- Built retaining structures
- Ensure plantation/vegetation
- Effective monitoring and forecasting mechanism
- Elaborate warning and evacuation measures
- Public awareness and capacity building
- Avoid fireworks etc. in crowded, congested places, narrow lanes, or inside the house
- Use of appropriate clothes
- Do not apply adhesive dressing on the burnt area
- Do not throw lighted cigarette buds

07

Disaster Risk Assessment

Disaster Risk Assessment

The Sendai Framework (SF) for DRR and its immediate predecessor, the Hyogo Framework (HF) for action, both call for identification and assessment of disaster risk. Thus, risk assessments form an important aspect of risk reduction strategies. It is defined and regarded as a methodology to determine the likelihood and magnitude of damage or other consequences by analyzing potential hazards and evaluating existing conditions of vulnerability that jointly could likely harm exposed people, properties, services, livelihoods, and the environment they depend on.

Components of Risk Assessment

As Disaster Risk = (Hazard x Vulnerability) / Capacity, therefore, the components of disaster risk are:

- Hazard Assessment
- Vulnerability Assessment
- Capacity Assessment

Hazard Assessment

Hazard Assessment is the process of identifying and assessing the relative properties or characteristics and direct effects of hazards regarding time. Hazard assessment is carried out by collecting data such as:

- Researching the history of disasters/emergencies, consulting, community members, newspaper, records
- Inspecting evidence of previous disasters/ emergencies existing identified hazards and existing vulnerability
- Gathering scientific information from local/national government bodies

Hazard ranking through a group technique

This is a quick method to determine people's perception of the most serious hazards:

- Get a group of people and ask them to write the 10 hazards faced in the area
- Rank the hazards into the level of seriousness by ranking them into "high" "medium" and "low"
- Each person should then say what he/she has written down (without the ranking) and answers should be recorded on a blackboard or paper.

A table of ranking is then produced as the number of hazards is ranked based on

the number of supports coming from the participants.

Hazard Ranking

Once the hazards are ranked, they should be prioritized to focus on the more serious ones and take mitigation measures.

The table below shows an example of how we can calculate hazard score and priority:

(Frequency + area of impact) x potential damaging magnitude = Total score					
Hazard	Frequency (1)	Area (2)	Magnitude (3)	Total (1+2)x3	Priority
Flood	4	3	4	28	4
Drought	3	5	4	32	2
Environmental degradation	2	1	3	09	7
Epidemics	5	2	2	20	6
Cyclones	1	4	5	25	5
Industrial Pollution	5	2	3	30	3
Traffic Accidents	5	4	3	28	4
Tsunami	5	5	4	40	1

Source: Intergovernmental Authority on Development (IGAD): Disaster Risk Management Training Manual 2007

The lack of resources and capacity for the management of hazards, vulnerability, and emergencies is a common limitation. But with the available resources, we are forced to consider the serious hazards only if we have to take preventive measures. One must decide which hazards are important to deal with in a specific area, time, and degree of intervention. There are many ways to determine the priority. For this training purpose, the Seriousness, Manageability, Urgency, and Growth (SMUG) system will be used. The SMUG system can be applied to assess a village, community, or district facing several hazard threats.

The SMUG priority table is given in the next table:

Hazard		Criteria (for each, rank High/Medium/ Low			
		Seriousness	Manageability	Urgency	Growth
Hazard	A	H/M/L	H/M/L	H/M/L	H/M/L
Hazard	B				
Hazard	C				
Hazard	D				

Hazard, Risk, and Vulnerability Mapping

Hazard mapping is the representation of the hazards faced by a community in a geographical area on a manually prepared map (improvised) or a technical map using the GIS.

A hazard map is the compilation of information marked on a map of the area under discussion!!

Using a technical map or a manually prepared one, the geographical important sites are marked, these include towns, villages, forest areas, plains or rivers, landslide areas, water holes, etc. Additionally, using different color markings, one could also show the areas exposed to identify the hazard. The next step is to mark those communities/towns that are likely to face some hazard impact. The map could also be used to indicate the vulnerability of people of the town by marking the zones with the highest density of population, the site of important facilities, where the good and bad roads are or in a bigger scale map indicate where the poor quarters are located and other vulnerability indicators.

Map type information shown	
Hazard Map	Shows relevant characteristics including extent e.g., Landslide, GLOF, Earthquake, etc.
Risk Map	Similar to the hazard map, but also shows the possibility of occurrence of a hazardous event, e.g., sewage near a water hole
Vulnerability Map	Shows the distribution of elements of the community that may be harmed or damaged e.g., old people, school area, hospital, etc.

When undertaking hazard analysis, the following tasks should be taken into consideration:

• Rank areas based on the risk faced; some sections of the community or village might be more at risk than others to flooding, or epidemics

• Identify town facilities that are critical to overall community services

- Shelters, schools, churches, police stations, bakery, fire station, communication, water wells, etc.
- Complete a critical facility inventory:
    - Collects some general information on the facilities that could be used in emergency response
    - Facility type, name, street address, city people who own it, telephone number of the professional staff, what skills they have, etc.
- Conduct vulnerability assessment on all critical facilities:
    - Find out their vulnerability relative to the hazard in question
    - How strong the infrastructure is, how safe they are, how well they are operated, if there are any exit doors, in what areas they are located, ease of access, etc.
- Identify areas of special considerations:
    - Here an assessment of people's capacity to respond to emergencies or preparation for disaster is carried out.

Look for
- Minority population
- Level of the income poverty level
- Number and location of old people, single parents, very young children, and disabled people
- Availability of transport
- Level of literacy
- Undertake economic analysis
- Identify primary economic sectors and centers
- Conduct general inventory of high economic centers
- Locate economic centers with a large population of employee
- Conduct vulnerability assessment of these centers
- Environmental analysis

Identify secondary hazard risk consideration sites and key environmental resources sites:

- Areas that will be affected by flash floods or dams bursting, leading to flooding, the release of toxic materials in rivers.
- Identify primary hazard risk consideration
- Deforestation, overgrazing
    - Mitigation opportunity analysis

This is an important task, where studies are taken in conjunction with hazard analysis, to identify where appropriate preventive measures could be taken. Studies to develop proper land-use policies or planning and locating areas for development in farming, or the curbing of deforestation and finding alternative solutions to energy shortages, etc. are some areas of importance in mitigation analysis.

Vulnerability Assessment

Vulnerability is the result of several factors that increase the chance that a community will be unable to deal with or withstand an emergency (hazardous conditions). The vulnerability may be expressed as the degree of loss (expressed in percentages) resulting from a potentially damaging event.

Definitions

Human vulnerability is the relative lack of capacity of a person or community to anticipate, cope with, resist, and recover from the impact of a hazard.

Structural or physical vulnerability is the extent to which a structure or service is likely to be damaged or disrupted by a hazard event.

Community vulnerability exists when elements at risk are in the path or area of the hazard and susceptible to damage by it.

Vulnerability describes two aspects of the subject (i.e., an individual, family community, etc.) in terms of susceptibility and resilience. There are some differences in application:

Susceptibility describes or concerns the conditions/ factors (single or multiple) operating in the life of a community that allows a hazard to cause emergency or widespread damage. Examples of such factors range from a community's level of development to its location in an earthquake-prone area. In other words, all the community is disposed equally to the occurrence of an earthquake or severe flooding.

Resilience on the other hand is the community's or the family's ability to withstand the damage caused by harmful events and disasters; it is a function of the various factors that allow a community to respond to and recover from disasters. The resilience of the different families in the same community could be different and the damage sustained would also be different depending on their better-built homes or better preparations they made.

Vulnerability Factors

A vulnerability has some distinct underlying causes. These driving forces can be grouped into recognizable factors. They are:

• Political
• Economic
• Social
• Physical
• Ecological

Political Factors

The level of vulnerability in any community can be directly linked to the political will and commitment to developmental concerns. Vulnerability is as much about the exposure to a given hazard as the decision-making linked to development which will address conditions of vulnerability. A set of deep-rooted socio-economic elements which include aspects such as denial of human rights, denial of access to power structures, access to quality education, employment opportunities, land tenure, availability of and access to resources, access to infrastructure, basic services and information, together have the ability to create and maintain extreme levels of vulnerability[16].

Political decision-making

The lack of wise, balanced decisions profoundly affects the socio-economic elements of a nation or a community and will inevitably lead to an increase in the numbers of:

• Recurrent strikes and high level of unemployment
• The strive over land tenure, number of homeless children
• Increasing degradation of the environment, expanding slums
• The unacceptable number of uncollected garbage
• Border conflict, the crumbling poor roads, and disorganized transport systems
• The number of dying mothers and children due to lack of appropriate health services
• The poor response to disasters and rampant corruption etc.

(As DRM practitioner you will be required to work along with these issues, as they are the cornerstone to the success of DRR/DRM)

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16. https://www.preventionweb.net/files/26081_kp1concepdisasterrisk1.pdf

Economic factors

- Due to lack of financial resources or poor planning and policy decisions, DRM is given little attention (e.g., Stocking of reserve food or protection infrastructure is very limited and not sustained)
- The cycle of poverty limits the resilience of any community despite the high willingness to cooperate.
  - Families are forced to migrate to urban areas,
  - Settle in slums, steep mountain slopes, riverbanks, etc.
  - Engage in informal and unhealthy practices
- Governments give little encouragement or limited initiatives to diversify small-scale production; the majority are still dependent on risky agricultural or nomadic means of subsistence.
- Unplanned economics and poor foresight limit decision-makers to the dangers of growing disaster risks and their management.

Socio-cultural factors

- People's perception of disaster risk is strongly influenced by religion and has a fatalistic attitude. The poor level of education and awareness on one hand and the lack of government initiatives for their proactive participation are sufficient reasons to create distrust on any last-minute emergency response by the government and to adhere to their beliefs.
- Again, without the introduction of modern agricultural methods, farmers tend to rely on traditional methods of farming, clearing of bushes, and outdated methods of production which are not cost-effective and increasingly destructive to the environment (e.g., erosion through desertification)
- The pressures of poverty, with the accumulating sense of helplessness, create tendencies of disengagement around the population, with little tolerance to any change and therefore social welfare interactions. Crime and corruption increase pushing people to revert to the rule of force.

Risk and Vulnerability Analysis

Vulnerability analysis is part and parcel of the risk management process and a component of the analysis of risk, focusing mainly on the elements at risk and their level of susceptibility and resilience to a specific hazard.

The basic steps in analyzing a community's vulnerability are as follows:

- Find out and identify the risk of threats/hazards a community is facing (climatic changes, epidemic, etc.)
- Study the community's level of susceptibility and resilience to withstand the identified hazard

- Explore the community's capacity to mitigate or prevent the effects of the hazard, materially, financially, and administratively
- Find out the level of perception of risk among the different groups within a community and what levels of risk are acceptable and non-acceptable
- Develop projects to mitigate the effects of a hazard, to be implemented in phases, and allocate roles and responsibilities, resources and mechanisms for monitoring activities
- Develop strategies to protect people and important facilities to save lives and properties
- Set up a mechanism for coordinating and proper implementation of the system. This vulnerability analysis could be carried out in conjunction with risk and hazard analysis.

The results risk assessment process lets Vulnerability and Capacity Assessment Matrix (VCAM) show the findings of vulnerability and capacity assessment in short form[17].

	Capacities	Vulnerabilities
PHYSICAL/ MATERIAL What productive resources, skills, and hazards exist?		
SOCIAL/ ORGANISATIONAL What are the relations and organization among people?		
MOTIVATIONAL/ ATTITUDINAL How does the community view its ability to create change?		

Source: Anderson – Woodrow (1990). A manual for training in capacities and vulnerabilities analysis.

17. https://www.adaptation-undp.org/sites/default/files/resources/6_capacities_ and_vulnerabilities_assessment_framework_cva_framework.pdf

For further understanding, the VCA matrix is explained with the following example:

Categories	Vulnerabilities	Capacities
Physical & Material	• The houses located on low land near the river. • Poor construction materials used (houses made of mud and bamboo only) • No telephone landline available; • road and bridge usually broken • no transport is available for evacuation • contaminated water in wells and hand pumps during flood • The community is very poor. Most of them are involved in fishing labour. Even children are engaged in different on-farm and off-farm labour activities • High level of illiteracy • school enrollment is very low • Worse health conditions due to malnutrition. Children and women are specifically victims of malnutrition. • Fields near river • no embankment • growing season is during flood season • crop varieties not resistant; no warnings or evacuation plans for animals	• Some government building is constructed with raised level with bricks and cement. These buildings can be used as safe havens • Some people have cell phones, TVs, and radio sets • People have donkey carts, fishing boats, and one farmer own a tractor • Filter plant installed by the government but is not yet operational. • Frequent river erosion. • ---km road is kacha & below flood level
Social & Organizational	• No formal organization or disaster management committee • No skilled labor • Stronghold of local landlords with local people having limited decision-making power • Women are never consulted in decision making • Individualist approach • No evacuation plans • Poor government services	• Family relationships are very strong • There are no religious and ethnic conflicts in the area. • A community member trained in first aid
Motivational & Attitudinal	• Misperceptions about disasters • Passivity, fatalism, hopelessness, dependent • Lack of initiative, no 'fighting spirit' • Lack of unity, cooperation, solidarity • Negative beliefs / ideologies • Unawareness about disaster risks • Dependence on external support / dole-out mentality	• Positive attitude towards involvement women in DRR activities • Willingness to be organized

Source: Islamic Relief Pakistan -VCA Practitioners' Guide

For technical guidance on MHVRA click the following link

http://www.pdma.gos.pk/new/resources/mhvra2017.pdf

08

Disaster Response Mechanism

Disaster Response Mechanism

What is Disaster Response?

The provision of emergency services and public assistance during or immediately after a disaster to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Response Actors:

- Community
- Government agencies
- NGOs, CBOs, and philanthropists
- UN system, INGOs and donors, etc. (normally get activated when an international appeal is launched)
- Humanitarian partners

Tiers of Response

FEDERAL LEVEL

Resources

Likely Hazard Intensity

PROVISIONAL LEVEL

DISTRICT LEVEL
Onwership By Local Authorities
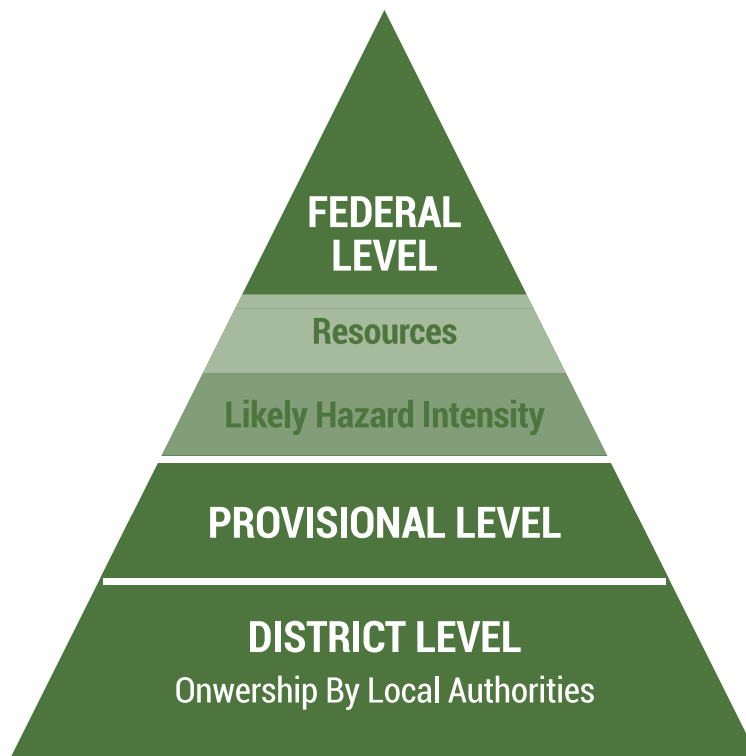
Important Characteristics of Response

Effective response to reduce the impact of disaster is critical, mainly to:

- Limit causalities
- Alleviate hardship and suffering of the affected population
- Restore essential life support and community systems
- Mitigate further damage and loss
- Provide the foundation for subsequent recovery

Requirements of Effective Response

- Information
- Resources
- Efficient response system
- Coordination of response operation

Activation of the Response System

For a rapid and effective response, usually, there needs to be a system for activating emergency response officials and resource organizations. It is useful to implement activation in stages. These might be alert, stand-by, and action. The benefit of this arrangement is that if, after the initial warning, the disaster does not materialize, activation can be called off. Thus, full mobilization of resources can be avoided and a minimum of disruption is caused to normal life. Government departments and other resource organizations should work to this system of different stages into their internal plans.

Coordination of Response Operations

Coordination of the action taken in response operations is very important. Good coordination ensures that resource organizations are utilized to best effect, therefore avoiding gaps or duplication in operational tasks. For effective coordination, an Emergency Operation Centre (EOC) will be activated at all levels. The EOC will serve as the hub for receiving an early warning and issuing information to the public, media, ministries, departments, and humanitarian response agencies. The EOCs will also lead the coordination and management of relief operations in affected areas and will function and be manned 24/7. The main objectives of the EOC are to:

- Disseminate warning on time
- Issue instructions to all stakeholders
- Communicate with stakeholders
- Coordinate with different stakeholders for effective response
- Organize and manage emergency operations at the national level
- Collect information, undertake analysis and arrange dissemination

Gender and Vulnerability Considerations in response activities

It has been established that the effects of a disaster are more pronounced on the vulnerable groups of society such as women, children, elderly persons, and persons with disabilities. Within these categories, there may be even more vulnerable groups, such as females heading their households, children with disabilities, or persons with mental health issues. Because of their vulnerabilities, at times these groups have limited access to relief commodities.

It is therefore imperative for the responders to safeguard the rights of vulnerable people in disaster. They must be accorded priority in the rescue operation and all other activities of response. It is also essential to cater to the unique needs of these groups while planning for and executing the response

Response Activities

Search and Rescue (SAR)

SAR is the search for and provision of aid to people who are in distress or imminent danger. The general field of search and rescue includes many specialties sub-fields, typically determined by the type of terrain the search is conducted over. These include mountain, ground search, and rescue, including the use of search and rescue dogs, urban search and rescue in collapsed structures, combat search, and water rescue. Various mediums like helicopters, boats, hovercrafts, or field rescue teams can be used for the search and rescue of people during disasters. For urban search and rescue, NDMA has raised six teams (2 x heavy & 4 x medium) and has been positioned at different locations namely Islamabad, Rawalpindi, Karachi, Lahore, Mardan, and Gilgit. The detailed tables for search and rescue are attached in the annexure.

Fire Fighting and First Aid including Mass Casualty Management

Provision of medical assistance and firefighting (if required) can be a simultaneous action during search and rescue.

Evacuation

Evacuation is the immediate and urgent movement of people away from the threat or actual occurrence of a hazard. Ranges from the small-scale evacuation of a building due to a storm or fire to the large-scale evacuation of a district or approaching cyclones etc. Evacuations may be carried out before, during, or after disasters for which evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected affected populations.

Rapid Need Assessment (RNA)

Carried out by the Government alone or in conjunction with UN System immediately following a sudden-onset disaster. The assessment aims to acquire fundamental information on the needs of affected populations and to support the identification of strategic humanitarian priorities. It thus enables the government and other stakeholders, a common understanding of the situation and its likely needs for

immediate interventions. To identify the relief needs, NDMA in coordination with OCHA has finalized a Multi-Sector Initial Rapid Assessment (MIRA) methodology to be followed by all for rapid need assessment. The main highlights of the methodology are:

Purpose: To help decision-makers with the nature and dynamics of the crisis and to further define strategic humanitarian priorities.

Timeline: Within 72 hours, a situation overview based on primarily secondary data and other sources (i.e., remote sensing). Within 7 days carry out a field assessment on a community level to identify the needs and priorities of the affected and vulnerable population.

Process: The MIRA process and report encompass three main steps:

- Review and analysis of secondary data which is the basis for the situation overview
- Community-level field assessment and primary data collection based on key informant interviews and structured observations
- Final inter-sectoral analysis and release of final MIRA report

Relief

Relief is the provision of services and public assistance during or immediately after a disaster to save lives, reduce health impact and meet the basic subsistence needs of the people affected. During the relief phase, the focus is on the provision of food, shelter, health assistance and water, sanitation & hygiene. Generally, the time for relief is three months, after which ideally recovery should begin. However, in certain it may surpass if required. Government agencies are the major relief provider, however, philanthropists, civil society organizations, the Pakistani community abroad, UN System in the country, international countries, and donors also take part in the relief depending upon the magnitude of the disaster. Some of the important features of effective relief are:

- Elaborate planning and guidelines/SOPs on the provision of relief
- Non-discrimination and taking care of vulnerable groups
- Logistic system for receipt and distribution and timely flow of relief goods
- Freedom of action and facilitation for relief workers/humanitarian community
- Coordinated operation
- Efficient/transparent cash grant system
- Information management
- Media handling

For further details, see National Disaster Response Plan (NDRP) 2019 by clicking the following link:

https://app.adpc.net/publications/national-disaster-response-plan-2019-ndrp-2019

09

Evacuation and Camp Management

Evacuation and Camp Management

Evacuation

To minimize human losses, people are evacuated from the area in the wake of a looming disaster. An evacuation plan can be prepared based on hazard assessment and preparation for evacuation and final evacuation will be based on the early warning.

What is Evacuation? The evacuation is an organized movement of people from an area of risk to a safer location.

Reason of Evacuate

Evacuation is required in the following situations:

- Floods or cyclones
- Urban or forest fire
- Massive earthquake
- Complex emergency

Preventive Evacuation

Preventive evacuation refers to evacuating when the flood water and other hazards or threats have not yet reached the houses of people at risk.

Phases/Stages of Evacuation:

- Warning
- Evacuation instruction
- Evacuation and evacuation center management
- Return to former or new place and rehabilitation

Evacuation Planning

The following factors should be kept in mind while preparing an evacuation plan. Evacuation committee formulated for the purpose should coordinate with the local authority for the safe evacuation of community members:

- Determine the population for the need to be evacuated
- Identify a safe place for evacuation
- Identify shortest and safest route including alternative route

- Safe assembly area or areas for assembling the community before evacuation
- Forming groups of people to be transported out of the endangered area
- Means and procedures of transportation of valuables and cattle etc.
- Identifying critical items, like medicine, edibles, and water, to be taken along during evacuation
- Necessary documents, like identity cards, educational certificates, and property ownership documents, to be identified for taking along during evacuation

Evacuation Committees and its Responsibilities

The role of evacuation committees is vital in a disaster scenario and they have specific functions to perform in pre, during, and post evacuation which is as follow:

Pre-Evacuation

- Prepare evacuation plan including warning system in consultation with warning team
- Training and education of community members
- Identify and prepare logistical needs for evacuation
- Networking, coordination, and resource generation for evacuation with the government disaster management authorities to make the best use of their resources and facilities

During Evacuation

- Passing on evacuation instructions
- Finalizing evacuation arrangements including transportation, guiding to identify evacuation routes, and taking special care of vulnerable groups
- Ensuring orderly evacuation
- Act as marshals/guides during evacuation
- Search and rescue
- Identify health needs in coordination with the health/first aid team
- Coordinate with health, food, sanitation, security, information committee
- Manage relief operations while in an evacuation center
- Networking, public information, advocacy, resource generation

Post Evacuation

- Ascertain through credible sources that the situation is perfectly normal
- The area must be assessed for safety before entering buildings and locality

Management of Evacuation Center

An evacuation center must be established for monitoring the evacuation process. Functions of these centers are:

During Evacuation
- Registration and monitoring of evacuees
- Space assignments to evacuees
- Maintain order (people, health, sanitation, garbage disposal, etc.)
- Coordination delivery of services (relief, medical mission, etc.)
- Provision of information
- Networking and resource generation

After Evacuation
- Ensure that return is safe or find an alternative place
- Repair damages in the community
- Clean evacuation site
- Return to the community

If this is not possible, networking, negotiation, advocacy will be necessary to find an alternative.

Identifying Safe Evacuation Routes

The safe evacuation routes can be identified and also be mapped by the community. Some of the things that can be kept in mind while identifying safe evacuation routes for the vulnerable community are as follows:
- Select evacuation routes that minimize the exposure to the hazard and other obstacles
- The evacuation route should lead to a safe area for the assembly of people
- Since, loss of electric power, poles, towers, fire breakout, etc. may affect the safe route so alternative routes should also be mapped and highlighted so that the entire community is aware of it
- The route should be direct
- The evacuation route should be easily accessible to even the most vulnerable group like women, children aged, and people with critical disabilities
- A signboard highlighting the safe evacuation routes should be put so that people can easily spot such routes
- The evacuation routes should be reviewed and monitored regularly. In case of issues, adjustments have to be made and communicated to the village populace at the earliest

Camp Management

Camp management is about providing assistance and protection to the residents of the relocation site following international law and standards and ensuring that every member of the community has the opportunity to participate in the activities of the relocation site.

Key considerations for Camp Management

International Law and Standards

International law provides a framework for assistance and protection activities. Standards ensure consistency and accountability in response activities.

Participation

Members of the displaced community identify and express their views and needs. Collective action is taken to reflect those views and meet those needs.

Protection

Protection activities in a camp should ensure that displaced populations have access to all facilities without any discrimination. The government has the primary responsibility for the physical, legal, and material security of the displaced population. UN agencies and NGOs - national and international can support the government as necessary. Activities should ensure that displaced populations have access to:

Physical Security: Protection against physical harm, protection against violence

Legal Security: Access to justice, legal status, and identification documentation

Material Security: Equal access to basic goods and services (water, shelter, and food, etc.)

Operational Standards for Camp Management

For camp management, SPHERE standards developed by a group of NGOs and the Red Cross and Red Crescent Movements as a consequence of the lessons learned in Rwanda 1994 are followed. These standards are used for the following, details of SPHERES are covered in SPHERE standards issued by UN System:

- Site/structure selection
- Structure and site assessment (planning/design or refurbishment/design)
- On-going care and maintenance
- Monitoring overall protection and assistance
- Promoting community participation
- Data collection, gap identification, and coordination
- Contingency planning (preparedness)

Site Selection

Site selection for a relief camp is one of the basic but critical things that require a great amount of attention by the government organizations/departments mandated to do so. Usually, the relief camps are established with a short-term plan in mind but it may go beyond a shorter period.

Since relief camps cannot be established in deserted areas or far away from settled local communities, it becomes close to inevitable that the host communities would also suffer in one way or another in case the relief camp continues to exist beyond days and weeks. It is of utmost importance that a careful and objective analysis of the host communities as well as the incoming displaced communities is undertaken before deciding on a specific location. Some of the physical characteristics are as under:

- Absorptive and stable soil
- Potential for cultivation
- Gentle slope, between 1% and 5% gradient
- The lowest point of the site is 3 meters or more above the maximum water table level
- Sufficient space, including room for expansion
- For collective centers: structural quality, existing infrastructure, proper ventilation/insulation, accessibility, feasibility for partitioning space
- The site should be free of major water and vector-borne disease
- If endemic diseases are present, care should be taken to avoid or control vector habitats and provide personal protection against mosquitoes, black flies, tsetse flies, etc.

Layout and Design

- Tents should face the upwind to avoid odors from latrines
- Ample space for the people to be sheltered and for all the necessary public facilities such as roads, firebreaks, and service areas
- Areas for public spaces (e.g., market) should be defined
- Food distribution areas should be specified
- At least two access roads for security and safety
- Shelters should be arranged in rows or clusters of 10-12 on both sides of a road at least 10 meters wide
- Built-up areas should be divided by 30 meters wide fire breaks approximately every 300 meters
- Shelters should be spaced 8 meters apart so that people can pass freely between them without being obstructed by pegs and ropes
- Minimum space of 3.5m2 per person in warm climates

- Minimum space of 4.5-5.5 m2 per person cold climates
- Plastic sheeting used as a shelter, one-piece, 4 meters by 6–7 meters, per household

Considerations for Water Sanitation and Hygiene

- Drainage ditches should be dug around the tents or other shelters and along the sides of roads, especially if there is a danger of flooding
- Care should be taken to lead water away from shelters, latrines, health centers, and stores
- Water points should also have adequate drainage to avoid mud
- Persistent areas of stagnant water that are difficult to drain can be backfilled, or covered with a thin layer of oil to control insects
- The surface of roads can be sprinkled with water to keep the dust down
- Sullage water can sometimes be used to keep down dust on dirt or gravel roads
- Restricting traffic and imposing speed limits can also help to reduce dust

10

Logistic Management

Logistic Management

There is often confusion between "logistics" and "supply chain management". Logistics is one activity of the end-to-end process of supply chain management. On the other hand, supply chain management deals with the management of materials, information, and financial flows in a network consisting of suppliers, manufacturers, distributors, and customers. Humanitarian logistics slightly differs commercial as business logistics and commercial supply chains are sophisticated operations based on demand, inventory control, and several models that optimize a dynamic and fast-moving system. Humanitarian supply chains are essentially the same but with the following significant differences:

- Unpredictable demand in terms of timing, geographic location, type, and quantity of commodity
- Short lead time and suddenness of demand for large amounts of a wide variety of products and services
- High humanitarian stakes regarding timelines in the face of a sophisticated global media and the high anticipatory attention of the donors
- Lack of initial resources in terms of supply, human resources, technology, capacity, and funding

What Is Supply Chain Management?

According to the Council of Supply Chain Management Professionals (CSCMP), "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement…and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies."

What Is Logistics?

The CSCMP also defines logistics management as "the part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption to meet customers' requirement. Logistics management is an integrating function, which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions

including marketing, sales manufacturing, finance, and information technology." (CSCMP 2011) Logistics activities can also be termed as the operational component of supply chain management, including quantification, procurement, inventory management, transportation and fleet management, and data collection and reporting. Supply chain management includes the logistics activities plus the coordination and collaboration of staff, levels, and functions. The supply chain includes global manufacturers and supply and demand dynamics, but logistics tends to focus more on specific tasks.

Components of Humanitarian Supply Chain

Following are the four components of the humanitarian supply chain:

- *Planning:* It can be defined as translating program requirements into logistics planning and includes the development of a strategy to select and manage the required resources as well as a set of metrics to monitor the supply chain's efficiency

- *Information (gathering and sharing):* is a key component of the success of the humanitarian supply chain. It starts with gathering correct information concerning needs identification and includes information sharing and coordination between different parts of the humanitarian supply chain

- *Sourcing:* It refers to the process of identifying sources of supply that can meet the organization's immediate and future requirements for goods and services. In an emergency, immediate needs would be a priority consideration

- *Logistics:* It is only a part of the supply chain and is concerned with physical material and information flows from raw material through to the final destination of the finished product. Major emphasis is now placed on the importance of information as well as physical flows, and an additional and very relevant factor is that of reverse logistics - a flow of products and packaging back through the system

Factors to Consider in the Development of a Good Logistics Plan

- Financial resources availability
- Staff availability
- Information management tools
- External infrastructure availability
- Stocks and movements
- Transport information
- Distribution, monitoring, and evaluation
- Security arrangements

Procurement Principles

Three important principles of humanitarian logistics procurement are:

Transparency:	All phases in the procurement process are fair and accurately documented
Accountability:	Accountability may require certain rules laid by the Government/donors to be followed when using the money, they have provided
Efficiency and Cost Effectiveness:	Meeting the six rights of supply; right price, right time, right quantity, quality services, delivery to the required places, and from the most cost-effective source

Procurement Policies

Procurement policies will vary depending upon the source of funding. In the case of public/government funds, the Public Procurement Regulatory Authority (PPRA) rules have to be followed. However, if resources are entrusted by the donors, rules specified by them need to be followed for all procurements.

11

Post Disaster Management Recovery

Post Disaster Management-Recovery

The United Nations Office for Disaster Risk Reduction aka UNISDR defines recovery as the restoration and improvement where appropriate, of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Ideally, the recovery continuum begins before a disaster strike. Preparedness activities such as planning, capability building, etc., which contribute to the community's and the nation's resilience can be undertaken. The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended or in the early stages of the response operations or it could be overlapping. It is based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation. Recovery programs, coupled with the heightened public awareness and engagement after a disaster, afford a valuable opportunity to develop and implement DRR measures and to apply the "build back better" principle.

Types of Recovery

Recovery efforts following rescue and relief in any disaster can be classified into two types as follows:

Intermediate Recovery/Early Recovery

It involves returning critical infrastructure and essential government or commercial services to a functional, if not pre-disaster state. Such activities are often characterized by temporary actions that provide a bridge to permanent measures. The term early recovery is widely used for defining and designing a recovery framework. Early recovery is a multi-dimensional process guided by development principles that begins in a humanitarian setting and seeks to build on humanitarian programs and catalyze sustainable development opportunities. It aims to generate and/ or reinforce nationally owned processes that are resilient and sustainable. It encompasses the restoration of basic services, livelihoods, transitional shelter, governance, environment, and other socio-economic dimensions.

Long-term Recovery

Process of recovery that follows a disaster event and may continue for months

and years. Examples include the development, coordination, and execution of service and site restoration plans, the reconstitution of government operations and services, individual, private sector, non-governmental, and public assistance programs to provide housing and to promote restoration, long-term care, and treatment of affected persons, additional measures for social, environmental and economic restoration, evaluation of the incident to identify lessons learned, post-incident reporting and development of initiatives to mitigate the effects of future incidents.

Disaster Recovery Planning

Ideally, the recovery continuum begins before a disaster strike, with preparedness activities such as planning, capability building, exercising, and establishing tools and metrics to evaluate progress and success; mitigation planning and actions; economic development planning, and vital partnership building, all of which contribute to the community's and the nation's resilience. Post-disaster recovery activities begin in the early stages of the response operations and may last for years. Actions that help recovery, resilience, and sustainability should be built into the steady-state operations of governments at all levels.

As response activities often set the stage for recovery, therefore can influence long-term recovery and be choice-limiting, and these long-term recovery impacts must be considered for their potential impact before implementation. As response actions wind down, stabilization activities are primary.

Stabilization is the process in which the immediate impacts of an event on community systems are managed and contained, thereby creating an environment where recovery activities can begin. The various elements of a community system will stabilize on different time frames, leading to a situation in which response, stabilization, and restoration activities can occur concurrently.

Recovery Planning and Disaster Management Cycle

The single most effective means of strengthening the capacity to plan and implement sustainable recovery efforts is preparing and planning for disaster recovery before a disaster happens. Integrating recovery planning throughout the disaster management process can expedite well-informed decision-making through the: -

• Identification of existing vulnerabilities and capacities
• Formulation of a vision and framework for post-disaster planning
• Engagement and capacity building of potential partners

- Development or strengthening of institutions and regulations to facilitate disaster operations

When governments do not engage in recovery planning until a disaster occurs, typically the result is:

- Hasty and reactive decisions that sacrifice relevance and sustainability or,
- Careful but delayed planning that sacrifices the need for urgency and must address potentially conflicting recovery efforts that have taken place in the waiting period

Damage Need Assessment (DNA)

The primary objective of the assessment is to provide a clear, concise picture of the post-disaster situation, to identify needs, and to develop strategies for recovery. In the context of Pakistan, the following types of analysis/assessment are conducted to determine the needs of recovery:

Intermediate Recovery/Early Recovery

In order to determine the recovery need, RNA is conducted. A comprehensive methodology for RNA has been formulated by NDMA in collaboration with United Nations Development Programme (UNDP). The assessment is based on the primary data collected by the government authorities, verification by the joint team, and analysis. Based on the assessment, the recovery needs are worked out for all the sectors.

Long-term Recovery

DNA is initiated to estimate the extent of the damage and the required needs for rehabilitation and reconstruction of the damaged assets and infrastructure; and restoration of livelihoods and economic productivity. ADB and the WB lead assessment the assessment process in close coordination with the government. EAD, MOF initiate the request for the conduct of DNA, whereas all coordination is done by NDMA/PDMAs.

Methodology

For the estimation of the effects and impact of the disaster, the methodological tool developed by the UN is used. The impact of the disaster on each sector of the economy is estimated with the following three costs:

- Direct damage
- Indirect Losses
- Reconstruction cost

Data from the district and tehsil level is collected by the government and, verified and validated by the DNA sector teams. The data received by the DNA sector teams are validated through several measures including field damage inspection visits by sector teams, interviews with stakeholders, desk review, satellite imagery and GIS data comparisons, and other plausibility checks. Based on the above, analytical work is undertaken by sector teams for a comparative pre and post-disaster assessment of the infrastructure and services affected.

Activities of Early Recovery

- Providing accessible interim housing (in or outside the affected area depending on suitability) and planning for long-term housing solutions
- Returning of displaced populations and businesses if appropriate
- Reconnecting displaced persons with essential health and social services
- Providing supportive behavioral health education, intervention, including continuing to provide crisis, grief, and group counseling and support
- Providing access and functional needs assistance to preserve independence and health
- Updating hazard and risk analyses to inform recovery activities
- Establishing a post-disaster recovery prioritization and planning process
- Developing an initial hazard mitigation strategy responsive to needs created by the disaster
- Ensuring that national and local critical infrastructure priorities are identified and incorporated into recovery planning
- Developing culturally and linguistically appropriate public education campaigns to promote rebuilding to increase resilience and reduce disaster losses
- Supporting the capacity assessment of local, state, and tribal governments to plan and implement recovery
- Complete assessments of natural and cultural resources and develop plans for long-term environmental and cultural resource recovery

Activities of Long-Term Recovery

- Identifying risks that affect long-term community sustainment and vitality
- Developing and implementing disaster recovery processes and plans, such as a long-term recovery plan, mitigation plan, land use planning, and management
- Rebuilding appropriate resilience standards in recognition of hazards and threats

- Rebuilding educational, social, and other human services according to standards for accessible design
- Implementing mitigation strategies, plans, and projects
- Implementing permanent housing strategies
- Reconstructing and/or relocating, consolidating permanent facilities
- Implementing economic and business revitalization strategies
- Implementing plans to address long-term environmental and cultural resource recovery
- Ensuring an ongoing and coordinated effort among all entities to deter and detect waste, fraud, and abuse

Success Factors of Disaster Recovery

Factors likely to stimulate a successful recovery are:

Citizen Engagement

Citizen Engagement, Public Participation, and Public Communications. Collaboration to maximize the use of available resources for recovery in a resilient manner and community participation for transparency and accountability must be ensured. Continuous communication with citizens on various recovery programs, as well as the overall recovery progress will increase public confidence.

Decision-Making and Coordination

Realistic metrics (preferably during pre-disaster planning and updated as soon as possible after the disaster) for tracking progress, ensuring accountability, and reinforcing realistic expectations among stakeholders must be established for informed and timely decisions. In addition, coordination and Integration of Community Recovery Planning Processes (CRPP) into recovery planning and implementation.

Development of pre-existing recovery plans

The development of pre-existing recovery plans to improve the speed and quality of post-disaster recovery decisions is essential. A process and criteria for transparently identifying and prioritizing key recovery actions and projects for the community will ensure success.

Recovery Management

Well-established, pre-disaster partnerships at all levels will help to drive a successful recovery. Leverage and coordinate disaster and steady-state public and private assistance programs are likely to accelerate the recovery process and avoid duplicative efforts.

Financial/Acquisition Management

Access to broad and diverse funding sources is critical to financing recovery efforts. The flexibility of program funds and resources is critical to financial planning, recovery management, program administration, and implementation in a post-disaster environment. Recovery management programs must have the capability to develop and maintain adequate financial monitoring and accounting systems that detect & deter fraud, waste, and abuse.

Organizational Flexibility

Recovery structures at all government levels should be able to evolve, adapt and develop new skills and capacities to address the changing landscape of post-disaster environments. Functional and effective intergovernmental relations can influence the efficiency of the recovery process. Flexible staffing and management structure can enhance the adaptability of the governmental structure; moreover, pre-disaster partnerships can help reduce or avoid the challenges of establishing new partnerships in a post-disaster environment.

12

Grievances Redress Mechanism (GRM)

Grievances Redress Mechanism (GRM)

Grievances Redress Mechanisms[18]

Grievances Redress Mechanisms are defined as organizational systems and resources established by national government agencies (or, as appropriate, by regional or municipal agencies) to receive and address concerns about the impact of their policies, programs, and operations on external stakeholders. The stakeholder input handled through these systems and procedures may be called "grievances," "complaints," "feedback," or another functionally equivalent term.

GRMs are intended to be accessible, collaborative, expeditious, and effective in resolving concerns through dialogue, joint fact-finding, negotiation, and problem-solving.

What principles should guide the design of a GRM?

Several guiding principles should drive the design of GRMs. GRMs designed according to these principles are more likely to provide effective resolution of stakeholder grievances:

Legitimate: enabling trust from the stakeholder groups for whose use they are intended, and being accountable for the fair conduct of grievance processes. Accountability for ensuring that the parties to a grievance process cannot interfere with its fair conduct is typically one important factor in building stakeholder trust.

Accessible: being known to all stakeholder groups for whose use they are intended, and providing adequate assistance for those who may face particular barriers to access. Barriers to access may include a lack of awareness of the mechanism, language, literacy, costs, physical location, and fears of reprisal.

Predictable: providing a clear and known procedure with an indicative timeframe for each stage, and clarity on the types of process and outcome available and means of monitoring implementation. For a mechanism to be trusted and used, it should provide public information about the procedure it offers.

Equitable: seeking to ensure that aggrieved parties have reasonable access to sources of information, advice, and expertise necessary to engage in a grievance process on fair, informed, and respectful terms. Where imbalances are not

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18. https://info.undp.org/sites/bpps/SES_Toolkit/SES%20Document%20Library/Uploaded%20October%20 2016/UNDP%20SES%20Supplemental%20Guidance_Grievance%20Redress%20Mechanisms.pdf

redressed, perceived inequity can undermine both the perception of a fair process and the GRM's ability to arrive at durable solutions.

Transparent: keeping parties to a grievance informed about its progress, and providing sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake. Providing transparency about the mechanism's performance to wider stakeholders, through statistics, case studies, or more detailed information about the handling of certain cases, can be important to demonstrate its legitimacy and retain broad trust. At the same time, the confidentiality of the dialogue between parties and of individuals' identities should be provided where necessary.

Rights compatible: these processes are generally more successful when all parties agree that outcomes are consistent with applicable national and internationally recognized rights. Grievances are frequently not framed in terms of rights and many do not initially raise human rights or other rights concerns. Regardless, where outcomes have implications for rights, care should be taken that they are consistent with applicable nationally and internationally recognized standards and that they do not restrict access to other redress mechanisms.

Enabling continuous learning: drawing on relevant measures to identify lessons for improving the mechanism and preventing future grievances and harms. Regular analysis of the frequency, patterns, and causes of grievances; strategies and processes used for grievance resolution; and the effectiveness of those strategies and processes, can enable the institution administering the GRM to improve policies, procedures, and practices to improve performance and prevent future harm.

Based on engagement and dialogue: consulting the stakeholder groups for whose use they are intended on their design and performance, and focusing on dialogue as the means to address and resolve grievances. For an operational-level grievance mechanism, engaging regularly with affected stakeholder groups on the GRM's design and performance can help to ensure that it meets their needs, that they will use it in practice, and that there is a shared interest in ensuring its success.

Grievance Redress Mechanism (GRM) of GLOF-II

The GLOF-II project GRM is reflected in the following figure, shows typical steps in a grievance resolution mechanism:

Step 1: Receive and register grievance
The project GRM enables aggrieved stakeholders ("complainants") to communicate their grievances through verbal, written, and digital channels.

Grievance Redress Mechanism (GRM) Procedures

Receive and Register Grievance

| *VERBAL* | *WRITTEN* | *DIGITAL* |

↓

Acknowledge, Assess, Assign
(written acknowledgement, serial number assigned, assess the eligibility of the grievance)

Tier 1 (Community Level)

Tier 2 (District Level GRC)

Tier 3 (Provincial Level)

Tier 4 (Federal/ Regional Level)

No agreement on response

Proposed Response

Agreement on Response?

Yes, agreement on response

Decide Ineligible

Implement agreed response

Grievance resolved successfully and closed

Grievance not resolved

Tier 5 | (GFC-IRM, UNDP-SRM, Court of Law)

Step 2: Acknowledge, Assess, Assign

Acknowledging receipt: The staff/office who has received the grievance provides a timely communication back to the complainant(s) that their grievance has been received, will be logged and reviewed for eligibility, and if eligible, will generate an initial project response. Normally, the initial acknowledgment should come within 3-5 days of receipt and can be in the form of a standard letter or email, with a clearly identified point of contact in the project, a brief description of the process that will be followed, and a reference name or number for the complaint.

Assessing eligibility for the GRM: This is a procedural step to ensure that the issue being raised is relevant to the project. A decision on eligibility is only meant to trigger an initial assessment and response. The staff responsible for the initial response need to follow clear guidelines on what kinds of issues are eligible to be

handled through the GRM, what issues should be referred to other mechanisms (such as internal audit departments, internal and external anti-corruption offices, police, etc.), and what issues or contexts may require further clarification to determine eligibility.

Eligibility is often determined based on four broad criteria:

- Does the complaint indicate that the project has caused a negative economic, social, or environmental impact on the complainant, or has the potential to cause such an impact?

- Does the complaint specify what kind of impact has occurred or may occur, and how the project has caused or may cause that impact?

- Does the complaint indicate that those filing the complaint are the ones who have been impacted, or are at risk of being impacted; or that those filing the complaint are representing the impacted or potentially impacted stakeholders at their request?

- Does the complaint provide enough information for GRM staff to determine the first three questions?

Assigning responsibility: Complaints are referred to the most appropriate tier including community level, District level Grievances Redress Cell (GRC), provincial level, and federal or regional level. The referral process likely depends on the type of issue raised and whether it is low or high risk. A simple categorization of complaints – i.e., type of issue raised and the effect on the environment/claimant if the impacts raised in the complaint were to occur – may support faster referral to the appropriate party. The process of assigning cases is done in a way that is transparent for complainants.

Step 3: Proposed Response

Project GRM generates three primary types of response to complaints:

- Direct action to resolve the complaint
- Further assessment and engagement with the complainant and other stakeholders to determine jointly the best way to resolve the complaint
- The determination that the complaint is not eligible for the GRM, either because it does not meet the basic eligibility criteria, or because another mechanism (within the project or outside it) is the appropriate place for the complaint to go or both.

Step 4: Communicate proposed response to complainant seek agreement on the response

The GRM is responsible for communicating the proposed response back to the complainant in a timely fashion, in writing (and orally as well if that is a more effective means of communication) using language that is easily accessible to the complainant. The response should include a clear explanation of why the response is being proposed; what the response would be; and what the complainant's choices are, given the proposed response. Those choices may include an agreement to proceed, request for a review of an eligibility decision or a referral decision, further dialogue on a proposed action, or participation in a proposed assessment and engagement process or pursuit of the complaint through other channels.

The complainant may or may not agree with the proposed response. In case of agreement, the project will proceed with the proposed response, whether direct action, further assessment, or referral. If the complainant challenges a finding of ineligibility, rejects a proposed direct action, or does not want to participate in a more extensive process of stakeholder assessment and engagement, the GRM staff need to clarify the reasons why the complainant does not accept the proposed response, provide additional information, and, where possible, revise the proposed approach. In general, GRM staff should meet with complainants who are not satisfied by the initial eligibility determination and/or by the proposed response, rather than use correspondence to attempt to resolve issues.

If there is still no agreement, GRM staff need to make sure the complainant understands what other recourse may be available, whether through the judicial system or other administrative channels and to document the outcome of the discussions with the complainant in a way that makes clear what options were offered and why the complainant chose not to pursue them.

Step 5: Implement the response to resolve the grievance

After the agreement between a complainant and the project moves forward with the proposed action or stakeholder process, implement the agreed response. The implementation may result in a successful resolution or nonresolution of the grievances. In case of non-resolution, the complaint will be forwarded to the fifth tier which includes Green Climate Fund- Independent Redress Mechanism (GFC-IRM), United Nations Development Program- Stakeholder Response Mechanism (UNDP-SRM), or Court of Law.

13

Mainstreaming Disaster Risk Reduction

Mainstreaming Disaster Risk Reduction

The need to mainstream DRR was formalized in January 2005 when the HFA was adopted by the signatory states. Mainstreaming is an ongoing process, not a one-time technical activity. Successful mainstreaming requires more than just developing appropriate approaches and tools. A change in organizational culture is required to ensure integration at all levels of the organization and across all programs. Political commitment and motivation, including financial support, can contribute to the strengthening of the organizational culture.

Mainstreaming DRR into Development Planning

Development projects in disaster-prone areas may have multiplier effects on hazards. Project activities may turn a hazard into reality through certain processes such as increasing the risks of landslides (excavations at the toe of landslide – common in northern Pakistan), geological instability due to cut and fill operations, water percolation in deeper soil resulting in loose soil texture, deforestation causing flash floods, increase in certain economic activities that generate greenhouse gases, etc.

While preparing developing programs/projects or schemes in such areas, we may have few options such as:

- Developing tools to identify risks and impacts that the proposed development program/project or scheme may have on hazard-prone areas or the environment where the development would take place. Tools may be checklists or the addition of subsections on disaster scenarios of the project i.e., whether the project will increase risks of disasters in the area

- Some projects require an Environmental Impact Assessment (EIA) (a requirement of the Environmental Protection Agency – EPA). The EIA discusses the impacts of climate change on project components. The EIA may also discuss the impacts of a project on disaster scenarios of the area i.e., increasing or decreasing the risks and hazards

- Mitigations may be suggested at the project planning stage. PC-I (formal document of the development project in the public sector) may have a section that will discuss disaster vulnerabilities and proposed mitigation measures

- Capacity building of line departments on mainstreaming DRR/DRM in project planning

In the following section, the checklists of the planning commission and GLOF-II projects are given to mainstream DRR into development planning:

NDMA Guidelines for DRR Mainstreaming in Basic Community Infrastructure[19]

NDMA has developed guidelines for DRR mainstreaming in the context of early recovery of Flood 2010. The Annexure B of these guidelines is about the DRR mainstreaming in community basic infrastructures. In the following section these guidelines are given:

• DRR primarily consists of structural and nonstructural measures. Safer building codes, land use, and quality control through regular monitoring and inspection regimes are important amongst structural measures while creating DRR awareness, planning, training, and capacity building of all stakeholders, especially the community and the government departments are important nonstructural measures.

• DRR must be an integral part of project selection and implementation. In order to set the design criteria for a risk reduction project, the hazards, the current risk, and the level of risk that is socially acceptable must be identified. A multi-hazard appraisal should be carried out at an early stage to identify the types of hazards, their likely severity, and recurrence.

• An evaluation of the current risk includes identifying locations most likely to become unsafe in the event of a natural hazard (e.g., areas prone to flooding, landslides, or earthquake-induced liquefaction) and assessing their land use, as well as assessing the ability of local construction to resist the identified hazards.

• If for the identified hazards, the level of current risk is greater than that which is socially acceptable, then the need for hazard-proofing (and/or re-siting) is established, and the socially acceptable risk and identified hazards become the design criteria for the new construction or strengthening works.

• Determine whether additional works are required to render the site viable for development or whether land use should be restricted to reduce vulnerability to natural hazards. Also, consider whether re-siting to a location of reduced risk is an option. Topographical features and landscape can be used to reduce the impact of potential natural hazards (e.g., to minimize flood risk or modify wind speed and wind direction).

• A technique to strengthen constructions or make them hazard-safe should consider all potential hazards, not just the recent floods. In many cases, design features intended to enhance resilience to one type of natural

19. https://reliefweb.int/sites/reliefweb.int/files/resources/DRR%20Guidelines%20for%20Mainstreaming.pdf

hazard will augment resilience to others, for example, the provision of good connections between foundations, frames, walls, and roofs of buildings. However, in certain cases, design features that help resist one type of hazard may be detrimental to the resistance of another. For example, heavy roofs help withstand strong winds due to cyclones, storms or typhoons, but will increase the forces on buildings subjected to earthquakes.

- The siting and design of critical facilities (e.g., bridges) and infrastructure that are essential for relief and recovery purposes in the event of a disaster should be given special consideration.

- The site for development will typically be defined by the local government based on availability and economic criteria. The suitability of these sites needs to be assessed. This can be done by following. Any hazard assessments carried out in previous stages should also be considered.

- Develop building codes and guidelines, accounting for local hazard conditions, building material characteristics, construction skills, and quality. The aids and guidelines prepared by UNHABITAT Pakistan should be used wherever applicable.

Possible Shortfalls, their Impact and Mitigation Measures

Sr.	Community Infrastructure	Potential Negative DRR Impact	Proposed Mitigation Measures
1	Link roads and paths	• Incorrect alignments can result in blocking the natural watercourses and become a potential flood hazard • Substandard construction can result in different types of disaster risks • Slope cutting for road/s widening may trigger landslides • Improper disposal of debris like dumping into rivers and streams	• Avoid new alignments which can block natural watercourses • Adopt slope stabilization measures • Ensure proper designing and quality control through monitoring and inspection regimes • Identify proper debris dumping site away from streams and rivers probably in depressions that need filling
2	Street pavement	• The drainage system may be blocked	• Ensure that proper designing and quality control of the street

Sr.	Community Infrastructure	Potential Negative DRR Impact	Proposed Mitigation Measures
3	Bridges (wooden, suspension,)	• Selection of wrong site and design may obstruct freshwater flow and hence the movement of aquatic life • The gradient of a stream may be changed and thus may change the morphology of a stream and river	• Adopt safer designs and ensure quality control • Give ample space for free movement of freshwater down the stream; do not obstruct water flow • Do not give too much gradient to the river or stream beds so that movement of the aquatic fauna is obstructed • Create DRR awareness among the community
4	Culverts	• Substandard construction can become a hazard rather than an aid to the community • Lead to high risk of water obstruction and hence waterlogging, flooding, and restricted movement of aquatic life	• Ensure quality control through proper monitoring and inspection regimes • Use standard designs and proper sites to allow free movement of water and avoid waterlogging • Create DRR awareness among the community/ all stakeholders.
5	Water channels, Watermills, Micro-hydel power units	• Cutting of slopes, which may lead to soil disturbance and landslides • Improper disposal of debris may lead to water contamination • Improper diversion bunds in streams and rivers at source may hinder the freshwater flow downstream	• Safe designing and quality control • Avoid realignment in slope and mountainous areas; If unavoidable adopt appropriate slope stabilization measures • Identify proper debris dumping site away from streams and rivers probably in depressions that need filling; • Construct diversion bunds in a way to allow the proper flow of water • Create DRR awareness among the community/ all stakeholders

Sr.	Community Infrastructure	Potential Negative DRR Impact	Proposed Mitigation Measures
6	Flood protection Embankments/ Bunds	• Improper structures may obstruct water flows downstream • Construction of flood protection spurs only on one side may redirect to water flow to the other side and thus may lead to banks cutting on the opposite side of the rivers and streams • Substandard construction may become hazardous • Breaches in the embankments can transform into a major disaster for the people, livestock, and agriculture	• Proper designs should be adopted to ensure that water flows are not obstructed but only the banks are protected; • Flood protection spurs are constructed on both sides of the waterways • Quality control must be ensured • Repair the existing breaches and create DRR awareness among the community/ all stakeholders • Develop community awareness about the risks of creating unauthorized breaches in the embankments

GLOF-II project checklist to assess environmental and social impacts of a subproject

GLOF-II project has well defined Environmental and Social Management Plan (ESMP) which provides a mechanism for initiating and implementing subprojects in GLOF prone areas in Northern Pakistan. The project has developed checklists to assess the environmental and social impacts of a subproject. The checklists also cater to the need to assess disaster scenarios of subproject i.e., whether the subproject will reduce or increase the risks of disasters. Please see the attached checklists wherein highlighted text is regarding disaster impacts of subprojects.

Some of the key areas of the checklist about climate change and DRR are given below:

Sr.	Type of expected impact	Yes	No	Not Known	Details/ Remarks
	Will the proposed project result in significant greenhouse gas emissions or may it exacerbate climate change?				
	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?				
	Will the project cause noise and vibration or the release of light, heat energy, or electromagnetic radiation?				Noise and vibrations may cause landslides, increased risk of an outburst of glacial lakes
	Will the project interventions result in road blocking and temporary flooding due to land excavation during the rainy season?				Should not trigger any disaster such as landslides, flooding
	Are the project interventions located in flood-prone areas?				
	Will the project have risks to community health and safety caused by (any or all of the below) • Management and disposal of waste; • Civil or electrical works; • Accidental and natural hazards, particularly where structural elements or components of the project are accessible to members of the affected community; and • Fire, electric shock, or failure of civil structures during operation.				Failure of certain civil structures may pose risks of disasters

Sr.	Type of expected impact	Yes	No	Not Known	Details/ Remarks
	Does the sub-project involve any physical construction work, i.e., rehabilitation, reconstruction, or new construction? Specify in the "remarks" column.				In relation to DRM
	Does the sub-project involve impacts on land, assets, and people?				It is important to find out impacts the subproject may have concerning DRM

Mainstreaming Gender, Age and Disability in DRR

Gender Mainstreaming

Gender mainstreaming is a strategy for making women's as well as men's concerns and experience an integral dimension of the design, implementation, monitoring, and evaluation of policies and programs on all political, economic, and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality." (NDMA guidelines on vulnerable groups)

GENDER ANALYSIS

The findings of the gender analysis allow to identify objectives and strategies that aim to promote gender equality. This is an exploration of power relationships between men and women in a particular DRM context. Questions to ask in a gender analysis:

- Who, which men or women, hold the power in the community?
- Who, which men or women, owns and/or controls resources?
- Who takes the decisions?
- Who sets the agenda?
- Who gains and losses from processes of development?

A gender analysis should (at the least) identify the following issues:

- Division of labour between women and men,
- Different access to and control over resources,
- Different skills, capacities, and aspirations of women and men,
- Different levels of participation and leadership enjoyed by women

Questions and Challenges

- What are cultural/religious constraints to contact women and girls and involve them meaningfully in programme design and decision-making?
- How is women's presence in the public sphere organized? What are the ways for women to participate in decision-making at community level?
- Are women and girls already overburdened with (paid and/or unpaid) workloads? What can be done to involve women and men equally without unnecessarily overburdening them with additional tasks?

Checklist for Gender Inclusion in Disaster Risk Management[20] Several studies have shown that disaster mortality rates are higher for women than for men. Primarily this is caused by differences in vulnerabilities of women and men as a result of socially constructed gender roles. However, women are not just victims of climate change and disasters. Women demonstrate extraordinary powers of resilience during disasters and they can also be powerful agents of change. Paying attention to gender means recognizing the different needs as well as capacities and contributions of women and men.

Mitigation and preparedness

1. **Risk Assessment:**
- Ensure active women's involvement in the GLOF risk assessment process and identify gender-specific aspects of risk and vulnerability
- Be aware of the vulnerabilities and concerns - as well as capacities - of different groups of women and men and how gender intersects with age, disabilities, ethnic background, and social and economic status. (e.g., Are all female-headed households more vulnerable in terms of housing and the location of the housing? What about widows, girl children, female orphans, etc.). Also, examine cultural/religious practices that may increase or decrease women's coping skills in case of disasters and natural hazards
- Identify the capacities and available resources of women and men for managing and reducing vulnerabilities

2. **Early Warning System:**
- Ensure that women and men have better and more equal access to GLOF early warning information
- Encourage the participation of women where possible in early warning systems and ensure that such systems are appropriate and accessible to both men and women
- Ensure that the installed communication system is tailored to the preferences and different behavioral patterns of men and women:
    - Identify the different patterns of behavior due to the division of labor and responsibilities between men and women. E.g., are there different behavioral patterns during different periods, e.g., night/day, wet/dry season, harvest season, summer and winter, etc.? What are the resulting implications in terms of equal access to information i.e., effective early warning and communication systems?

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20. https://www.shareweb.ch/site/Disaster-Resilience/Documents/GenderDRR_Checklist_final_draft.pdf

- Male or female heads of household – do both - men and women - have equal access to early warning information

3. **Capacity Building:**

• Ensure equal representation of women in membership and leadership of HWGs

• Involve women in HWGs decision making

• Ensure that women should have equal access to disaster preparedness training and awareness sessions

• Ensure that women's, as well as men's knowledge, is promoted to build a culture of safety

Response:

• Before and during rescue and survival efforts conduct gender-sensitive (basic) needs assessment

• Ensure women access emergency registration systems

• Separate distribution points or desks should be for women

• Women, especially pregnant and lactating mothers' nutritional requirements should be considered in food support programs

• Ensure women's privacy needs in the construction of water and sanitation facilities in temporary shelters

• Avoid assuming that all women or all men share the same needs and perspectives

Examples:

• Identify the location where women/men are likely to spend most of their time during daytime as well as during nighttime? What are the implications for rapid evacuation efforts?

• Who is more likely to care for the most vulnerable such as the sick, the very young, and very old – men or women? Will this impact women's capacity to cope with a disaster? Are there implications for evacuation efforts? E.g.: Will the responsibility for others slow a person down?

• Ensure that evacuation shelters and emergency housing are equally accessible to both women and men and that women have adequate privacy and security.

• Put in place the protection mechanisms including prevention of gender-based violence.

• Consider long term impact of response on women and men

Recovery:

Ensure that measures are designed in a way that:

- Challenge attitudes and beliefs that discriminate against women and girls
- Identify ways to involve women and men equally meaningful in decision-making and program design, implementation, and monitoring
- Ensure that women are enabled to take up leadership positions throughout the program management cycle
- Work with men to secure their support for program activities that uphold women's rights and empowerment
- Support women's right to ownership and control over strategic assets such as housing and land

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Sexual and Gender-Based Violence (SGBV) Against Women & Girls

Many factors are contributing to acts of SGBV in any setting. In situations of socio-economic instability (e.g., during and after disasters, displacements, etc.), women and girl children face additional risks and vulnerabilities.

- Raise awareness among both women and men about women's rights to live free from violence at home and in the public sphere.
- Build on and strengthen already existing social protection mechanisms against Gender-Based Violence (GBV).
- Listen to women's concerns and involve women in creating a safer and more secure environment for themselves in particular and the community in general.
- Do not assume that forms of SGBV will be brought to your attention. SGBV is often highly stigmatized and remains hidden (e.g., within the private and domestic sphere).

Guidelines on Mainstreaming Age and Disabilities

PWDs are generally denied the due resources and facilities due to lack of resources. PWDs hardly reach the realm of decision and policymaking, their fate remains in the hand of those who are more active than PWDs. Since 'normal' people are the decision-makers- they generally ignore the needs of the people with special needs on the pretext of lack of resources.

In the DRM context, all government agencies need to take into account the special needs of the PWDs in the planning and response phase of disaster management:

- Participation of PWDs should be ensured during the risk assessment. They should be facilitated with a translator and communicators of sign language

to understand their viewpoint and know their concerns, needs, and priorities regarding DRR.

- The accessibility needs of PWDs should be taken into account in infrastructure design

- Special attention should be given to PWDs in response and relief activities and their limitations should be considered in the design and implementation of response actions.

- PWDs friendly Early Warning Signs (EWS) should be developed

- Age and disability disaggregated data reporting systems should be introducing in different DRR projects and programs.

- The training and awareness material should be translated to braille and other formats to promote knowledge and education about DRR to PWDs.

14

Information Management

Information Management

Information management is an emerging field that is concerned with: The infrastructure used to collect, manage, preserve, store and deliver information. The guiding principles allow information to be available to the right people at the right time.

Managing information during a humanitarian emergency is a crucial part of any operation. The humanitarian community recognizes the importance of gathering reliable data on the locations of those affected, what they urgently need, who is best placed to assist them, and the value of this information for effective and timely humanitarian assistance.

Information Needs by Audience during Emergency Response

Following are the essential information that would be needed by stakeholders during emergency response for the planning and execution phase:

Audience	Products of their Interests
Operational Agencies	• Contact list of partners and authorities • Generic guidance applied to the context • Gaps and needs analysis based on all partners' contributions and mapping support • Meeting schedule and minutes • Policy, strategic document • Flowcharts/ guidance docs • Dashboard, snapshot • Documents available in the country language to allow national partner's full participation
Government Departments	• Contact list of partners, departments, and nominated authorities • Policy, strategic document • Gaps and needs analysis based on all partners' contributions and mapping support • Meeting schedule and minutes • Dashboard, snapshot • Who is doing, what, where, when (4-Ws)

Audience	Products of their Interests
Donors	• Overall interventions • Need - gaps analysis • Funding requirements overall and per agency • Dashboard, Snapshot • Cluster framed within the overall emergency response agreed with the Government
Beneficiary Community	• Communication tools to involve the community in the decision-making process and/or awareness-raising on the activities to implement

Information Management Chain
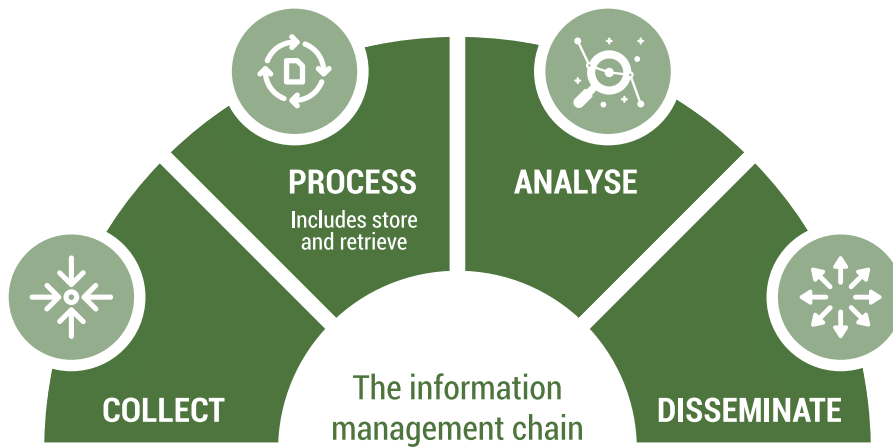
Source: OCHA ISS

Collection

This includes warnings, technical reports, assessment reports, damage needs assessments, contact details of different stakeholders, etc.

Processing

It consists of primarily technical processes that transform raw data (i.e., numbers) into a format that can be easily manipulated or combined with other data in preparation for further analysis. This includes activities such as 'cleaning', compiling from various sources, and using established storage and archiving structures.

Analysis

An analysis is a process by which data or information is aggregated and summarized for presentation.

Dissemination

The last step of the chain puts information products into the hands of policy-makers and planners at various levels.

Principles and Standards for Information Management

Accessibility

Humanitarian information and data should be made accessible to all humanitarian actors by applying easy-to-use formats and by translating information into common or local languages when necessary. Information used for humanitarian purposes should be widely available through a variety of online and offline distribution channels, including the media.

Inclusiveness

Information management and exchange should be based on a system of collaboration, partnership, and sharing. There should be a high degree of participation and ownership by multiple stakeholders, especially representatives of the affected population.

Inter-operability

All sharable data and information should be made available in formats that can be easily retrieved, shared, and used by humanitarian organizations.

Accountability

Users must be able to evaluate the reliability and credibility of data and information by knowing its source. Information providers should be responsible to their partners and stakeholders for the content they publish and disseminate.

Verifiability

Information should be accurate, consistent, and based on sound methodologies, validated by external sources, and analyzed within the proper contextual framework.

Relevance

Information should be practical, flexible, responsive, and driven by operational and decision-making needs throughout all phases of a crisis.

Objectivity

Information managers should consult a variety of sources when collecting and analyzing information to provide varied and balanced perspectives for addressing problems and recommending solutions.

Humanity

Information should never be used to distort, mislead, or cause harm to affected or at-risk populations and should respect the dignity of victims.

Timeliness

Humanitarian information should be collected, analyzed, and distributed efficiently, and must be kept up-to-date.

Sustainability

Humanitarian information and data should be preserved, cataloged, and archived so that they can be recovered for future use in areas such as preparedness, analysis, lessons learned, and evaluation.

15

DRM Planning

DRM Planning

The DRM plans define priorities and provide guidelines for DRM in the district, provide strategic directions for DRM, define resources available in the district, and describe Standard Operating Procedures (SOPs) for emergency response by the district government.

The purpose of the DRM plan is to develop a plan of action for the DDMA/U and other district stakeholders to set priorities and provide directions for DRM, define the roles of various stakeholders in DRM, and raise awareness of stakeholders about disaster risks and the requirements for DRM.

Key Stakeholders

DDMAs should consult the following stakeholders for the development of the District DRM

Plan:

- All district line departments
- Universities and research institutions in the district
- NGOs working on DRM in the district
- District level DRR Forum
- Local media (TV, radio, newspapers, magazines)
- Local business companies and groups
- Local communities
- Any other key stakeholders

Process

Following steps are involved in the DRM planning:

Step 1	Review of secondary data and literature including risk assessment
Step 2	Consultation with district stakeholders
Step 3	Prepare a draft of the District DRM Plan
Step 4	Submit the draft to PDMA/NDMA for technical review and advice
Step 5	Circulate the draft plan to all stakeholders for comments and feedback
Step 6	Organize district level workshop to seek comments on the draft plan
Step 7	Finalize the district plan based upon stakeholder comments
Step 8	Approval of the Plan
Step 9	Publish and disseminate the district plan to all relevant stakeholders
Step 10	Revision and updating of the plan

Key Priority areas

Key priority areas defined by NDMA for DRM Planning

Priority Area 1	Strengthening the district level institutional and legal system for disaster management
Priority Area 2	Prepare disaster management plans at various levels
Priority Area 3	Conduct Multi-Hazard, Vulnerability, and Risk Assessment (MHVRA)
Priority Area 4	Establish/ strengthening multi-hazard early warning system
Priority Area 5	Disaster risk management through training, education, and awareness
Priority Area 6	Strengthening DRM through disaster resilient communities
Priority Area 7	Mainstreaming DRR into development Sector
Priority Area 8	Strengthening district emergency response system
Priority Area 9	Capacity development planning for post-disaster recovery

Contingency Planning

Contingency planning is an important tool for disaster mitigation and preparedness. The impact of a disaster cannot be reduced only by taking mitigation measures.

To respond to anticipated emergencies contingency helps to determine:

- The state of preparedness
- Required resources
- Methodologies
- Coordination mechanism
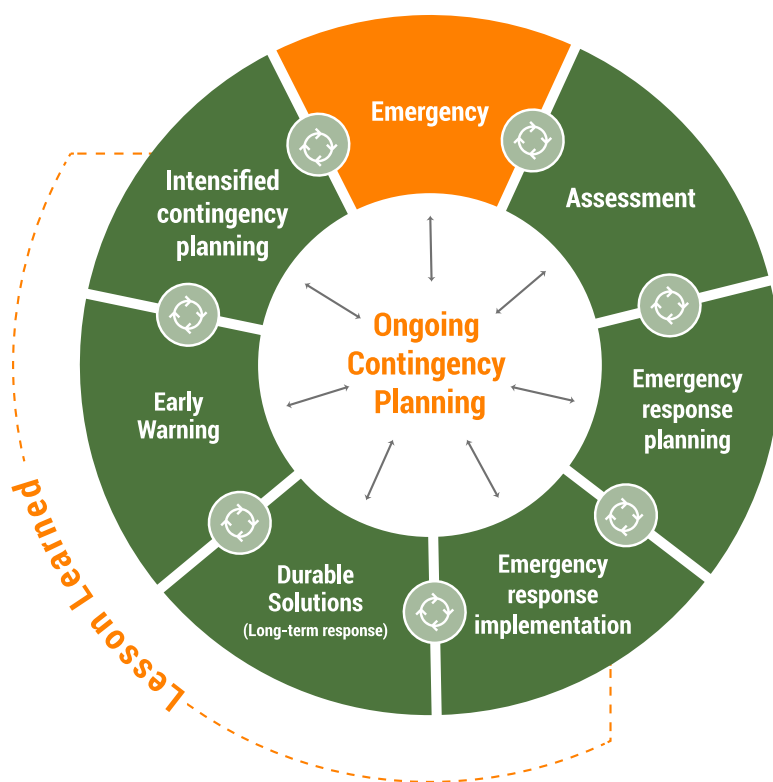
Source: NDMA Guidelines

Elements of Contingency Planning

Risk Assessment

Determining the most possible crisis scenarios and selecting one or more as a basis for planning built on the risk assessment information that may have already been done either at the national level for some key sectors. NDMA, PDMAs, DDMUs, I/NGOs, and UN agencies are useful sources for this information.

Defining and Prioritizing Contingencies

It is almost impossible to develop a contingency plan for every hazard that exists in a community, as it requires sufficient financial and human resources. To save time and resources, it may be appropriate to adopt a multi-hazard approach to developing a contingency plan.

Emergency Scenarios

It is important to envisage a worst-case scenario for designing an appropriate contingency plan. However, these scenarios are not developed in isolation rather based on the risk assessment and likely threat.

Process of contingency planning

Step 1	Threat analyses
Step 2	Co-ordination and preparing for the contingency planning process
Step 3	Context analysis, scenario building, and defining planning assumptions.
Step 4	Defining strategies and objectives.
Step 5	Defining management and coordination arrangements
Step 6	Developing response plans
Step 7	Consolidating the process and follow-up actions
Step 8	Implementation of plan
Step 9	Review the process and preparations
Step 10	Lessons learned best practices, policies.

Scenarios on Risk Identification and Assessment

Scenario 1:

If a responsible community member was to present a short report about the GLOF about their village or community and writes down that "the GLOF was heavy, overflowing its bank and that it caused a lot of damage to nearby community" with little additional information.

What kind of picture would you be able to make out?

Here even though an attempt was made to give a picture of a disaster, it does not tell us what the magnitude was, except for what could be a subjective and vague report of "a damage that has occurred in a village". There is not enough substantial information to convey the level of risk that was prevailing and the relationship between the people and the effects of the hazard (flooding) before, during, and after the event took place!

One naturally wants to know a) how many people were injured, b) how many homes and schools were washed away c) how fast and how strong the floods were. Anyone (d DRM manager) would want to know how the people are coping, where they are living, who came to assist them etc. The need to quantify comes naturally; it gives one a clearer picture of the event. Such information becomes more important especially if one is prepared to take measures to prevent such disasters from recurring again. This then leads us to develop systems or procedures to determine risk (analyze and describe) and its impact. The need to know why the community was not prepared and measures were not taken to

prevent/mitigate the effects of the flooding are very crucial to know if any DRM measures are to be successful.

The report should have included one more essential piece of information, i.e., the magnitude of the effects of the flooding. The magnitude of a disaster is usually described in terms of the adverse effects of a flood, drought, landslides, conflicts or wars has had on:

- Lives
- Property
- Infrastructure
- Environmental damage and
- The cost is attached to immediate, post-disaster recovery and rehabilitation.

The report again could have attempted to give reasons as to why the village was easily affected. This becomes necessary because the risk is relative to a particular situation for a particular group of people.

Scenario 2:

Imagine another village located a kilometer downstream and on the opposite side, and whose village elders or assembly having learned from past experiences, had taken basic but practical preventive measures to protect the village, such as planting trees or avoided cutting trees along the riversides or pathways of GLOF and building low stonewalls around strategic bends of the river, etc. They had also moved most of the huts further away from the river banks. They devised a simple early warning system and made sure that everyone was aware of their plans. They had done all these at no or minimum cost.

What would the effects of the GLOF be in this village compared to the one located upstream? The villagers' attempt to reduce the risk from the flooding will have a mitigating effect and the damage will be less.

It is a proven fact that the same hazard will have different destructive effects on the ones who have different coping capacities. The poorer the population in question the more vulnerable they are and the higher the magnitude of a particular disaster/hazard.

Simply, disaster risk is the product of the combination of three elements:

- Vulnerability (e.g., villages living near hazard areas)
- Coping capacity (better in a village with wise elders)
- Hazard (the GLOF)

Practical Scenario on Managing Risk

On one of your trips to visit your grandfather who lives in a remote village in the north of the country, you had to take a bus ride of 3 hours, then a one hour walk through a dry, brown dusty countryside, climbing hills and through dry river beds before you reach the village. The few herds of animals you come across are skinny and not well-looking. The fields are barren and the trees you had loved so much during your childhood days are nowhere to be seen. You look as far as the eye could see and not many trees are left except for the big oak tree at the center of the village. You heard about the problems the village was facing from friends but you had never anticipated the changes you observed today.

The next day your grandfather takes you for a walk and tells you about the drought they had during the last two years, how people in their desperation are cutting trees for a living, the trees that stood over their village for hundreds of years are now being sold as firewood. The herds, he said, were taken by the people to the glacier lakes for grazing, which further increases the risk of slipping rock and stones into the lake and have serious consequences on lake outburst. But on other hand, we have no alternative grazing area for animals. If the animals are sold, children are the first to suffer from loss of weight because there is no milk or food. All the young men were leaving he lamented, because there was no work and also because they are so easily attracted to the shining things from the cities. "We complained to the district administrator to do something to stop the cutting of trees or to find us some support to help us sustain this season. We had no response" says the old man in suppressed anger.

During the week, you stayed with your grandfather you tried to keep up the feelings of all around you but every day there was something that reminded you of the state of utter misery some of the villagers were experiencing; the children were too emaciated and always crying, not many people in the village, even at the village market you hardly were able to see familiar faces. The women had to go out to fetch water as early as 5:00 in the morning and coming back sometime in the afternoon. The night before you left the village you decided to do something about the situation in your village. You found out the people were willing to work in any way to mitigate the situation.

- What do you anticipate will happen; estimate the probability and magnitude of the worsening phenomenon.
- What will be your "gut" reaction and actual response as a part of district administration or DRM practitioner and, given the time, what can you do to avert the phenomenon?
- What other actions would you take to prevent similar situations from recurring in the short time and weeks to come?

- Who would be responsible for reducing this risk, and how would you approach the concerned body; how should they fix the problem?

Scenario on Response and Contingency Planning

The glacier's monitoring system generated an alert of a high magnitude GLOF in your district during the forthcoming summer season. The life, houses, and livelihood of about 15000 households residing in ten settlements from three union councils are exposed to highly to the adverse impacts of the potential hazard. The results of baseline studies and data available at the district level show that the average household size of the area is 8. 47% of the population is comprised of children, among whom 30% are below five years of age. The older people above 60 years of age, also constitute 15% of the population at risk. The major livelihood sources of the population at risk are agriculture and tourism-related jobs and businesses, which are also at high risk.

Given the above-mentioned scenario, develop emergency management or contingency plan addressing information management, logistics planning, response planning comprised of safe evacuation, shelter, water, and sanitation, distribution of food and non-food items, safety, and security, etc. because of the inclusion of vulnerable groups (women, especially pregnant women, children, old aged persons, and PWDs.)

Annexures

Annexure 1: Checklist of recommended actions before, during, and after the disaster for a common man

Different disasters require different actions. Here we present pre, during, and post-disaster actions specific to the frequent disasters of the project area.

A. Earthquake[21]

Before:

- Make sure you have a fire extinguisher, first aid kit, a battery-powered radio, a flashlight, and extra batteries at home
- Learn first aid
- Learn how to turn off gas, water, and electricity

Basic Disaster Supplies Kit

To assemble your kit store items in airtight plastic bags and put your entire disaster supplies kit in one or two easy-to-carry containers such as plastic bins or a duffel bag. A basic emergency supply kit could include the following recommended items:

- Water (one gallon per person per day for several days, for drinking and sanitation)
- Food (at least a three-day supply of non-perishable food)
- Battery-powered or hand crank radio and/or Radio
- Flashlight
- First aid kit
- Extra batteries
- Whistle (to signal for help)
- Dust mask (to help filter contaminated air)
- Plastic sheeting and duct tape (to shelter in place)
- Wrench or pliers (to turn off utilities)
- Local maps
- Cell phone with chargers and a backup batteries

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21. http://www.geo.mtu.edu/UPSeis/bda.html

- Make up a plan of where to meet your family after an earthquake
- Don't leave heavy objects on shelves (they'll fall during a quake)
- Anchor heavy furniture, cupboards, and appliances to the walls or floor
- Learn the earthquake plan at your school or workplace

During:

- Stay calm! If you're indoors, stay inside. If you're outside, stay outside
- If you're indoors, stand against a wall near the center of the building, stand in a doorway, or crawl under heavy furniture (a desk or table). Stay away from windows and outside doors
- If you're outdoors, stay in the open away from power lines or anything that might fall. Stay away from buildings (stuff might fall off the building or the building could fall on you)
- Don't use matches, candles, or any flame. Broken gas lines and fire don't mix
- If you're in a car, stop the car and stay inside the car until the earthquake stops
- Don't use elevators (they'll probably get stuck anyway)

After:

- Check yourself and others for injuries. Provide first aid for anyone who needs it
- Check water, gas, and electric lines for damage. If any are damaged, shut off the valves. Check for the smell of gas. If you smell it, open all the windows and doors, leave immediately, and report it to the authorities (use someone else's phone)
- Turn on the radio. Don't use the phone unless it's an emergency
- Stay out of damaged buildings
- Be careful around broken glass and debris. Wear boots or sturdy shoes to keep from cutting your feet
- Be careful of chimneys (they may fall on you)
- Stay away from damaged areas
- If you're at school or work, follow the emergency plan or the instructions of the person in charge
- Expect aftershocks

B.   Flood/ Flash Flood/ GLOF[22]

Before:

- Ask local officials whether your property is in a flood-prone or high-risk area. (Remember that floods often occur outside high-risk areas). Ask about

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22.   https://www.ifrc.org/docs/IDRL/-%20To%20add/Community%20Disaster%20Preparedness%20Guide.pdf

official flood warning signals and what to do when you hear them. Also, ask how you can protect your home from flooding

- Identify ghuts or natural run-offs in your area and determine whether they pose a hazard to you

- Be prepared to evacuate. Learn your community's flood evacuation routes and where to find high ground

- Talk to your household about flooding. Plan a place to meet your household in case you are separated from one another in a disaster and cannot return home. Choose a relative or friend that the family may contact to say they are okay

- Determine how you would care for household members who may live elsewhere but might need your help in a flood. Determine any special needs your neighbors might have

- Prepare to survive on your own for at least three days. Assemble a disaster supply kit. Keep a stock of food and extra drinking water

- Know how to shut off electricity, gas, and water at main switches and valves.

- Some options to consider protecting your property:
  - Make a record of your personal property. Take photographs or videotapes of your belongings. Store these documents in a safe place
  - Keep insurance policies, deeds, property records, and other important papers in a safe place away from your home
  - Avoid building in a flood-prone area unless you elevate and reinforce your home.
  - Elevate your water heater and electric panel to higher floors or levels if they are susceptible to flooding
  - Call ERT, Rescue Officials, or local Disaster Management officials for more information

During:

- In case of a flash food move immediately to higher ground. Do not wait for instructions to move

- Listen to radio or television stations for local information

- Be aware of ghuts or drainage channels and other areas known to flood suddenly, as flash floods can occur in these areas with few warning signs

- If local authorities issue a flood watch, prepare to evacuate:
  - Secure your home. If you have time, tie-down or bring outdoor equipment and lawn furniture inside. Move essential items to the upper levels
  - If instructed, turn off utilities at the main switches or valves. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water

- Fill the bathtub or clean containers with water in case water becomes contaminated or services are cut off. Before filling the tub, sterilize it with a diluted bleach solution
- Do not walk through moving water. Six inches of moving water can knock you off your feet. If you must walk in a flooded area, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you
- Do not drive into flooded areas. Six inches of water will reach the bottom of most passenger cars causing loss of control and possible stalling. A foot of water will float many vehicles. Two feet of water will wash away almost all vehicles. If floodwaters rise around your car, abandon the car and move to higher ground. IF you can do so safely. You and your vehicle can be quickly swept away as floodwaters rise

After:

- Avoid floodwaters. The water may be contaminated by oil, gasoline, or raw sewerage. The water may also be electrically charged from downed power lines
- Stay away from downed power lines and report them to the power company
- Avoid moving water. Moving water only six inches deep can cause you to lose your footing
- Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car
- Stay away from designated disaster areas unless authorities ask for volunteers
- Return home only when authorities indicate it is safe. Stay out of buildings is surrounded by floodwaters. Use extreme caution when entering buildings. There may be hidden damage, particularly in foundations
- Consider your family's health and safety needs:
    - Wash hands frequently with soap and clean water if you come in contact with floodwaters
    - Throw away food that has come in contact with floodwaters
    - Listen for news reports to learn whether the community's water supply is safe to drink
    - Listen to news reports for information about where to get assistance for housing, clothing, and food
    - Seek necessary medical care at the nearest medical facility
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewerage systems are a serious health hazard

- Also, drain and clean cisterns as they may also be contaminated
- Assess your damage and rehabilitation:
  - Take photos of your belongings and your home or videotape them
  - Separate damaged and undamaged items
  - Locate your financial records
  - Keep detailed records of cleanup costs

C. Landslides[23]

Before:

- The key to staying safe is to prepare and to have an emergency plan in place
- Find out if you live in an area where landslides could potentially happen. Landslides may also be referred to as mudslides, debris flows, mudflows, or debris avalanches
- Listen to local news and weather reports for any potential landslide watches and warnings in your area
- Talk with your family and neighbours about what you would do during a landslide.
- Identify a safe place to gather
- Have practice drills with your family, so you know what to do and are prepared
- Become familiar with the land around where you live and work so that you understand your risk in different situations
- Avoid actions that could increase instability. For example, don't undercut a steep bank; don't build near the top or base of steep slopes; don't place fill on steep slopes, and don't drain swimming pools or otherwise increase water flow down steep slopes
- Learn how to recognize the signs of potential imminent landslides. This could include slope cracks, slope bulges, an unusual seepage of water on the slope, sudden changes in streamflow, and small rocks falling
- Watch the patterns of stormwater drainage on slopes near your home, especially where runoff water converges
- Know who to notify if you see these signs. Have municipal emergency contact numbers on hand
- Have your emergency kit ready
- Make a personalized emergency kit. Families should be prepared to be self-sustaining for at least three days

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23.   https://www.redcross.ca/how-we-help/emergencies-and-disasters-in-canada/types-of-emergencies/landslides

- Kits should include practical items such as drinking water, food, cash, and a portable radio. However, they should also include items that are unique to your own families' needs. This could include baby items, medical prescriptions, pet food, etc.
- If you have already dipped into your emergency kit and food supply while staying at home, consider safely getting the supplies to replenish it following your local public health authorities' guidelines for leaving your residence
- During the COVID-19 pandemic also add hygiene items such as hand sanitizer and non-medical masks to your kit to keep your family safe during an evacuation

During:
- Be prepared to evacuate at a moment's notice
- If you suspect imminent danger evacuate immediately. Inform affected neighbours if you can, and contact your public works, fire, or police department
- Listen for unusual sounds that might indicate moving debris, such as trees cracking or boulders knocking together

If indoors:
- Find cover in the part of the building that is the furthest from the approaching landslide
- Take shelter under a strong table or a bench
- Hold on firmly and stay put until all movement has stopped

If outdoors:
- Move quickly away from its likely path, keeping clear of embankments, trees, power lines, and poles
- Stay away from the landslide area. The slope may experience additional failures for hours to days afterward

If you are in your car:
- Watch for collapsed pavement, mud, fallen rocks, and other indications of possible debris flow

After:
- Continue to take precautions and listen to and follow directions from local authorities
- Listen to the radio, watch your local news channels, and/or follow your local news outlet and/or emergency officials on social media for further instructions from officials and local leaders
- Stay away from the slide area until local officials say it is safe to enter
- Look for and report broken utility lines to appropriate authorities. Reporting

potential hazards will get the utilities turned off as quickly as possible, preventing further hazards and injury

- Check your home's foundation, chimney, and surrounding land for damage
- Replant damaged ground as soon as possible because erosion caused by loss of ground cover can lead to flash flooding
- If you suspect your home is unsafe, do not enter. Rely on the professionals to clear your home for re-entry, if you are unsure
- Experiencing a disaster is challenging enough, but during the COVID-19 pandemic, it can feel even more difficult

D. Fire[24]

Before:
- Review escape routes with your family. Practice escaping from each room
- Consider escape ladders if your residence has more than one level
- Never use flammable liquids indoors
- Never smoke near flammable liquids
- Be careful when using heating sources and cooking burners
- Keep matches and lighters up high, away from children, and, if possible, in a locked cabinet
- Never smoke in bed or when drowsy or medicated. Provide smokers with deep, sturdy ashtrays. Douse cigarette and cigar butts with water before disposal
- Has the electrical wiring in your residence been checked by an electrician?
- Sleep with your door closed
- Install fire extinguishers in your residence and teach family members how to use them

During:
- If your clothes catch on fire, you should stop, drop, and roll - until the fire is extinguished. Running only makes the fire burn faster
- To escape a fire, you should check closed doors for heat before you open them. If the door is hot, do not open. Try to escape through another door or window
- If the door is cool, open slowly and ensure fire and/or smoke is not blocking your escape route
- Crawl low under any smoke to your exit - heavy smoke and poisonous gases collect first along with the ceiling
- Close doors behind you as you escape to delay the spread of the fire

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24.   http://dumbo-isif.interlab.ait.asia/preparation-fire

Annexure 2: Hazard Watch Group Volunteers GLOF-II Project Roles & Responsibilities

Role and Purpose:

To ensure that the harmful effects of disasters are mitigated, it is essential to mobilize a workforce that can put their skills into effect when and where needed. Volunteers have various skills and resources that they can offer during a disaster. They can make an invaluable impact by increasing response capacity to disasters, assisting community members to respond to disasters, allowing professionals to focus on specialized roles. They can assist individuals, households, and communities to prepare for, respond to and recover from emergencies caused due to disasters, allowing to reduce their initial distress, ascertain needs, and support coping and adjustment during and post disasters. Potential outburst flood hazards need to be addressed from different perspectives and in coordination with Community-Based Organizations (CBOs) and community members aiming to protect life and property in the downstream of each valley, hence the importance to combine preparedness and response, small-scale infrastructures with Early Warning System (EWS)-based mechanisms downstream to address GLOF risks.

Structure of Volunteer Groups:

The GLOF-II Project aims to increase and strengthen the capacity of vulnerable communities to prepare for and respond to disasters. Therefore, it focuses on mobilizing volunteers in any given region/targeted valley in order to ensure that the community has sufficient trained resources to assist in times of need. Hence, emphasis has been placed on registering volunteers for Hazard Watch Groups (HWG) with the assistance of formed Community Based Disaster Risk Management Committees (CBDRMCs) to mitigate the adverse aftermath of potential disasters and to improve understanding of community-based and participatory approaches for the introduction and implementation of climate change adaptations initiatives at the local level. The basic structure of these is as follows:
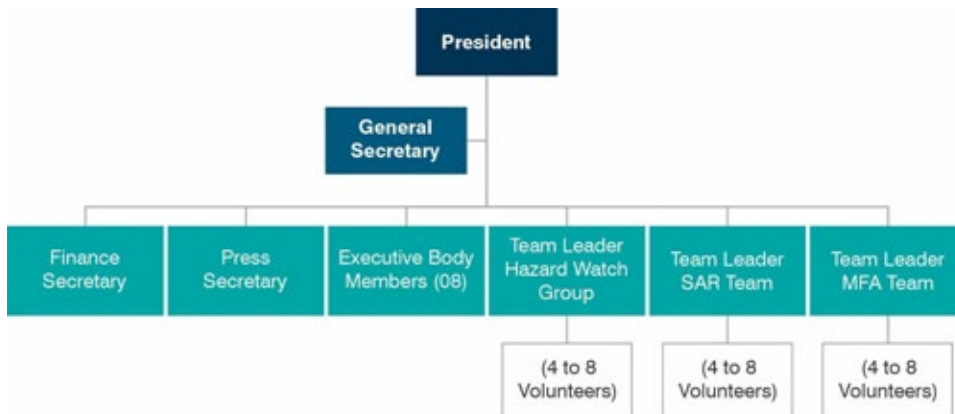
Roles Responsibilities:

- Understanding the type of disasters, its impact on affected people, and how to mitigate its adverse aftermath
- Participate in team briefings, providing updates and attending available trainings
- Executing the designated emergency action plan when required
- Providing input and feedback to relevant departments regarding emergency action plans being devised for potential disasters
- Providing First Aid and Basic Life Support to any affected people until professional assistance arrives
- Carrying out Search and Rescue in limited capacity until professional assistance arrives
- Being aware of designated safe havens in the regions and guiding affected people through the appropriate access routes
- Evacuating people from affected areas and guiding them to shelter
- Being aware of and trained in the use of the proposed mode of available and appropriate communication channels to be activated during and/or after a disaster
- Ask affected people especially marginalized groups especially women about their needs, concerns and requirements and then providing information or assistance, or directing them towards the concerned departments and/or areas
- Distributing emergency supply of food, water, tools/equipment, and other essential items as guided by relevant authorities
- Establish and record the identity of affected people in a disaster to be forwarded to concerned departments when needed
- Always work cooperatively and contribute towards team effectiveness
- Practice caution and encourage others to do so as well

a. Functions of Emergency Response Teams [25]

1. Information and Communication

Before Disaster
- To keep coordination with all the committees of the Emergency Response Team
- To use the collected information for decision making
- To keep all the committees updated on the disaster situation
- To keep in contact with other organizations and departments
- To keep all records regarding hazards, hazardous areas, and their population as well as safe places and safe ways during a disaster. Also, historical background of disaster and vulnerabilities and capacities in specific areas
- Prepare disaster preparedness, mitigation as well as Emergency Response Plan

During Disaster
- In case of disaster to inform local communities before it's happening
- To activate local response system
- To make sure information is accessible to local communities
- Write a comprehensive but brief report on the situation

After Disaster
- To collect the report from the deputy team leaders of all teams and with the help of the executive body convey it to different departments and organizations
- At the end of the response phase, collect reports, equipment, and resources used in disaster response
- Based on the analysis, report learning for the development of a future strategy

2. Search and Rescue/ Fire Fighting

Before Disaster
- To prepare teams by giving training(s) and doing regular drills
- To keep necessary equipment, tidy and ready to use

During Disaster
- To reach the disaster location as soon as possible
- To start work without wasting time
- To start searching one by one in all locations
- To search, rescue, and evacuate a victim
- To keep injured in triage
- During disaster stop the supply of gas and electricity

After Disaster
- To analyze basic damages

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25.   http://dumbo-isif.interlab.ait.asia/preparation-fire

- To prepare the detailed list of victims and hand it over to the executive body
- At the end of the response phase, collect the equipment and resources used in the disaster response phase

3.   First Aid

Before Disaster
- To select the location for first aid
- With the help of the information and communication team, identify the nearest hospital or health centre
- Give training to first aid team members
- To keep team members and equipment ready to use in disaster

During Disaster
- To keep injured in triage
- To give first aid on a priority basis
- To keep the records of all injured people before departure for the hospital

After Disaster
- To take precautionary steps to stop epidemics
- To encourage and motivate those affected
- To replenish First Aid Kit

4.   Admin and Logistic

Before Disaster
- To arrange food, shelter, drinking water, and sanitation arrangements for those affected
- To arrange transport for the delivery of equipment in the field and injured people traveling to the hospital as well as to deliver the food and nonfood items in safe areas
- To keep coordinate volunteers
- To keep all equipment in a ready to use condition
- To keep a record of all equipment

During Disaster
- To ensure that those affected by disaster have provisions to meet their basic needs
- To arrange temporary shelter and transport for those affected
- To keep close and continued coordination with other departments for relief

After Disaster
- Repair relevant equipment that has been used during disaster
- Collect relief and rehabilitation items
- To recollect useable items
- To ensure the security of the people and the aid workers who perform rehabilitation of the people affected
- Future planning

Annexure 3: List Items Provided to Hazard Watch Group (HWG)

List of rescue and relief items purchased and distributed amongst the HWG identified under GLOF-II project target valleys are as follows:

No	Item Provided
1	Sleeping Bag
2	Mattress / Mats
3	Tent
4	Sheets for rain
5	Floor mats
6	Water-proof trekking trousers
7	Rain-Coats
8	Water-proof outer jacket
9	Hiking boots with crampons (detachable)
10	Goggles/ sun-glasses
11	Walking ice axe
12	Gloves
13	Back-pack 80 liters
14	Backpack 40 liters
15	Rope (15 meters hiking rope)
16	Trekking sticks
17	Shovels
18	Stretchers

No	Item Provided
19	Complete tool kits
20	Torch headlight
21	Carabiner
22	Knives
23	First Aid Kit
24	Small Solar panels
25	Batteries
26	Invertors
27	Electric extensions
28	Walkie talkie
29	Binoculars
30	Complete tool kits (mechanical)
31	Porter Generators
32	Utensils
33	Stove Gas Cylinders
34	Wheel-barrows
35	Axes

Annexure 4: GLOF-II Project's selection criteria for target valleys

There are more than 7000 glaciers in Pakistan, 3044 glacial lakes, and 33 potentially hazardous lakes in Khyber Pakhtunkhwa (KP) and Gilgit Baltistan (GB). Due to rising temperatures, these glaciers are melting at a higher pace and they can cause a disaster downstream in the form of Glacier Lake Outburst Flood (GLOF). These sudden GLOF events can release millions of cubic meters of water and debris, which can cause damages to livelihoods, property, and infrastructure. There are 7.1 million people in GB and KP that are vulnerable to such GLOF events. Based on one study of multi-dimensional poverty, 38.8% of all people in the districts covered by the project are living in poverty, compared to a national poverty index of 27.8%.

Scaling-up of Glacial Lake Outburst Floods Risk Reduction in Northern Pakistan (GLOF-II) Project' is a continuation of the four years 'Reducing Risks and Vulnerabilities from GLOF in Northern Pakistan (GLOF I) Project' that helped communities prepare against disasters through early warning systems, enhanced infrastructure, and community-based disaster risk management. Led by the Ministry of Climate Change (MoCC), in collaboration with United Nations Development Program (UNDP) and support from the Green Climate Fund (GCF), GLOF-II aims to empower communities to identify and manage risks associated with GLOFs and related impacts of climate change.

There has been a widespread debate on the selection of valleys in GB, as some local habitants feel a lack of ownership by the stakeholders and slight neglect for not adding their valleys to the project area. The most vulnerable 24 valleys of GB and KP were selected based on scientific criteria developed by the Pakistan Meteorological Department and UNDP's technical team. Keeping in view the vast area covered by the provinces, executing interventions in all valleys of GB and KP under the umbrella of one project is beyond the scope of such developmental projects as providing due assistance requires immense resources, and such projects are focused on achieving specific results.

The selection process is a cumbersome and lengthy task involving extensive data collection, technical and on-ground assessments, and analysis using scientific knowledge by experienced professionals. The selection of valleys for the respective GLOF-II project was done through extensive on-ground assessments.

Firstly, a collective list of valleys was outlined by responsible departments, based on previous research studies, community engagements, and recommendations as well as suggestions from district administration officials. Endorsement for the vulnerability of the valleys was sought by DDMA/GBDMA/KPDMA as they are the first responders in the event of a disaster. Pakistan Meteorological Department undertook a desk assessment through satellite imagery of the targeted glaciers to formulate a vulnerability index to assess the valleys for further selection, to be included under the project mandate. At the provincial level, all such actions are endorsed by the Provincial Project Steering Committee comprising of Secretaries of the respective line departments and representatives of UNDP. The final phase of the selection process included feasibility assessments of the valleys conducted by ground-truthing teams who visit each site to assess its vulnerability to the adjacent glacier and associated risks. There is an established GIS-based assessment criterion of the selected valleys, based on which these valleys are given weightage for selection. This set criterion as used by PMD is listed below:

Settlement Area Size — 10%
Size of the Lake — 8%
Adjoining Area Slopes — 12%
Distance to Settlement — 12%
Distance from Glacier — 13%
Stability of Lake (Damming Material And Width Of Damming Wall At Outflow) — 12%
Glacier Situation (Hanging, Crevasses) — 9%
Location Of The Lake, Supra, Side Moraine, End Moraine, Englacial, Erosion — 13%
The Steepness of the Lake — 11%
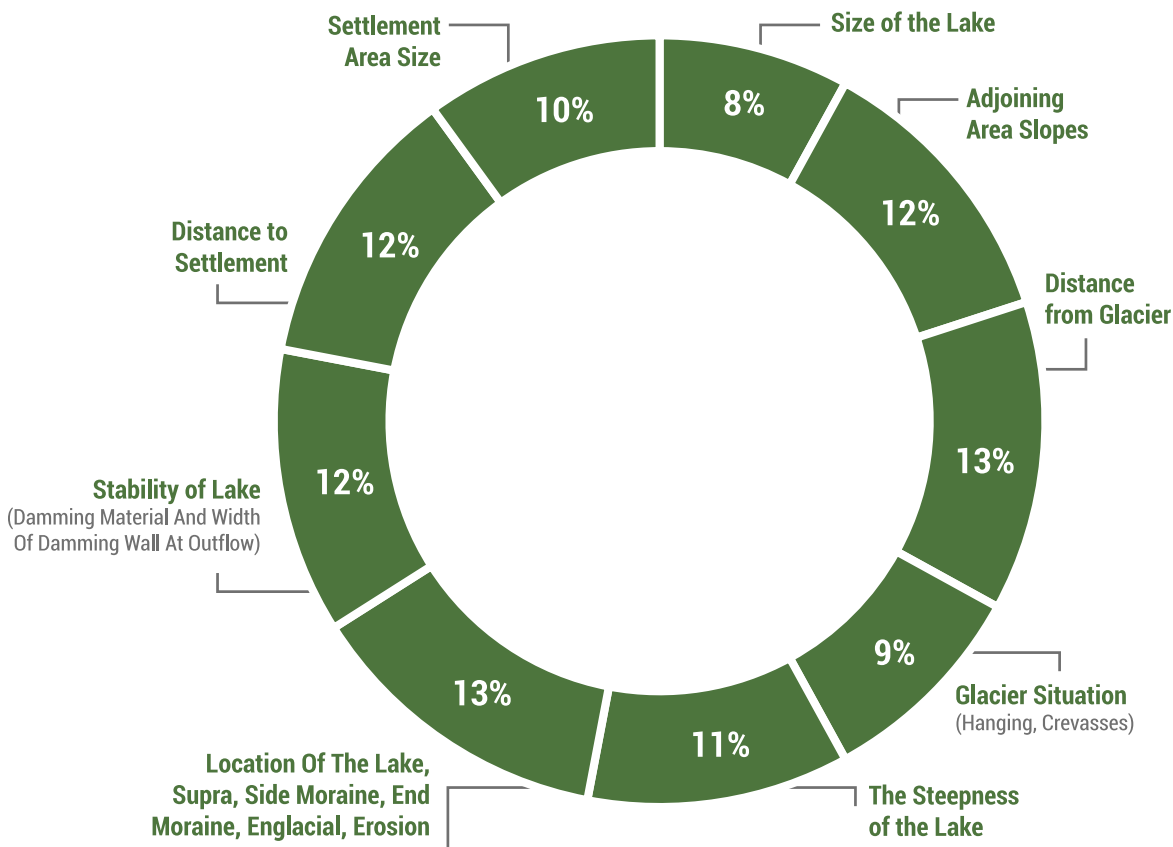
As per the rigorous selection criteria outlined above, the following 24 valleys were chosen for the project, endorsed by the Project Steering Committee at the Federal and provincial levels:

S. No.	Division	District	No of valleys (total=24)	Valley name
1.	Diamer Astore Division	Diamer	1	(1) Muthat (Nanga Parbat Massif)
2.		Astore	2	Rupal, (Tarashing) Parashing
3.	Gilgit Division	Gilgit	1	(1) Haramosh
4.		Nagar	1	(1) Hispar
5.		Hunza	3	Shispare, Ghulkin/Hussaini, Shimshal
6.		Ghizer	3	Darkut/ Darkot, Susat (3) Badswat
7.	Baltistan Division	Skardu	1	(1) Strangbut (Basho Valley)
8.		Shigar	1	(1) Arindu
9.		Ghanche	2	Barah, Khaplu
10.		Kharmang	1	(1) Ghandus
11.	Malakand, KP	Lower Chitral	2	Arkari Madaklasht
12.		Upper Dir	1	(1) Kumrat
13.		Swat	2	Utror, Gabral Matiltan
14.		Upper Chitral	1	(1) Reshun
15.		Kohistan	1	(1) Kandia
16.		Swat	1	(1) Mankeyal, Bahrain

Under this project, early warning systems comprising of automated weather stations, rain gauges, water discharge gauges, and level measuring gauges for lakes and rivers will be installed in the targeted valleys to understand the weather patterns and to foresee flood onsets. River discharge gauges/ sensors will be installed to collect river flood data to understand and predict flood peaks. Moreover, a centralized integrated data center will be established for improved surveillance and availability of data from the catchment areas.

Technological support is also provided through this project to the concerned Hazard Watch Groups in the form of equipment including communication, surveillance, relief, and rescue items. There are also capacity-building activities of the line departments to integrate GLOF risks in the Provincial Action Plans.

The locals remain fearful of the frequent onsets of unforeseen disasters and lack of resources and capacities to deal with the consequences. GLOF-II is working with full zeal to strengthen the capacities of these communities with available resources, however much more efforts are needed to be put in by local governments to become self-sufficient to deal with impending climate change impacts.

Annexure 5: List of CBDRMCs formed in KP and GB under GLOF-II project

Sr.	Name of CBDRMC	No of Members		Name of Members	Designation	Member Contact No
		Women	Men			
1	CBDRMC Arkari	11	23	Abdul kareem	Chairman	0346-2067258
				Fida Muhammad	General Secretary	0345-4931531
2	CBDRMC Madaklasht	19	21	Qazi khursheed	Chairman	0344-9701775
				Asia Bibi	General Secretary	0348-7972338
3	CBDRMC Kumrat	0	33	Rahimullah Kohistani	Chairman	0320-9610094
				Sharoon Khan	General Secretary	0320-9610092
4	CBDRMC Utror	0	34	Malek Aqil Zada	Chairman	0345-6118555
				Muhammad Khan	General Secretary	0334-4131281
5	CBDRMC Matiltan	0	40	Faridullah Chairman	Chairman	0300-9078848
				Muhammad Afzal	General Secretary	0344-9880378
6	CBDRMC Reshun	21	52	hayat-ud-din	Chairman	0321-9713183
				Muhammad Nabi Khan	General Secretary	0323-8913877
7	CBDRMC Kandiya	0	41	Abdul Aziz S/O Tajan	Chairman	0344-3901291
				Abdul Aziz S/O Sikander	General Secretary	0345-1885788
8	CBDRMC Mankiyal	0	43	Awal Khan	Chairman	0311-6940111
				Muhammad Nabi	General Secretary	0312-9135353
9	CBDRMC Golain (GLOF-I)	0	31	Khursheed Moghul	Chairman	0346-8990014
				Akbar Uddin	General Secretary	0340-2402099

Sr.No	Name of CBDRMC	No of Members		Name of Members	Designation	Member Contact No
		Women	Men			
1	CBDRMC Darkut	4	20	Zar Muhammad	Chairman	05814482685
				Abdul Rasheed	General Secretary	03554146546
2	CBDRMC Badsawat	5	16	Sherbaz Khan	Chairman	03555243819
				Didar Wali	General Secretary	03555029910
3	CBDRMC Hussaini/Gulkin	9	21	Sultan Akbar	Chairman	03555692879
				Ghulam Karim	General Secretary	03555310069
4	CBDRMC Rupal	1	29	Mushtaq Ahmed	Chairman	03555408357
				Abdul Raoof	General Secretary	03555693656
5	CBDRMC Ghandus	12	29	Syed Muhammad Taha	Chairman	03555191621
				Syed Mustafa Shah	General Secretary	03555613934
6	CBDRMC Barah	9	34	Khadim Hussain	Chairman	03555656655
				Abdullah Jan	General Secretary	03555413568
7	CBDRMC Khaplu	11	27	Niaz Ali	Chairman	03555167490
				Mazahir Hussain	General Secretary	03122127152
8	CBDRMC Shishper	8	16	Traiq Jamil	Chairman	03154855395
				Inam Ul Karim	General Secretary	03442125056
9	CBDRMC Sosat	6	21	Aman Hussain	Chairman	03555609791
				Nasir Hussain	General Secretary	03554140429
10	CBDRMC Shimshal	7	23	Shaheen Karim	Chairman	03555314880
				Didar Ali	General Secretary	03555468597
11	CBDRMC Bashoo	10	27	Johar Ali	Chairman	03554194536
				Ejaz Hussain	General Secretary	03555657548
12	CBDRMC Arindo	10	22	Hussain	Chairman	03554174662
				Mohd. Jawad	General Secretary	05815483930
13	CBDRMC Muthat	0	25	Hajat Khan	Chairman	03129720711
				Ehtisham Ayoub	General Secretary	03105598181
14	CBDRMC Haramosh	0	20	Yasir Arafat	Chairman	03555034027
				Qasim Ali	General Secretary	03452398226
15	CBDRMC Parashing	1	29	Zaheer Abbass	Chairman	03555241621
				Muhammad Nasir	General Secretary	03555607406
16	CBDRMC Hisper	0	35	Sheikh Filda Hussain	Chairman	03555078632
				Muhammad Ismail	General Secretary	03555479286

16 CBDRMCs established under GLOF-II Project's initially identified 16 valleys of Gilgit Baltistan

Annexure 6: DRM Officials Contact Details

KP DRM Officials Contact Numbers						
S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-Mail
1	Secretary	Relief, Rehabilitation & Settlement Department	Peshawar	091-9212058	091-9214025	secretary@pdma. gov.pk
2	Additional Secretary RR&SD	Relief, Rehabilitation & Settlement Department	Peshawar	091-9213250	091-9214025	N/A
3	Deputy Secretary RR&SD	Relief, Rehabilitation & Settlement Department	Peshawar	091-9223641	091-9214025	N/A
4	Director General	Provincial Disaster Management Authority	Peshawar	091-9213855	N/A	dg@pdma.gov.pk
5	Director Human Resource/ Administration	Provincial Disaster Management Authority	Peshawar	091-9213890	N/A	director.hr@ pdma.gov.pk
6	Director Relief	Provincial Disaster Management Authority	Peshawar	091-9213890	N/A	director.relief@ pdma.gov.pk
7	Director Rehabilitation	Provincial Disaster Management Authority	Peshawar	091-9216221	091-9216212	pm.parrsa@ pdma.gov.pk
8	Senior Planning Officer	Provincial Disaster Management Authority	Peshawar	091-9212212	091-9216212	waseemkundi@ pdma.gov.pk
9	Assistant Director Management Information System/ Information Technology	Provincial Disaster Management Authority	Peshawar	091 9213959	N/A	tauseef@pdma. gov.pk
10	Project Director (Provincial Emergency Operations Centre & Management Information System)	Provincial Disaster Management Authority	Peshawar	091-9214095	N/A	dd.mis@pdma. gov.pk
11	Deputy Director Infrastructure	Provincial Disaster Management Authority	Peshawar	091-9216212	N/A	amjad.khan@ pdma.gov.pk
12	In charge Provincial Emergency Operations Centre	Provincial Disaster Management Authority	Peshawar	091-9213845, 5274339, 5274625, 9213867	N/A	incharge.peoc@ pdma.gov.pk
13	WSSP Control Room/Zone-3	Water & Sanitation Services (WSSP) Peshawar	Peshawar	091-9217135	N/A	N/A

KP DRM Officials Contact Numbers					
S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-Mail
14	WSSP Control Room/Zone-2	Water & Sanitation Services Peshawar	Peshawar	091-2213595	N/A	N/A
15	WSSP Control Room/Zone-1	Water & Sanitation Services Peshawar	Peshawar	091-4445162	N/A	N/A
16	Irrigation Department	Irrigation Department	Peshawar	091-9211907 / 091-9212114	N/A	N/A
17	Director General	Provincial Disaster Management Authority	Peshawar	091-9217035	N/A	N/A
18	Agent-Pakistan MET Department	Pakistan Metrological Department	Peshawar	091-9210184 / 051-9250291	N/A	N/A
19	Media Coordinator	Provincial Disaster Management Authority	Peshawar	091-9214095	N/A	mc.parrsa@ pdma.gov.pk
20	WSSP/ General Manager Office	Water & Sanitation Services Peshawar	Peshawar	091-9217863	N/A	N/A
21	Commissioner	Establishment	Peshawar	091- 9211334	091-9214085	N/A
22	District Disaster Management Officer	Establishment/District Administration	Peshawar	091-9212304	091-9212303	N/A
23	Emergency Response Centre Control Room Cabinet Division Islamabad	National Disaster management Authority	Peshawar	051-9051413 / 051-9202528	N/A	N/A
24	DC Peshawar Control Room	Establishment	Peshawar	919211338	N/A	N/A
25	Deputy Commissioner	Establishment/District Administration	Peshawar	091-9212302	091-9212303	N/A
26	Commissioner Control Room	Establishment	Peshawar	091-9212338 / 091-9240178	N/A	N/A
27	National Disaster Management Authority Control Room	National Disaster management Authority	Peshawar	051-9205035 / 051-9202523 / 051-9205037	N/A	N/A
28	Flood Control Room Nowshera	District Administration	Nowshera	9239220099	N/A	N/A
29	Deputy Commissioner	Establishment/District Administration	Swat	0946-9240340	0946-9240329	N/A
30	District Disaster Management Officer	Establishment/District Administration	Swat	0946-9240341-9240008	0946-9240329	N/A
31	Deputy Director Planning	Provincial Disaster Management Authority	Swat	0946-725035	N/A	planning_mkd@ hotmail.com

				KP DRM Officials Contact Numbers		
S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-Mail
32	Swat Control Room	Assistant Commissioner Office Dir Upper	Swat	0946-9240225	N/A	N/A
33	Civil Defense Officer	Civil Defense KP	Swat	0344-9133355	N/A	N/A
34	Deputy Commissioner	Establishment/District Administration	Dir Upper	0944-880394	0944-881130	N/A
35	District Disaster Management Officer	Establishment/District Administration	Dir Upper	0944-880506	0944-881130	N/A
36	Dir Upper Control Room	Assistant Commissioner Office Dir Upper	Dir Upper	0944-880506 / 0944-880104	N/A	N/A
37	Civil Defense Officer	Civil Defense KP	Dir Upper	0346-9454554	N/A	N/A
38	Malakand Control Room	District Administration	Malakand	0946-9240459 / 0946-9240185	N/A	N/A
39	Commissioner	Establishment	Mansehra	0992-9310222 / 0992-9310444	0992-9310467	N/A
40	Deputy Commissioner	Establishment/District Administration	Mansehra	0997-304148	0997-305513	N/A
41	District Disaster Management Officer	Establishment/District Administration	Mansehra	0997-300751	997305513	ac.mansehra@gmail.com
42	Deputy Commissioner	Establishment/District Administration	Abbottabad	0992-9310200	0992-9310202	N/A
43	Deputy Commissioner	Establishment/District Administration	Upper Kohistan	0998-407002, 0998-405091	0998-407001, 0998-405092	N/A
44	District Disaster Management Officer	Establishment/District Administration	Upper Kohistan	0998-407029	0998-407001	N/A
45	Deputy Commissioner	Establishment/District Administration	Lower Kohistan	0998-405091, 0998-407002	0998-405092, 0998-407001	N/A
46	District Disaster Management Officer	Establishment/District Administration	Lower Kohistan	0998-405130	0998-405092	N/A
47	Deputy Commissioner	Establishment/District Administration	Battagram	0997-310030 / 0997-310136	0997-310051	N/A
48	Deputy Commissioner	Establishment/District Administration	Chitral	0943-412055 / 0943-412519	0943-412421	N/A

S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-Mail
KP DRM Officials Contact Numbers						
49	Deputy Commissioner	Establishment/District Administration	Chitral	0943 470355	N/A	N/A
50	District Disaster Management Officer	Establishment/District Administration	Chitral	0943-412368	0943-413686	N/A
51	Chitral Control Room	District Administration	Chitral	0943-412519	N/A	N/A
52	Civil Defense Officer	Civil Defense KP	Lower Chitral	0345-5646083	N/A	N/A
53	Federal Flood Commission	Federal Flood Commission	Islamabad	519505596	519260529	N/A

GB DRM Officials Contact Numbers:						
S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-mail
1	Secretary	Home Department GB	Gilgit	5811-920208	05811-920422	N/A
2	Director General	Gilgit-Baltistan Disaster Management Authority	Gilgit	5811-922030	05811-920875	walikhan1466@gmail.com
3	Director General 1122	Rescue 1122	Gilgit	5811-922074	5811-922137	N/A
4	Commissioner	Commissioner Office Gilgit	Gilgit	5811-922541/42	5811-922543	N/A
5	Deputy Commissioner	Deputy Commissioner Office Gilgit	Gilgit	5811-920100	5811-920101/502	N/A
6	Director Regional MET Office-GB	Pakistan MET Department Regional Meteorological Office Gilgit	Gilgit	5811-922463	N/A	N/A
7	Deputy Director GBDMA	Gilgit-Baltistan Disaster Management Authority	Gilgit	0314-5100181	05811-920875	zaheergbdma@gmail.com
8	Assistant Director	Gilgit-Baltistan Disaster Management Authority	Gilgit	0355-5033334	05811-920875	ghufranhunzai@gmail.com
9	Assistant Director, Logistics	Logistics, Gilgit-Baltistan Disaster Management Authority	Gilgit	0333-3605500	05811-920875	hassamddrmc@gmail.com
10	Assistant Director	District Disaster Management Authority	Gilgit	0333-5400637	N/A	shehzadbaig86@gmail.com
11	Assistant Director	Meteorological Observatory-PMD	Bagrote-Gilgit	0355-5204619 0344-3874460	N/A	N/A
12	Commissioner	Commissioner Office Baltistan	Skardu	5811-920100	5811-920127	N/A
13	Deputy Commissioner	Deputy Commissioner Office Skardu	Skardu	5811-920200	5811-920201	N/A
14	Assistant Director	District Disaster Management Authority	Skardu	0323-5518703	N/A	zubairk21@gmail.com
15	Assistant Director	Meteorological Observatory-PMD	Skardu	5815-923087	N/A	N/A
16	Commissioner	Commissioner Office Diamer-Astore	Chillas-Astore	5811-920214	5811-920216/13	N/A
17	Assistant Director	Meteorological Observatory-PMD	Chillas-Astore	5812-920134 0346-9526069	N/A	N/A
18	Deputy Commissioner	Deputy Commissioner Office Diamer	Chillas-Diamer	5811-920055	5811-920187	N/A
19	Assistant Director	District Disaster Management Authority	Diamer	0346-7433901	N/A	miraftabid@gmail.com
20	Deputy Commissioner	Deputy Commissioner Office Astore	Eid Gah-Astore	5811-920100	5811-920294	N/A
21	Assistant Director	District Disaster Management Authority	Astore	0332-5594585	N/A	imtiaz_qurashi@hotmail.com

GB DRM Officials Contact Numbers:					
S#	Designation Officers/Officials	Department	Location/ District	Tel Office	Fax	E-mail
22	Deputy Commissioner	Deputy Commissioner Office Ghanche	Khaplu-Ghanche	5811-920100	5811-920104	N/A
23	Assistant Director	District Disaster Management Authority	Ghanche	034-68487929	N/A	nasirgis4@gmail.com
24	Deputy Commissioner	Deputy Commissioner Office Ghizer	Gahkuch-Ghizer	5811-920100	5811-921097	N/A
25	Deputy Commissioner	Deputy Commissioner Office Kharmang	Ghoari-Kharmang	5811-927000	5811-15-927055	N/A
26	Deputy Commissioner	Deputy Commissioner Office Shigar	Shigar Khas	5811-924000	5811-15-924011	N/A
27	Deputy Commissioner	Deputy Commissioner Office Nagar	Chalt-Nagar	5811-922001	5811-922026	N/A
28	Deputy Commissioner	Deputy Commissioner Office Hunza	Aliabad-Hunza	5811-920100	5811-920107	N/A
29	Assistant Director	Meteorological Observatory-PMD	Hunza	0355-5165840 0346-2855999	N/A	N/A
30	Assistant Director	Gilgit-Baltistan Disaster Management Authority	Hunza	0344-5135168	N/A	mahayatali5@gmail.com
31	Assistant Director	Gilgit-Baltistan Disaster Management Authority	Ghizer	0355-5280072	N/A	alitajik85@gmail.com

Annexure 7: GLOF-II Project Officials Team Details

S#	Officers	Designation/ department	Location	Tel Office	Email
1	Misbah Zafar	National Project Manager	Islamabad	051-8355795	misbah.zafar@undp.org
2	Abdul Basit	Provincial Project Coordinator - GB	Gilgit Baltistan	05811-920678	abdul.basit@undp.org
3	-	Provincial Project Coordinator - KP	Khyber Pakhtunkhwa	094 3414699	-
4	Iqtidar Ul Mulk	Field Officer	Chitral - KP	091-5845239	iqtidar.ul.mulk@undp.org
5	Rashid ud din	Field Officer	Skardu - GB	05815-90184	rashid.din@undp.org

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