SINDH DISASTER MANAGEMENT POLICY

- SDMP

Provincial Disaster Management Authority

Rehabilitation Department
Government of Sindh

March, 2023

Chief Minister's Message

SYED MURAD ALI SHAH

Advisor to CM for Rehabilitation & Relief's Message

RASOOL BUX CHANDIO

Chief Secretary's Message

DR. MUHAMMAD SOHAIL RAJPUT

Secretary Rehabilitation's Message

MUHAMMAD ALI KHOSO

DG PDMA's Message

SYED SALMAN SHAH

PREFACE

The events during last 30 years (1991-2020) show that the frequency of global natural disasters in 2021 was 13% higher, with 81% lower in deaths, 48% less in the affected population, and 82% more in direct economic losses. Global flood disasters in 2021 were the most frequent, 48% more than the historic levels[1]. This indicates a significant rise in frequency of disastrous events, particularly hydrometeorological disasters. These figures suggest one more important aspect of the reduction in deaths and affected population. This can be attributed to more robust forecasting systems, better preparedness, structured disaster management frameworks, more awareness and alike. On the other hand, direct economic losses have been exponentially increased up to 82% which signifies the two aspects i.e., i) intensity / magnitude of disasters is increased, ii) disaster events are occurring in human settings and tearing the socio-economic fabric. This is an alarming trend for nations with meager and fragile economies because disaster and development are two faces of a coin and have direct relationship with each other. Development increase disaster risks and disasters jeopardize development.

Disaster Management in Pakistan is relatively new subject so the associated authorities. Before 2005, limited response to the extent of relief were operational through Relief Commissioners. Senior Member Board of Revenue in each province was provincial Relief Commissioner with limited operations. During the 2005 earthquake in Kashmir the importance of dedicated disaster management institute was realized to manage and coordinate rescue, relief, recovery, and rehabilitation efforts for such high impact disaster. It was 2010, when disaster management act was passed by national assembly of Pakistan and formal disaster management authorities at national and provincial level came into being. Initial years of disaster management authorities spent in institutional capacity building with gradual steps in vertical and horizontal expansion of overall disaster management in the country. Response to disasters by the

[1] 2021 Global Natural Disaster Assessment Report (https://reliefweb.int/report/world/2021-global-natural-disaster-assessment-report)

authorities has significantly improved over the years but still improvements are required to extend service delivery in all phases of disaster management. Occurrence of consecutive disaster events in one province or other or across the country have necessitated for changing existing disaster management practices to overcome challenging events which had happened and may likely to continue in future due to climate change effects.

Physiographically Sindh province is situated in tail of river Indus and has long coastal belt. Though Indus and coastal belt is blood line for the province but at the same time pose residual risks of riverine floods, cyclones and tsunami in addition to various other hazards associated with the geographical location. A series of successive disastrous events have provided both challenges and opportunities for the government, relevant departments, and sectors. Though provincial disaster response is drastically improved but still emerging scenarios demand implementation of disaster risk reduction approach to absorb disaster shocks and economic losses. The real win-win situation for the province will be when all disaster risk reduction systems are in place and integrated to reduce all kinds of losses and damages. In achieving this objective, both structural and non-structural measures are necessary to be established and put in place for implementation. Institutionalization of disaster management, provision of policies, guidelines, procedures, framework, roles, and responsibilities are equally important. Policies provide a framework on what to do and how to do in a systematic and organized manners and provide integration of all possible resources to harmonize actions for achieving better results.

Sindh Disaster Management Policy (SDMP) is awaited and timely initiative. The policy aims to lay the foundation for disaster management and specifically disaster risk reduction. SDMP integrates all possible actors and actions combined in a way to produce multiplying and additive results and outcomes. It is holistic document to encompass all likely situations based on experience and cater likely future scenarios. As matter of fact, policies and other frameworks are live documents and require periodic upgradation based on situations and scenarios. Therefore, SDMP will serve a tenure of 10 years and is required to be reviewed after 10 years or after occurrence of any major disaster in the province to abreast the changing and dynamic scenarios.

Benefits of SDMP are embedded in its implementation in true letter and spirit and only integrated disaster management and disaster risk reduction approach will bring desired objective and results.

CHAPTERS

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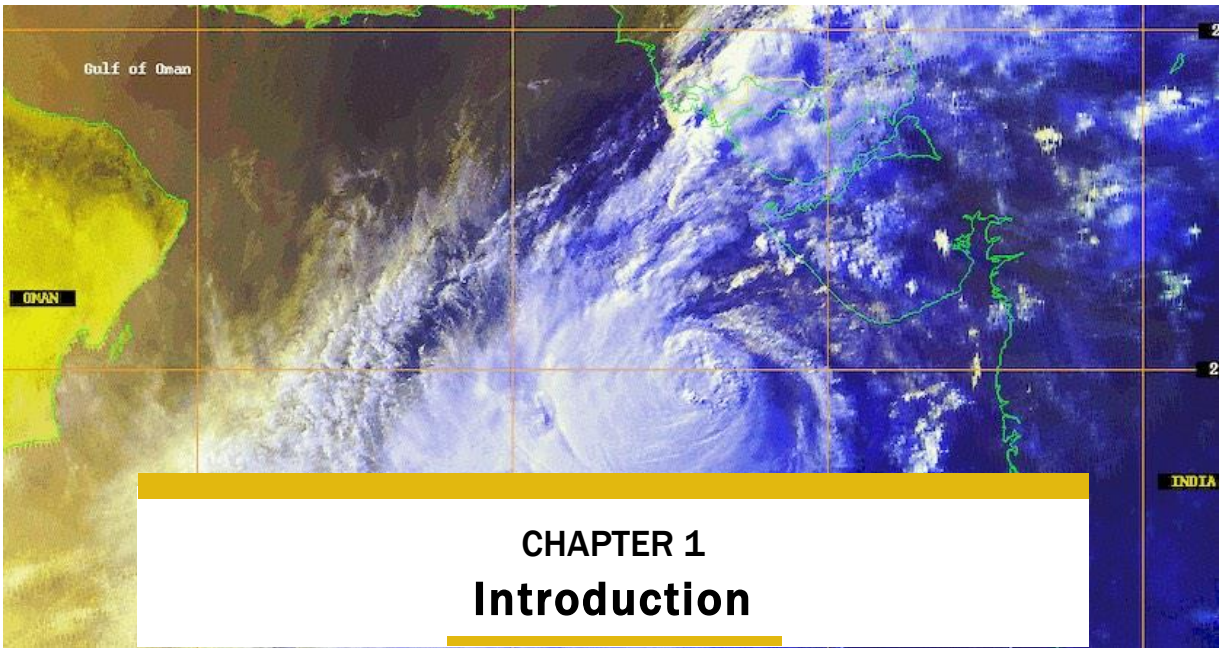


CHAPTER 1

Introduction

1. DISASTER MANAGEMENT STRUCTURE IN SINDH

A reactive emergency response approach remained predominant in Pakistan till 2010. The emergency response was governed by the Calamity Act 1958. The system was composed of Relief Commissionerate at provincial level and an Emergency Relief Cell (ERC) in Cabinet Secretariat for organizing response at Federal level. After promulgation of National Disaster Management Act 2010 and creation of National Disaster Management Authority (NDMA), a three-tiered response system was established i.e., National Disaster Management Authority (NDMA) at national level, Provincial Disaster Management Authorities (PDMAs) at provincial level and District Disaster Management Authorities (DDMAs) at district level. At provincial level, Provincial Disaster Management Authority is lead agency and oversight on implementation, coordination, and assessments of ongoing risk reduction efforts or on-the-ground emergency responses. PDMAs are tasked with examining provincial vulnerabilities to different disasters and specifying prevention or mitigation measures.

1.1. Provincial Disaster Management Commission (PDMC)

Composition

Provincial Disaster Management Commission (PDMC) is an epic body to oversee disaster management in the province. The Commission was constituted under Disaster Management Ordinance 2006

which became NDM Act in 2010. Composition of PDMC is;

a) The Chief Minister of the Province as Chairperson, ex officio.

b) Leader of the opposition and one member nominated by him to be a member of the provincial disaster commission.

c) Other members to be nominated by Chief Minister; and

d) The Chairperson of the Provincial Commission may designate one of the members nominated under clause (c) to be the Vice-Chairperson

Composition of notified Commission for the province is;

Sr.#	Commission	Role
1	Chief Minister	Chairperson/Ex-Officio
2	Chief Secretary	Member
3	Leader of the Opposition	Member
4	Nominee of the Leader of the Opposition	Member
5	Minister/ Advisor Finance	Member
6	Minister for Revenue, Relief & Rehabilitation	Member
7	Minister for Irrigation	Member
8	Minister for Works & Services	Member
9	Minister for Local Government	Member
10	Minister for Health	Member
11	Minister for Information	Member
12	Senior Member, Board of Revenue/ Relief Commissioner	Member
13	Secretary Rehabilitation	Member
14	Director General, PDMA Sindh	Member/ Secretary
15	Representative of FPCCI	Member
16	Representative of Chamber of Agriculture	Member
17	Representative of Sindh Abadgar Board	Member
18	Representative of KCCI	Member

Mandate

The Commission is a strategic level planning body with following mandate;

a) Lay down the Provincial disaster management policy.

b) Lay down the Provincial Plan in accordance with the guidelines laid down by the National Commission.

c) Approve the disaster management plans prepared by the departments or Provincial Disaster Management Authorities.

d) Review the implementation of the plan.

e) Oversee the provision of funds for mitigation and preparedness measures.

f) Review the development plans of the different departments of the province and ensure that prevention and mitigation measures are integrated therein.

g) Review the measures being taken for mitigation, capacity building, and preparedness by the departments of the Provincial Government and issue such guidelines or directions as may be necessary.

1.2. Board of Provincial Disaster Management Authority

Composition

To streamline and expediate disaster management activities, a board was established in 2014 and re-constituted in 2016.

The board is composed of;

Sr.#	Board	Role
1	Minister Rehabilitation	Chairman
2	Chairman Zakat Council	Member
3	SMBoR/ Relief Commissioner, Board of Revenue	Member
4	Secretary, Zakat Department	Member
5	Secretary, Finance Department	Member
6	Secretary, Rehabilitation Department	Member
7	Secretary, Irrigation Department	Member

Sr.#	Board	Role
8	Secretary, Local Government & HTP Department	Member
9	Secretary, Health Department	Member
10	Director General, PDMA	Member
11	Director (Operations) PDMA	Member
12	Director (F&A) PDMA	Member/Secretary

Mandate

The PDMA Board is operational level planning body with the following mandate;

a) Formulate the provincial disaster management policy and obtain the approval of the PMDC

b) Coordinate and monitor the implementation of the National Policy, National Plan, and Provincial Plan

c) Examine the vulnerability of different parts of the province to different disasters and specify prevention and mitigation measures

d) Lay down guidelines to be followed for the preparation of disaster management plans by the Provincial Departments and District Authorities

e) Evaluate preparedness at all governmental and non-governmental levels to respond to disaster and enhance preparedness

f) Coordinate response in the event of disaster

g) Give directions to any Provincial department or authority regarding actions to be taken in response to disaster

h) Promote general education, awareness, and community training in this regard

i) Provide necessary technical assistance or give advice to district authorities and local authorities for carrying out their function effectively

j) Advise the provincial government regarding all financial matters in relation to disaster management

k) Ensure compliance inclusion and compliance of disaster risk reduction

measures in development projects and schemes

l) Ensure that communication systems are in order and disaster management drills are being carried out regularly; and,

m) Perform other functions assigned by National or Provincial Commission.

n) Provincial Disaster Management Authority (PDMA)

o) The Provincial Disaster Management Authority is the operational arm of the disaster management system in Sindh. The authority coordinates and implements disaster management programs in the province. The PDMA was established after NDM Act 2010 and Act defines Provincial Authority as;

p) The Provincial Authority shall be a body corporate having perpetual succession and a common seal with power, subject to the provisions of this Act to acquire and hold property both movable and immovable and may by the said name sue and be sued;

q) The Provincial Authority may appoint such officers, advisors, experts, consultants, and employees as it may consider necessary for the efficient performance of its functions on such terms and conditions as it may deem suitable.

r) The Provincial Authority may constitute financial, technical, and advisory committees as may be deemed necessary for carrying out the purposes of this Act.

s) The Provincial Authority may, by general or special order, delegate to the committees any of its power or function under this Act subject to such conditions as it may deem fit.

Responsibility and Functions

The Act delegates the same power and functions to PDMA as of PDMA Boards mandate, however, PDMA Board mainly acts as operational planning body while, PDMA is executing and implementing body and conducting operational disaster management activities in the province.

1.3. District Disaster Management Authority (DDMA)

Responsibility and Functions

To extend disaster management to grass root level, District Disaster Management Authorities have been placed at district level. DDMA is headed by the respective Deputy Commissioner of the district. Currently, 30x District Disaster Management Authorities operate in each district of the province. The functions of DDMAs are;

a) Prepare a disaster management plan including district response plan for the district;

b) Co-ordinate and monitor the implementation of the National Policy, Provincial Policy, National Plan, Provincial Plan and District Plan;

c) 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;

d) Ensure that the guidelines for prevention, mitigation, preparedness and response measures as laid down by the National Authority and the Provincial Authority are followed by all departments of the Government at the district level and the local authorities in the district;

e) 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;

f) Lay down guidelines for preparation of disaster management plans by the departments of the Government at the districts level and local authorities in the district;

g) Monitor the implementations of disaster management plans prepared by the departments of the Government at the district level;

h) Lay down guidelines to be fol1owed by the departments of the Government at the district level;

i) Organize and co-ordinate specialized training programmes for different levels of officers, employees and

voluntary rescue workers in the district;

j) Facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organizations;

k) Set up, maintain, review, and upgrade the mechanism for early warnings and dissemination of proper information to public;

l) Prepare, review and update district level response plan and guidelines;

m) Co-ordinate with, and give guidelines to, local authorities in the district to ensure that pre-disaster and post-disaster management activities in the district are carried out promptly and effectively;

n) Review development plans prepared by the departments of the Government at the district level, statutory authorities, or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;

o) Identify buildings and places which could, in the event of disaster situation; be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places;

p) Establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;

q) Provide information to the Provincial Authority relating to different aspects of disaster management;

r) Encourage the involvement of non-governmental organizations and voluntary social-welfare institutions working at the grassroot level in the district for disaster management;

s) Ensure communication systems are in order and disaster management drills are carried out periodically; and

t) Perform such other functions as the Provincial Government or Provincial Authority may assign to it or as it deems necessary for disaster management in the district.

Composition

S. #	Committee Representative	Role
1	Deputy Commissioner	Chairperson
2	Additional Deputy Commissioner	DDMO
3	Senior Superintendent of Police	Member
4	Assistant Director Local Government	Member
5	District Information Officer	Member
6	Cantonment Officer (Where Applicable)	Member
7	District Health Officer	Member
8	District Education Officer	Member
9	District Food Controller	Member
10	Deputy Director Civil Defense	Member
11	District Officer Social Welfare	Member
12	District Officer Livestock	Member
13	District Chairmen Zakat	Member
14	Executive Engineer (Works and Service)	Member
15	Executive Engineer Irrigation	Member
16	Executive Engineer Public Health	Member
17	Municipal Commissioners /CMOs/TMOs	Member(s)
18	Representative Officer of Armed Forces	Member
19	Two Elected Representatives Nominated by The Chair	Member
20	Two Representatives of NGOs/Civil Society	Member
21	Two Representatives of Business Community	Member
22	Representatives of Agriculture and Livestock Department	Member
23	Representatives of NHA	Member
24	Representatives of Electric Supply Corporation	Member
25	Representatives of SSGC	Member
26	Representatives of Red Crescent	Member

S. #	Committee Representative	Role
27	Representatives of Sindh Scouts	Member
28	Representation of Volunteers from Communities of Risk	Member(s)

2. REFORMS IN DISASTER MANAGEMENT STRUCTURE

The disaster management structure is sufficient for management of small scale or localized disasters, however, over the years of experience in managing disasters, it is observed that efficacy of the system stretches to beyond limits when disaster is large scale in nature and extent of disaster crosses to multiple districts. The riverine flood of 2010, urban floods of 2020 and 2022 are such events in which the majority of the territorial land of the province was affected concurrently. Such situations demand reforms for swift response and better service delivery. In wake of the demanding situation the structure has been extended to Taluka and Union Council levels.

The extension of disaster management structure to community level will greatly improve the performance of disaster management in the province. Details of structural reforms are;

2.1. Taluka Disaster Management Committee (TDMC)

Responsibility

a) The TDMC shall work as front-line body for disaster management in the district and shall ensure implementation of disaster management measures set by DDMA and PDMA

b) The TDMC shall interact directly with communities at risk in disaster preparedness, disaster risk reduction and response

c) The TDMC shall bridge between government and communities in disaster response

d) The TDMC shall coordinate between DDMA, PDMA and all stakeholders working at grass-root level in pre, during and post disaster events

Functions

a) Identification and updation of all hazards in their respective locations and conduct of risk and vulnerability

analysis and communicate to DDMA and subsequently to PDMA

b) Ensure that the officers and employees are trained in disaster management

c) Ensure that resources relating to disaster management are maintained and readily available for use in the event of any disaster situation

d) Coordinate and monitor disaster management plans, mainstreaming operations in the district and over all disaster management initiatives

e) Land use planning and zoning within the municipality / jurisdiction by preparing master plans while keeping the multi hazard of the municipality and Taluka in context

f) Ensure the implementation of bylaws related to encroachment at hazardous places, building codes, land use planning and hazard zonation etc.

g) Identify evacuation/shelter places in face of any disaster/emergency

h) Monitor the disaster management activities of NGOs, UCDMCs and other sectors

i) Share initial damage and needs assessment reports to DDMA and subsequently to PDMA

j) Carry out relief, rehabilitation and reconstruction activities in the affected areas in accordance with the DDMA and PDMA

Composition

Sr.#	Committee	Role
1	Assistant Commissioner	Chairperson
2	Mukhtiarkar	Secretary
3	Town Municipal Officer (TMO)	Member(s)
4	Sub Divisional Police Officer	Member
5	Taluka Education Officer	Member
6	Medical Superintendent Taluka Level Medical Facility	Member
7	Representative from Civil Defense	Member
8	Representative from Social Welfare Department	Member
9	Representative from Livestock Department	Member

Sr.#	Committee	Role
10	Assistant Engineer (Works and Services)	Member
11	Assistant Engineer Irrigation	Member
12	Assistant Engineer Public Health	Member
13	Two Representatives of NGOs/Civil Society	Members
14	Two Representatives of Business Community	Members
15	Representative of Agriculture and Livestock Department	Member
16	Representative of Electric Supply Corporation	Member
17	Representative of SSGC	Member
18	Representative of Red Crescent	Member
19	Representative of Sindh Scouts	Member
20	Representation of Volunteers from Communities at Risk	Member

2.2. Union Council Disaster Management Committee (UDMC)

Responsibility

a) UCDMC shall work as front-line, first responder body at village/ mohalla / ward level.

b) Assist TDMC, DDMA and PDMA especially in disaster response.

c) Encourage and keep record of volunteers in Union Council.

d) Formulate different groups to respond to disaster and emergency events such as evacuation group, camp management group etc. and share this record with TDMC, DDMA and PDMA.

e) Prepare awareness and capacity development proposals and training programs and follow-up with TDMC, DDMA and PDMA for arranging such events at grass root level.

Functions

a) Identification and updation of all hazards in their respective locations and conduct of risk and vulnerability analysis and communication with TDMC, DDMA and subsequently with PDMA.

b) Prepare/update UC level disaster management plan for emergent

hazards or new hazards caused by any disaster event.

c) Make an analysis of disaster risk and to prepare a list of vulnerable villages and areas of the concerned union councils.

d) Mobilize community for maintaining public ways, public streets, culverts, bridges and public buildings, de-silting of canals and other development activities.

e) Coordinate with the villages in case of emergency to get quick information about the severity and extent of a disaster impact and report it to the TDMC and DDMA.

f) Report cases of handicapped, destitute, and socially excluded groups to TDMC, DDMA and PDMA to streamline their special needs in relief and response operation.

g) Mobilize and coordinate the work of volunteers and ensure community participation.

h) Conduct search and rescue operations in coordination with the rescue teams and Police.

i) Provide assistance to other agencies for mobility/transport of staff, including rescue parties, relief personnel and relief materials. Communicate with the TDMC, DDMA or PDMA for required additional resources.

j) To monitor NGO activities and provide necessary support to ensure community participation by establishing coordination mechanisms among NGOs and local communities.

Composition

Sr.#	Committee Representative	Role
1	UC Chairman / Administrator	Chairperson
2	Secretary UC	Secretary
3	Station House Officer (Police) – Concerned	Member
4	Two Representatives of NGOs/Civil Society	Members
5	Representation of Volunteers from Communities at Risk	Members
6	Representation of Renowned Persons	Members

2.3. Modus operandi to realize structural reforms in Provincial DM

The following procedure shall be applied to implement above mentioned structural reforms in provincial disaster management system.

a) The PDMA Board shall thoroughly review and examine responsibilities, functions and composition of Taluka and Union Council Disaster Management Committees and determine practical implementation of reforms and shall notify the Committees.

b) Once Committees are notified, it will be considered bidding for Committees to operate as per defined responsibilities and functions.

c) PDMA shall monitor the performance of Committees for all disaster related activities and in case of any deficiency shall propose changes in responsibilities, functions, or composition. Such recommendations shall be brought in PDMA Board meeting for decisions.

2.4. PDMC and PDMA Board Meetings

a) PDMC meeting shall be conducted once a year before the start of monsoon / flooding season to review the preparedness of disaster management authorities and all stakeholder departments and shall provide strategic guidance.

b) PDMC special meeting shall be called after every major disaster in province to discuss and evaluate performance of relevant departments, policies, and procedures. In case of any shortcomings, PDMC shall guide the PDMA Board to review and align procedures and actions to meet challenging situations.

c) PDMA Board meeting shall be conducted twice in a year i.e., i) before monsoon / flood season ii) post monsoon to review the overall situation and performance of disaster management authorities and committees. The Board shall also review the performance of stakeholder departments. The assessment / proceedings of the meeting shall be shared with PDMC for appraisal.

d) In case of any emergency / disaster meeting shall be called any time to discuss and oversight the disaster response. The Chairman of Board shall apprise the PDMC on response strategy. PDMA shall be responsible for executing and implementing the response strategy recommended by the Board.

3. FORMATION OF EXECUTIVE COMMITTEE

During disasters, demanding situations require immediate decisions and actions to support disaster response and relief. For oversight and urgent decision making a committee shall be formed comprising;

a) Minister / Advisor to Chief Minister on Rehabilitation (Chairman)

b) Secretary Rehabilitation Department (Member)

c) Secretary, Health Department (Member)

d) Director General, PDMA

ToRs of the Committee shall be as follows;

a) Oversee and decide on emergency procurement matters

b) Organize and manage disaster response and relief

c) Identify and engage resources available with different departments in relief operation

d) Identify and engage useful sources and resources to support disaster response and relief

e) Any other emerging and pertinent matter to enhance effectiveness of disaster response and relief.

4. SCOPE AND OBJECTIVES OF DISASTER MANAGEMENT POLICY

4.1. Background

Disasters - natural or man-made, cost lives and livelihoods and bring serious disruption to humans, materials, economy, and environment. The occurrence of disasters requires immediate spending needed for response and reconstruction which is compounded by weakened economy, damaged infrastructure, destroyed businesses, reduced tax revenues, and rise in poverty levels. The poorer a community is, the more vulnerable it is to natural hazards and climate change. Disaster and development nexus are such that disaster limits development, development causes

disaster risks and development reduce disaster risks by overcoming vulnerability. Thus, development and disaster represent two sides of the same coin and need to be dealt with in unison. The lack of consideration of disaster risks in the development process lead to investments in constructing and reconstructing risks which perpetuate the conditions for unsustainable human development and the scarce resources originally programmed for development are diverted into relief and response. As a result, the achievement of poverty alleviation, good governance and other related goals becomes more difficult.

There are two approaches to deal with the disasters;

a) To consider disaster as unavoidable and focus on providing relief and response as early as possible after the disaster to prevent further loss of life and damages.

b) To recognize disasters as failures of development or as the result of unsustainable development.

Both approaches have pros and cons, but the second approach is more robust and encourages better disaster preparedness, leading to reduced life losses and damages.

In present era, disaster management paradigm of how we "prepare for, respond to and learn from the effects of major failures" is changed to "reduce disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events".

In changing weather and climate scenarios, the scope of disaster management is changed from reactive to proactive approach. Disaster Risk Reduction and Disaster Resilience are contemporary practices in disaster management. Both approaches demand pro-active actions for reduced fiscal shocks and ensure sustainable development at any jurisdiction or administrative level.

In view of forgoing, it is utmost important to organize and structure disaster management system in the province. Sindh Disaster Management Policy is a governing instrument for disaster management in the province. It is a strategic document to provide insights and broader layouts of procedures to be adopted and a vision for disaster risk reduction in the province.

4.2. Scope

The Sindh Disaster Management Policy (SDMP) is a governing and guiding

document for disaster management in the province. SDMP shall be applicable in entire provincial territory. It applies to all departments under the administrative control of government of Sindh, departments, or affiliated offices under the control of federal government / autonomous bodies, cantonments boards and other authorities, national and international non-governmental organizations, philanthropist organizations, civil society, other bodies, and groups functioning within provincial territory. All relevant actors shall adhere to and ensure compliance of SDMP and shall play their role in disaster risk reduction for integrated disaster risk management.

4.3. Objectives

The objectives of SDMP are;

a) Provide strategic insight for disaster management in the province

b) Provide guiding and governing principles and procedures

c) Layout well-structured disaster preparedness, mitigation, response, relief, recovery, and rehabilitation strategy

d) Layout and implement integrated disaster risk reduction and management

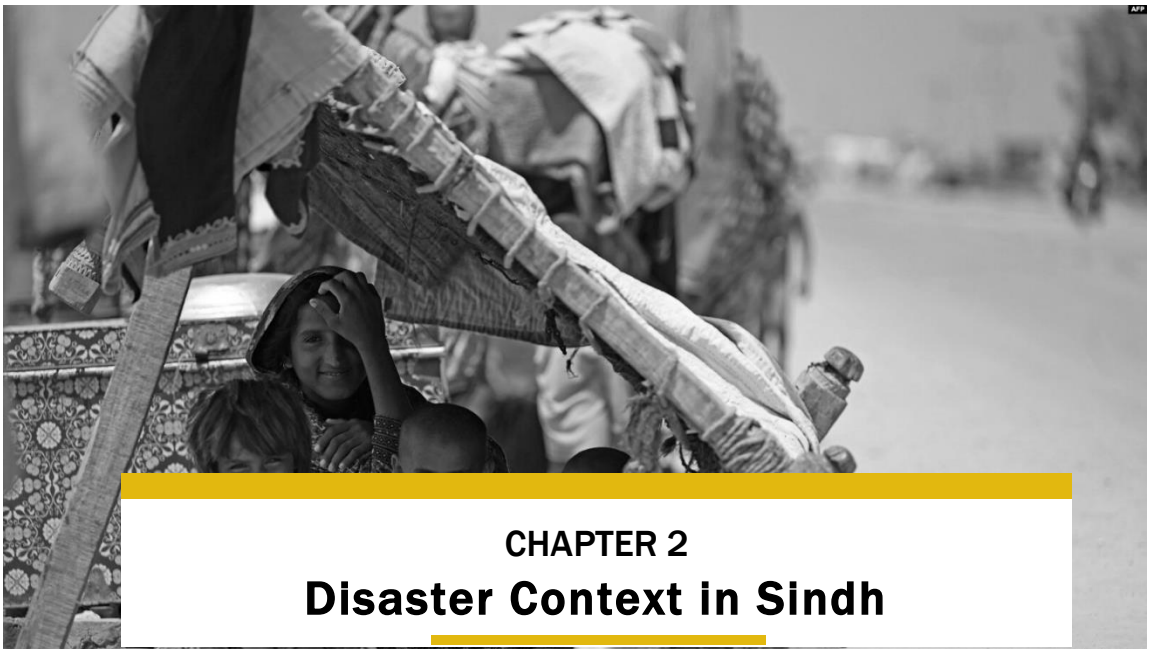
e) Streamline disaster management procedures and protocols

f) Advancing disaster management from reactive to proactive approach

g) Assign clear roles and responsibilities to all relevant stakeholders which directly or indirectly influence disaster risks and disaster management

4.4. Validity of SDMP

In normal circumstances, the policy shall be valid for 10 years and shall be reviewed to ensure and include new and emerging scenarios. However, if felt necessary policy shall be reviewed after each major disastrous event to assess its effectiveness and relevant sections shall be changed and approved on requirement. Changes in policy shall be notified and communicated to all stakeholders through the PDMA Board.



CHAPTER 2

Disaster Context in Sindh

1. ABOUT SINDH

1.1. Geography

Province of Sindh is in the south-eastern part of Pakistan covering an area of 140,914 Sq. km which is approximately 18% of the total area of the country. The province consists of 8.0 million hectares of cultivable land out of 14 million hectares. While remaining part of the province consists of Khirthar Range, Thar Desert, and the riverine area. Annual average precipitation lies between 6 to 7 inches. The river Indus flows in the middle of the province. Seasonal streams emanating from the Khirthar range become active in the monsoon season and fallout in River Indus and Arabian Sea. Landuse / Landcover (LULC) map of Sindh province is given in Figure 1.

1.2. Geology

Geology of Sindh is divisible in three main categories; the mountain ranges of Kirthar, Pab containing a chain of minor hills in the west and Thar Desert in the east and exposure of Karoonjhar Mountains, which is famous for production of Granite. In the north, Sindh is covered by rocks of Laki range extending to Suleiman range while southern most part is encircled by the Arabian Sea. Mostly, rocks are of sedimentary origin of clastic and non-clastic nature that belong to marine, partly marine and fluviatile depositional environments.

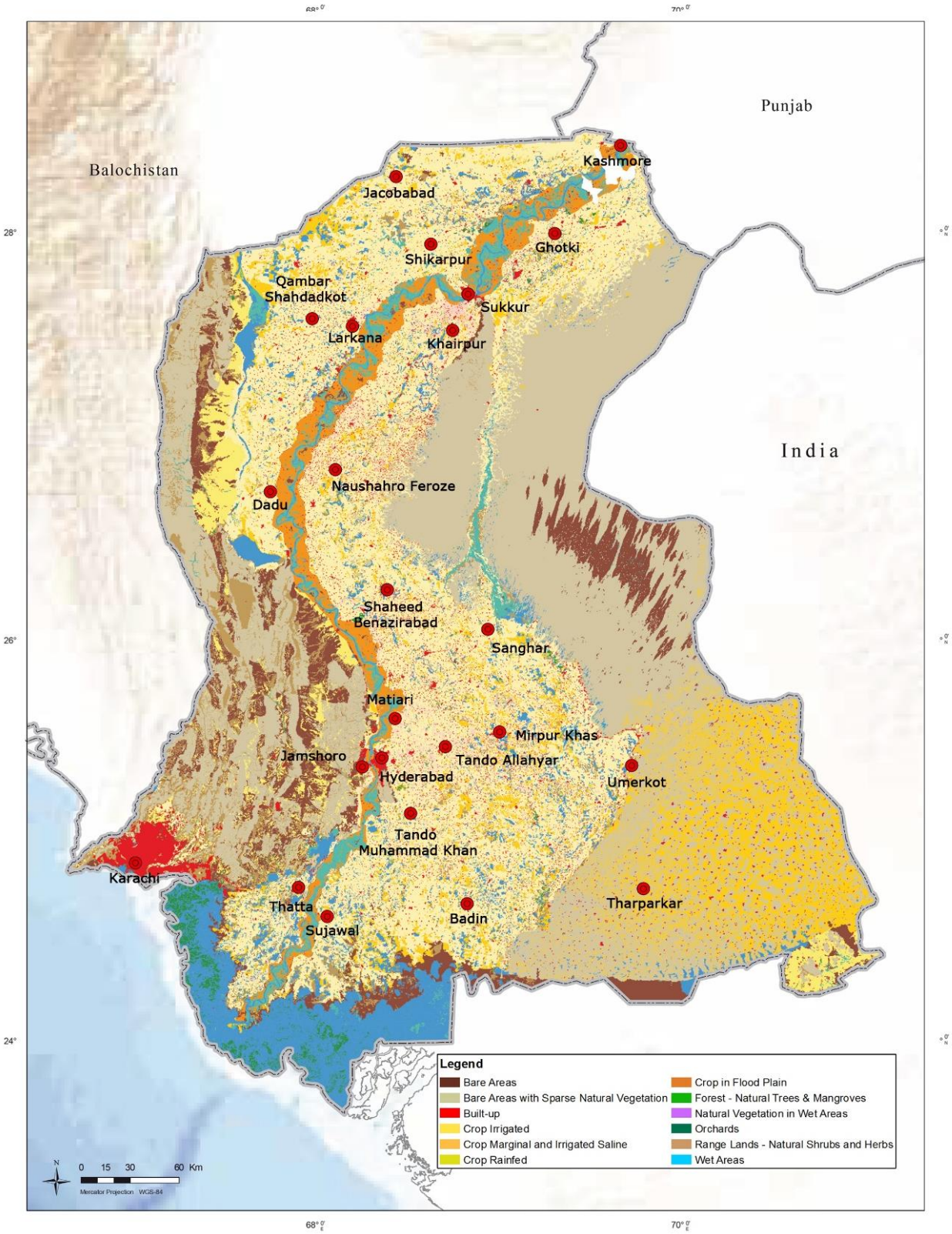


Figure 1. Landuse / Landcover Map of Sindh

1.3. Demography

According to 2017 census reports of Pakistan, the population of province is 47.89 million, with a growth rate of 2.41%. Urban and rural population statistics 52.02% and 47.98% respectively, indicate Sindh as the most urbanized province of the country. The overall literacy rate of the province is 45.29%.

Province is predominantly cosmopolitan where widely spoken languages are Sindhi, Urdu, Punjabi, Pushto, Siraiki, Balochi, Brahui, Rajasthani and Gujarati etc. Majority of the population in Sindh is Muslim. The province is home to Hindus that approximates to 2.0 million, along with non-Muslim communities of Christians, Paresis or Zoroastrians and Ahmadis.

1.4. Economy

Sindh has the second largest economy of Pakistan that includes agriculture, livestock, fisheries, industries, and services sectors. The province has an irrigated agricultural economy that depends almost entirely on the water from Indus River regulated through Guddu, Sukkur and Kotri barrages. Principal crops in Sindh are wheat, rice, cotton, oilseeds, and sugarcane. Most of the industries are concentrated in three major cities Karachi, Hyderabad and Sukkur which produce automobile, textile products, cement, cardboard, chemicals, electric power supplies, heavy machinery, and other metal products etc. Sindh preserves rich mineral resources i.e., petrol, gas, coal and granite that contribute substantially to the national economy. There are two modern seaports in the province namely Karachi Port and Bin Qasim Port.

1.5. Housing and Shelter

According to 2017 census reports of Pakistan, there were 5.022 million households in Sindh, with average household size of 6 persons and occupancy at 3.3 persons per room. Based on population statistics, the projected number of households is approximately 7.5 million. The overall housing stock comprised 52 percent Katcha (uncemented) houses mostly without proper water and sewerage system, 48 percent cemented or semi-cemented houses. During flood in 2010 and heavy rainfall in years 2011 and 2012, the number of houses that were damaged were 876,249, 1,503,098 and 462,725 respectively. As per Joint Survey Report, about 1,436,914 fully and 650,272 partially damaged during Flood 2022.

1.6. Administrative System

Consequent upon the revival of the Commissionerate system, the province is administered through six divisions namely Karachi, Hyderabad, Mirpurkhas, Sukkur and Larkana and Shaheed Benazirabad headed by Commissioners. The divisions are further divided into 30 districts headed by the respective Deputy Commissioners. Karachi, being a metropolitan city and a division as well, is governed in parallel by Karachi Metropolitan Corporation (KMC) and District Municipal Corporations

(DMCs). There are 138 Talukas across Sindh province.

2. DISASTER PROFILE AND EVENTS

Most of the disasters occurring in Sindh are categorized as natural disasters. The most common disasters are floods, cyclones, drought, earthquake, and heatwaves. Flood is the most frequent disaster and causes damage to crop, houses, livelihoods, threat to human lives and destruction to civic infrastructure. Monsoon has been assumed to be the common cause of floods. Since 1926, significant floods have occurred approximately 50 times. The frequency of cyclones is every 3rd or 5th year. Similarly, the earthquake of 2001 inflicted 12 life losses, 45000 houses fully / partially damaged. Earthquake in April 2013 jolted the entire province at 5.5 Richter scale. The province also experienced severe drought for almost 5 years from 1999-2003.

2.1. Severity and Frequency of Disasters

District-wise severity and frequency matrix of disaster is appended below;

Sr. #	District	Hazard	Frequency	Severity	Years
1	Karachi Central	Urban Floods	Monsoon	Medium	1966, 1977
		Heatwave	Frequently	High	Almost Every Year
		Earthquake	Rare	Low	2013
2	Karachi East	Floods	Monsoon	Medium	2017
		Heatwave	Frequently	High	Almost Every Year
		Earthquake	Rare	Low	2013
3	Karachi South	Urban Floods	Monsoon	Medium	1966, 1977, 2017
		Heatwave	Frequently	High	2015
		Earthquake	Rare	Low	2013
4	Karachi West	Urban Floods	Monsoon	Medium	1966, 1977
		Heatwave		High	Almost Every Year
		Earthquake	Rare	Low	2013
5	Korangi	Urban Floods	Monsoon	Medium	1966, 1977, 2017

Sr. #	District	Hazard	Frequency	Severity	Years
		Heatwave	Frequently	High	2015 – 2017
		Earthquake	Rare	Low	2013
6	Malir	Floods	Monsoon	Medium	2013, 2014, 2017
		Heatwave	Frequently	High	Almost Every Year
		Earthquake	Rare	Low	2013
7	Hyderabad	Floods /Rain	Monsoon	Medium	2010,2011, 2012,2014
		Droughts	Rare	Medium	1998-2012
		Earthquake	Rare	Low	2011, 2013
8	Badin	Floods /Rain	Monsoon	High	1970,1975, 1979,1994, 2003,2006, 2011,2012
		Droughts	Rare	Medium	1998 to 2012
		Earthquake	Rare	Low	2011,2013
		Cyclone	Rare	High	1964, 1999, 2007
9	Dadu	Floods /Rain	Monsoon	High	2010
		Flood /Rain	Monsoon	High	2011
		Droughts	Rare	Low	1997-2002
10	Jamshoro	Riverine Floods	Monsoon	High	2010, 2011
		Heavy Rainfall	Monsoon	Low	Heavy Rainfall Monsoon Low 2011, 2012, 2013, 2014
		Droughts	Rare	High	1999-2002
		Earthquake	Rare	Low	2013
11	Matiari	Riverine Floods	Monsoon	Medium	2010, 2011
		Heavy Rains	Monsoon	High	2011, 2012
		Earthquake	Rare	Low	2013

Sr. #	District	Hazard	Frequency	Severity	Years
12	Sujawal	Floods/Rain	Monsoon	Medium	2012
		Droughts	Rare	Medium	1998 to 2012
		Earthquake	Rare	Low	2011,2013
13	Tando Allahyar	Flood	Monsoon	Medium	2010, 2011, 2012
		Earthquake	Rare	Low	2013
		Heavy Rains	Monsoon	Medium	2010, 2011, 2012
14	Tando Muhammad Khan	Flood	Monsoon	High	2010
		Rain/Flood	Monsoon	Medium	2011
15	Thatta	Flood	Monsoon	High	1840,1856, 1874,1942, 1946,1948, 1956,1973, 1974,1976, 1978,1978, 1988,1989, 1992,1994, 1995,1996, 1999,2003, 2006,2007, 2010, and 2011
		Cyclones	Seasonal	High	1964,1993, 1999,2003,
		Monsoon rains	Seasonal	Medium	Every year
		Tsunami	Rare	High	1945, 2005
		Earthquake	Rare	Low	2001, 2013
16	Mirpur Khas	Rain/ Flood	Monsoon	Medium	2006-2012
		Earthquake	Rare	Low	2013
17	Larkana	Riverine Floods	Monsoon	Medium	2010, 2011, 2012
		Flash Floods	Seasonal	Low	
		Earthquake	Rare	Low	
18	Jacobabad	Floods	Monsoon	Medium	1942, 2010

Sr. #	District	Hazard	Frequency	Severity	Years
		Drought	Rare	Low	1999
		Earthquake	Rare	Low	Nil
19	Kambar Shahdad Kot	Flash Flood	Monsoon	Medium	2007, 2010, 2011
		Drought	Infrequent	Low	1999-2002
		Earthquake	Infrequent	Low	1935
20	Kashmore	Floods	Monsoon	High	2003, 2005, 2010
		Drought	Rare	Low	2002
		Earthquake	Rare	Low	2001, 2013
21	Shikarpur	Floods	Monsoon	High	2003,2005, 2010-2012
		Earthquake		Low	2001
22	Shaheed Benazirabad	Riverine Flood	Monsoon	Medium	1973,1976, 1992,2010
		Drought	Frequent	High	1999 – 2002
		Earthquake	Rare	Very Low	2013
23	Naushahro Feroz	Riverine Flood	Monsoon	High	1973,1976,2010,2011,2012,2013
		Earthquake	Rare	Low	
24	Sanghar	Riverine Flood	Monsoon	High	2006,2007, 2011,2012
		Drought	Common	Low	1997-2000, 2013-2014
		Earthquake	Rare	Low	2013
25	Sukkur	Riverine Flood	Monsoon	High	1973,1976, 2010, 2010
		Drought	Rare	Low	1999, 2002
		Earthquake	Rare	Low	

Sr. #	District	Hazard	Frequency	Severity	Years
26	Ghotki	Riverine Flood	Monsoon	High	2010,2011, 2012
		Drought	Rare	Low	2002
		Earthquake	Rare	Low	
27	Khairpur	Riverine Flood	Monsoon	High	2010,2011, 2012, 2014
		Drought	Infrequent	Low	1999-2002
		Earthquake	Infrequent	Low	
28	Tharparker	Drought	Frequently	High	1987-88, 1991-92, 1999,2000, 2002-03,2005,
		Earthquake	Rare	Low	1982,2001, 2005,2009
29	Umerkot	Floods	Monsoon	low	2011, 2012
		Drought	Rare	Low	1999- 2002

Note: *District Keamari is 30th district of Sindh and was notified after completion of study. The jurisdiction of the district remained part of district West and shared urban flooding, heatwaves, and minor earthquakes in past.*

3. RESIDUAL DISASTER RISKS IN PROVINCE

3.1. Indus River

River Indus is a blessing for the province. It is a blood line and provides about 90% of useable water, support agriculture and livelihood of majority of provincial population. During flooding and high flows, it recharges the aquifer to sustain groundwater for multiple uses. It sustains the ecosystem of flood plain and delta and supports natural habitat. With all the blessings, River Indus is a permanent threat of flooding. Physiographicaly, Sindh is situated at tail of river Indus and river behavior is predominantly deltaic. It flows in braided channels, sediment deposition is dominant, it frequently changes the course, has shallow channels without proper banks, and when flooded level of water gets above the surrounding lands. Historical evidence shows that it flowed to sea through 17 channels before the construction of barrages and embankment on it. Historical channels of Indus and tributary system are shown in

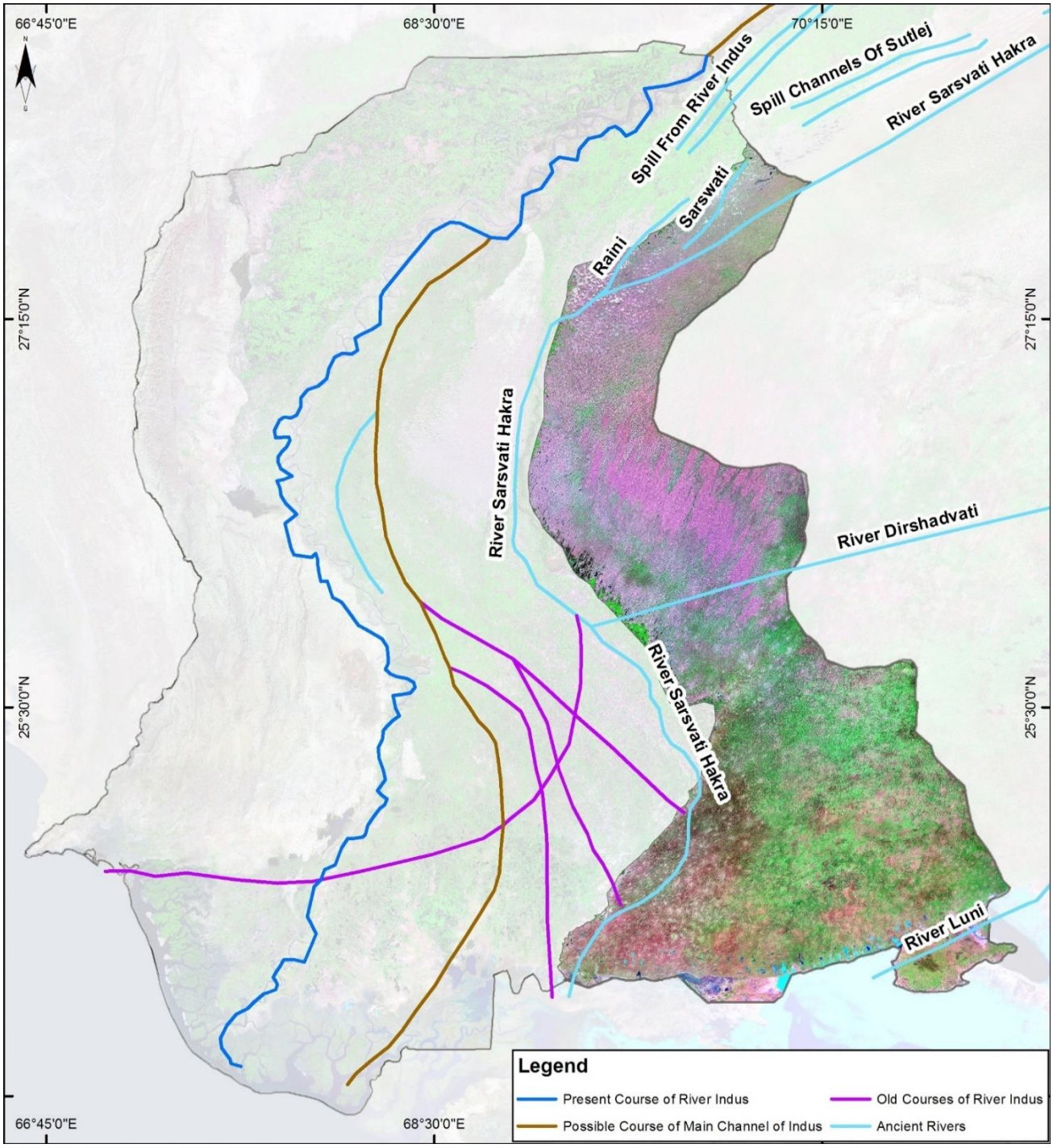


Figure 2. Historical channels of river systems in Indo-Pakistan (Panhwar, 1985) overlaid on satellite imagery

Figure 2. Barrages were built to boost agriculture economy and livelihood of the people and river was confined within flood protective embankments for protection of settled areas from the flooding. With all positive aspects for Indus, the following are the key issues and challenges posed by it.

a) During normal flows and floods, the population residing within flood plain is disturbed, however, their displacement, recovery and resettlement becomes the responsibility of the government.

b) The natural gradient is low in Sindh and sediment deposition by river Indus is more dominant, therefore. river possesses migration tendency; and it changes its course frequently and causes threat to flood protective embankments.

c) The flood plain is highly altered due to human interventions including agricultural activities, construction of private embankments within flood plain, construction of road bridges over Indus etc., therefore, river behaves differently during each flooding season.

d) The earthen embankments along the river regularly weaken due to human activities resulting in increased risk of breaching and consequent flooding and require regular rehabilitation with huge investments.

e) Most of the land in the riverine belt i.e., existing flood plain of Indus in Sindh was primarily reserved for forests and a large tract of forests existed from Kashmore to Keti Bandar. The trees were a natural barrier against erosion and to some extent protection for embankments but for one reason or other the land has been occupied by people for agricultural purposes. Absence of trees coupled with large scale human interventions has added riverine flood risk in the system.

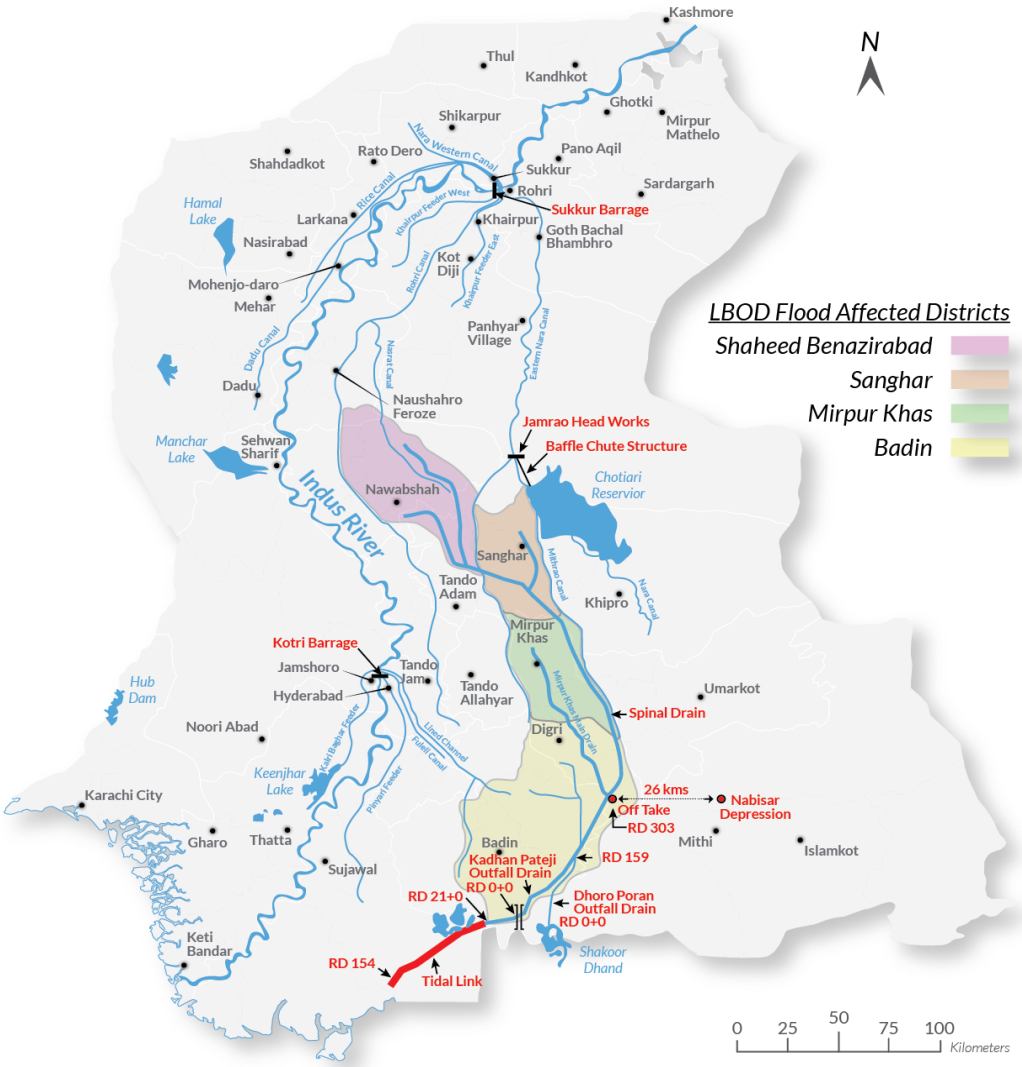
f) As both sides of the river are bounded by embankments, it practically does not convey rainwater of the province to sea. The old and abandoned channels and lakes of Indus which used to convey / distribute rainwater of the province is presently either modified and used in irrigation / drainage or have been altered for agricultural activities. Therefore, drainage of rainwater aggravates and turns into a major problem.

3.2. Left Bank Outfall Drain (LBOD) System

The left bank of Indus River lacks natural drainage, and a few existing lines were severed by network of irrigation canals and construction of road infrastructure. The poor drainage conditions coupled with perennial irrigation supplies have resulted in the rise of water table in commands of left bank area. To reduce the impact of raised water table and drain surplus, wastewater, agricultural effluents, and stormwater the project was designed and constructed in 04 component i.e., Nawabshah, Sanghar, Mirpurkhas and Badin Components. It serves 1734,523

Cultivable Command Area (in Acres) and is composed of;

Sr#	Type of Drain	Number of Drains	Length (Km)
1	Sub drains	99	1012.77
2	Branch drains	6	210.53
3	Main drains	5	334.63
4	Spinal drains	1	211.46
5	Dhoro Puran Outfall Drain (DPOD)	1	40.87
6	Kadhan Pateji Outfall Drain (KPOD)	1	58.06
7	Tidal Link	1	41



Source: Article on "Disastrous Effects of Rain 2011 in Sindh, Pakistan" by Dr. Bakhshal Khan Lashari & Zarif Iqbal Khero from Pakistan Engineering Congress Website

Figure 3 Map of LBOD

The map of LBOD is given in Figure 3.

After construction of LBOD and its network, various drawbacks and constraints have been observed specifically during and after heavy rains. Some of the key drawbacks of the system are;

a) The existing drainage network is unable to drain the catchment areas of all subcomponents of LBOD Project within a period of 3 to 5 days to minimize damage to standing crops.

b) The inadequate freeboard results in breaches at weak sections of Spinal Drain and overflowing at bridges and other structures.

c) Inundation of low-lying areas and towns due to breaches in irrigation and drainage network.

d) During heavy rains, the irrigation water of escapes and breaches of the irrigation distribution network when added with the storm water play havoc with the neighboring towns and villages and damage infrastructure in the area i.e., road network and protections bunds.

e) The design drainage capacity of LBOD is 4,500 cusecs and it disseminates into DPOD with design capacity of 2,000 cusecs and KPOD with capacity of 2,500 cusecs. DPOD drains into Shakoor Dhand and KPOD in sea through Tidal Link.

f) With all positive aspects of the LBOD project, it is constant disaster risk for adjoining areas. Its presence produces domino disaster effects throughout its course. During heavy rains in its catchment, the effects of overflowing and breaching cripple and aggravate the situation and effects remain present long after the rains.

3.3. Drainage issues on Right Bank of River Indus

Most of the land area on the right bank of the river Indus lies in foothills of Khirthar and Koh e Suleman ranges. In addition to provincial territorial lands, the right bank shares catchments of Balochistan province and rain-fed rivers of Balochistan drains into Indus through Hamal, Manchhar lakes. Main Nara Valley Drain (MNVD) carry both agricultural wastewater and storm water of the area and dumps in Manchhar lake. Aral Canal, the canal on Manchhar lake plays a dual role i.e., it off-takes from Indus to Manchhar and drains excess water from Manchhar to River Indus. The Aral Head Regulator can discharge 10,000 cusecs to Manchhar when downstream discharge from Sukkur Barrage exceeds 250,000 cusecs.

While Aral Tail Regulator can discharge 25,000 cusecs to River Indus during its normal flow. The FP Bund (Flood Protective Embankment) runs from Hamal to Manchhar Lake and protects settled areas from flooding during rains in Khirthar and Suleman range. Normal rains bring prosperity to the area and both ground and surface water quality improves after rains.

The situation worsens when heavy rains occur in corresponding catchments and rivers emanating from Balochistan province drain into Hamal and Manchhar lake. The situation gets more complicated if it coincides with flooding in River Indus. Unbalance in inflow and outflow from Hamal to Manchhar occurs and results in over pressure on FP Bund and cause breaching and consequent flooding. Disastrous events have happened in known past and during 2022 floods. Large tracts of land come under flooding when controlled and uncontrolled breaches occur in FP Bund. If unattended, residual risk of disaster and climate change effects may continue to invade the area with frequent intervals.

There is an urgent requirement to address this persistent disaster threat and feasibility studies should be conducted for permanent solution keeping in view multiple scenarios. The solution should be environmentally friendly to Hamal and Manchhar lake and their watersheds. The catchment draining into Hamal and Manchhar are shown in Figure 4.

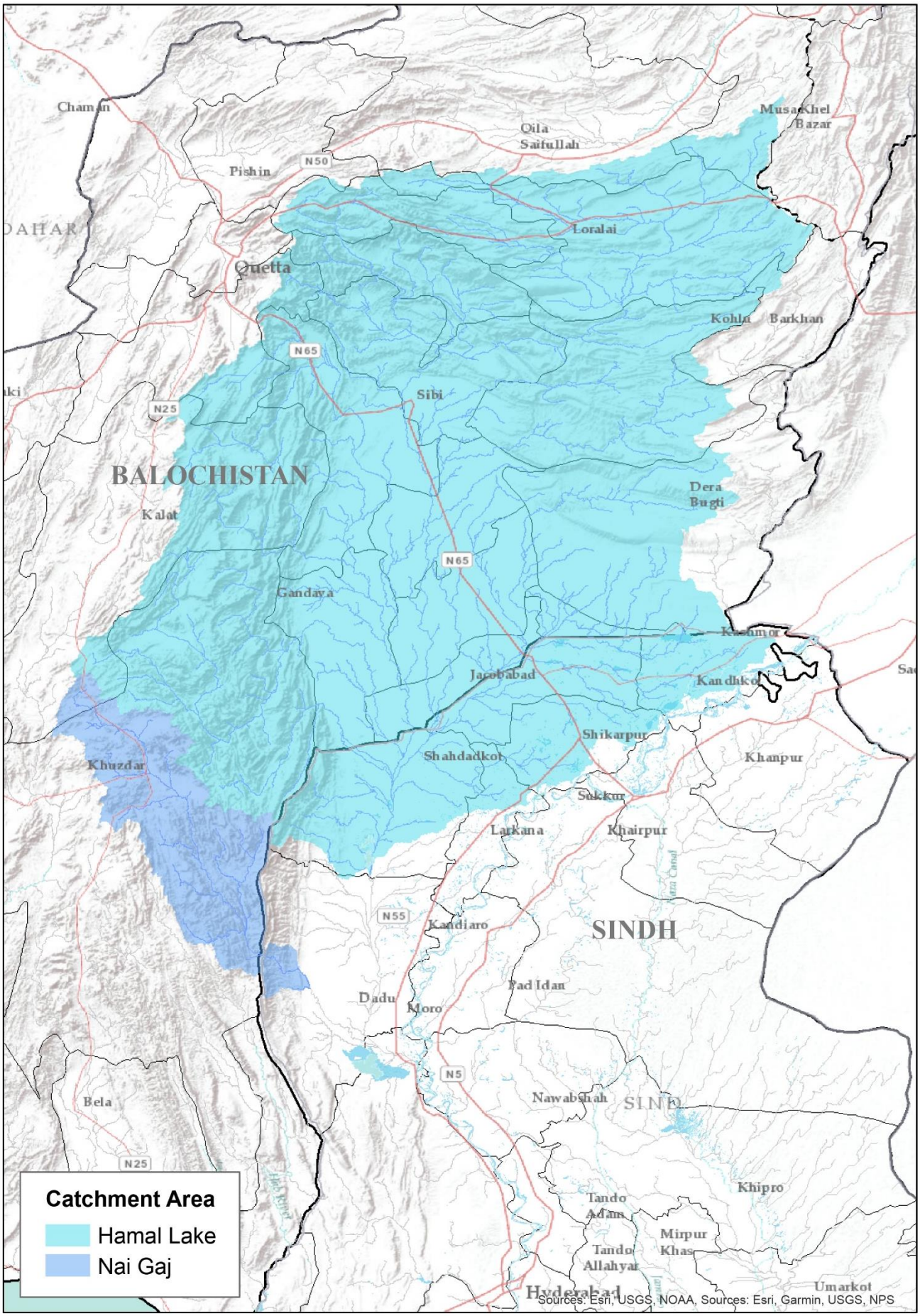


Figure 4. Catchments draining in Hamal and Manchhar Lake

3.4. Unorganized Urban Growth and Drainage

The major cities and towns of the province are under expansion due to migration and population growth. This trend is stretching the resources of cities to limits and causing various administrative and social problems. Some urban sprawls are planned while most are unauthorized and unplanned or poorly planned. Drainage systems of the cities and towns are either encroached, overwhelmed, insufficient or old to withstand present requirements in lieu of expanded population. Further, the available drainage systems are predominantly used and occupied for sanitation and sewerage. In most of the cities sewerage system is used to convey storm water which in heavy rains create additional turmoil by overflowing of sewer water in cities. Lack of separate storm water drainage in cities is a major problem which compounds the normal rains into disasters. The rain in Karachi during 2020 monsoon is an example. The city was jeopardized for several days, and most parts of the city remained paralyzed till the dewatering process completed.

It is highly important to introduce efficient stormwater conveyance systems in all settlements including cities, towns, and villages for mitigation of urban flood impacts. Additionally, there is a strong need to control and authorize development of new settlements with respect to resilient disaster cities in the province.

3.5. Roads and Irrigation Network

Communication, canal irrigation and drainage network are indicators of development and added in prosperity and growth of the province. However, development usually accompanies additional disaster risks. Long an intricate network of roads, irrigation and drainage network have altered the slopes and subsequent changes in natural drainage of the province. Above the ground roads, without or insufficient culverts when intersecting the natural slopes causes blockage to natural flow and area behaves as an isolated catchment without drainage. In such isolated pockets ponding of water is natural and require mechanical dewatering and man and material resources. The same situation emerges due to banks of irrigation network. Irrigation network adds further risks and complexities in the system during heavy rains. The domino effect of breaching irrigation channels complicates the local flooding.

Apparently, there is hardly any remedy to overcome the effects of existing communication and drainage network in

disaster risks. However, for future development, following is recommended;

a) Feasibility studies for such projects shall be carried out considering the overall topography of the area.

b) It shall be ensured that development is in line with the natural slopes and rainwater drainage has been considered in the project area.

c) In construction of roads, it must be ensured that proper and sufficient culverts / bridges have been provided to safely drain water of the area.

d) It must be ensured that any new development is not adding any additional disaster risk in the area.

3.6. Climate Change

Climate change is considered among the topmost and critical agents to complicate disaster management. Changing weather patterns and frequent occurrence of hydrometeorological disasters are associated with climate change impacts. Major hydrometeorological impacts associated with climate change are i) melting of snow and glaciers and associated flooding, ii) occurrence of unprecedented rains, iii) frequent spells of droughts, iv) severe weather patterns (raised temperatures and extreme cold weather), and v) increased risk of cyclones. Overall, the country and Sindh province are on crossroads of climate change impacts and almost all the climate change impacts are observable in Sindh. Being at tail of River Indus, the province is under persistent threat of riverine floods and recipient of major losses and damages. A large tract of coastal belt and economic hubs is exposed to cyclones. Frequent heatwaves and droughts disturb the socio-economic balance. And above all, devastating rains lashes cities, towns, villages, agriculture, livestock and bring major effect on sustainability, growth, and development. Climate change is happening, and the province must be abreast of impacts. It is a wise and timely action to consider disaster risk reduction as a development portfolio. All departments of the government of Sindh and entities working in the province are and shall be liable to prepare and implement departmental action plans against climate change impacts to reduce disaster risks in the province.

CHAPTER 3

Disaster Partners – Roles and Responsibilities

1. RATIONALE

Management of disasters is the collective responsibility of all segments of society. The role of all stakeholders is equally important whether actors are government functionaries, non-governmental organizations, philanthropists, individuals, or affected communities. Effective disaster management is not possible without collaborative efforts. In some instances, hazards turn into disasters only because of poor human and hazard interaction. If hazards are rightly identified and communicated, it is the responsibility of all strata of society to take precautionary and preemptive measures. If remedies, actions, and systems are placed well in time before occurrence of any hazard, then hazard can be prevented to shape into a disaster. It is also fundamentally important that communities at risk must be aware of their role as first disaster responders. Community awareness programs must be ensured by all concerned for sensitization on their roles and responsibilities as an integral component of disaster management and first responders.

The SDMP identifies the partners and establishes their role in different phases of disaster management. It is the responsibility of all partners to collaborate in disaster management for safer and prosperous Sindh.

2. PARTNERS, THEIR ROLES & RESPONSIBILITIES

2.1. Agriculture and livestock Department

Pre-Disaster

a) Capacity building of department regarding disaster management and risk reduction and implementation of sector specific disaster risk reduction measures

b) Provide recommendation on changing/rescheduling of cropping patterns with respect to changing climate and weather scenarios

c) Create Community Seed Bank at Union Council level

d) Provide livestock vaccination and de-worming

e) Assessment of high prone areas and estimation of possible damage and needs for recovery regarding livestock, crops, irrigation facilities in case of any disaster

f) Mass awareness regarding epidemics and diseases to livestock and crops

g) Close coordination with PDMA and DDMA

During-Disaster

a) Close and regular coordination with DDMA and PDMA

b) Immediate transfer of current situation to DDMA and PDMA

c) Vaccination of livestock

Post-Disaster

a) Facilitation to institutions / NGOs/ INGOs which focus on rehabilitation activities as per guidelines provided by DDMA and PDMA

b) Submit report on damages and needs to DDMA and PDMA

c) Mass awareness regarding epidemics and diseases to livestock and crops

d) Vaccination of livestock

e) Upgrade Community Seed Bank (CSB)

f) Timely compensation to affected farmers

g) Prepare overall report of the department regarding intervention and disseminate to DDMA and PDMA

2.2. Provincial Disaster Management Authority (PDMA)

Pre-Disaster

a) Close coordination with national and international institutions engaged in disaster forecasting.

b) Coordinate meeting and engage DDMA for preparation of anticipated disasters

c) Ensure readiness of equipment and inventory

d) Disseminate disaster alerts to concerned DDMA with action plans for forecastable disasters

e) Ensure availability of relief goods and other relevant stuff before anticipated disaster

f) Advise concerned departments on removal of congestion from water ways before monsoon period

g) Aware and sensitize public and private departments on main streaming disaster risk reduction in developing planning

h) Ensure availability and functioning of provincial emergency operation center

i) Provide and report high risk population and infrastructure in anticipated hazard areas.

j) Capacity building of line and stakeholder department on disaster risk reduction and management.

During disaster

a) Coordination and mobilization of man and material resources

b) For rescue and evacuation of people, provide and manage temporary shelter and life restoration equipment in disaster affected regions

c) Coordinate with line departments for health and veterinary services in the affected regions and ensure to control outbreak of any communicable diseases

d) Coordinate with DDMA and line departments

e) Coordinate with individual donors, donor organizations, NGOs and INGOs and ensure distribution of relief among disaster affectees

Post Disaster

a) Coordination with DDMA and line departments for need and damage assessment

b) Need and damage assessment reporting to higher management, NGOs, INGOs and other agencies for rehabilitation

c) Ensure rehabilitation on build back better principle

2.3. District Disaster Management Authority (DDMA)

Pre-Disaster

a) Close coordination with PDMA and other relevant stakeholders

b) Risk assessment and identification of disaster-prone areas

c) Aware and sensitize public and private departments on main streaming disaster risk reduction in developing planning

d) Coordinate meetings and engage TDMC for preparation of anticipated disasters.

e) Ensure readiness of equipment and inventory

f) Disseminate disaster alerts to concerned TDMC with action plans for forecastable disasters

g) Ensure availability of relevant staff before anticipated disaster

h) Advise concerned departments on removal of congestion from water ways before monsoon period

i) Ensure availability and functioning of district emergency operation center

j) Arrange emergency response exercises and drills along with volunteer groups, social welfare and civil defense on various disaster scenarios

During disaster

a) Mobilization of man and material resources

b) For rescue and evacuation of people, provide and manage temporary shelter and life restoration equipment in disaster affected regions

c) Coordinate with TDMC and line departments

d) The DDMA shall lead the evacuation of people to safer places with the assistance of PDMA. DDMA shall also ensure safety, security, supply chain, life commodities and management of relief camps

e) Only authorized officials of DDMA shall brief media on disaster situation and the response activities.

Post Disaster

a) Coordination with TDMC and line departments for need and damage assessment

b) Need and damage assessment reporting to PDMA

c) Ensure rehabilitation on Build Back Better principle

2.4. Civil Defense

Pre-Disaster

a) Assign representatives for DDMA to participate in meetings

b) Information sharing regarding capacities and needs of Civil Defense department regarding disaster risk management

c) Capacity building of Civil Defense department regarding disaster risk management

d) Information sharing regarding technical and personnel expertise with DDMA

e) Conduct trainings for Volunteers regarding Rescue and other relevant expertise in collaboration with Health department and PDMA

f) Create awareness regarding rescue, evacuation and first aid

g) Effectively establish, train and systemize volunteers' initiatives in collaboration with education department / institutions

During-Disaster

a) Fire fighting

b) Rescue and evacuation

c) Assign volunteers in coordination with PDMA and DDMA

d) Communicate to DEOC about details of all activities

e) Communicate to DEOC any additional resources required for performing the above tasks

f) Facilitate line departments as per demand in disaster response

Post-Disaster

a) Assist in rehabilitation process if required

2.5. Education Department

Pre-Disaster

a) Assign representatives for DDMA and participate in meetings

b) Information sharing regarding capacities and needs of Education department regarding disaster risk management

c) Teachers and students are informed about the disaster-prone areas of the district

d) Teachers and students are informed of their responsibilities to take care of materials and documents to safe places during disaster

e) Facilitate and collaborate with PDMA in preparation of disaster management curriculum

f) Collaborate with PDMA and DDMA in synergizing volunteers

During-Disaster

a) Mobilize human resources for intervention during disaster

b) Inform schools situated in high risk areas about hazard and hazard forecast

c) Assist in arrangement of relief and shelter camps in educational institutes for the disaster affectees

d) Facilitate Health department and other relevant entities in arranging medical camps, blood donations and provision of medical aid during disaster and emergencies

e) Coordinate with PDMA and DDMA in assigning volunteers for emergency response

Post-Disaster

a) Assessment of damages occurred to educational institutes

b) Provide assistance to teachers, students and other staff who are victimized by disasters (lack of food, shelter, etc.)

c) Rehabilitation and reconstruction of affected educational facilities

d) Facilitate institutions / NGOs / INGOs which focus on rehabilitation of educational facilities

e) Prepare overall report of the department regarding intervention and disseminate to PDMA and DDMAs

2.6. Finance Department

Pre-Disaster

a) Regular coordination with PDMA

b) Allocate budget on contingency basis, to handle any emergency situations

c) Facilitate other departments in planning and meeting their financial needs

During-Disaster

a) Provide funds to PDMA and other line departments for procurement of material and equipment required for emergency response

b) Provide funds to PDMA and other line departments for rescue and relief activities

Post-Disaster

a) Get statistical data regarding actual damage and recovery needs from all line departments

b) Provide funds for execution of rehabilitation process

2.7. Health Department

Pre-Disaster

a) Assign representatives for DDMA, and participate in meetings

b) Information sharing regarding capacities and needs of Health department regarding disaster risk management

c) Build capacity of health department regarding disaster risk management and preventive health care especially in disaster prone areas

d) Monitor the general health situation, e.g., monitor outbreak of diseases

e) Provide specific information required regarding precautions for epidemics

f) Establish a health mobile team in district and taluka headquarter hospital

g) Set-up an information Centre to organize sharing of information for public information purposes

h) Prepare first aid kits, medicines, water test kits, chloramines and anti-snake venom serum.

i) Collaboration with relevant organizations / partner NGOs for participation and support through technical resources

j) Up-gradation and smooth functioning of hospitals, BHUs, equipped with required staff, medicines and equipment

k) Database and linkages with ambulance services/blood banks

l) Health and hygiene awareness and education

m) Ensure proper disposal of hospital waste

During-Disaster

a) Provide emergency treatment for the seriously injured

b) Ensure emergency supplies of medicines and first-aid

c) Supervise food, water supplies, sanitation and disposal of waste

d) Assess and co-ordinate provision of ambulances and hospitals where they could be sent (public and private);

e) Provide special information required regarding precautions for epidemics

f) Set-up an information Centre to organize sharing of information for public information purposes

g) Conduct disaster impact assessment on health

h) Intervene in case of disease outbreak

i) Medical camps and vaccination

j) Ongoing surveillance with regard to health issues and disease outbreaks

Post-Disaster

a) Conduct disaster impact assessment on health situation

b) Prepare plan for the following year along with reports and submit to PDMA and concerned department.

c) Medical camps and vaccination

d) Rehabilitation of health infrastructure affected during disaster

e) Preparation of impact assessment surveys covering strengths and weaknesses of interventions and impact on affected victims and dissemination of learning to PDMA and other concerned institutions

2.8. Information Department

Pre-Disaster

a) Close coordination and liaison with PDMA and DDMA

b) During monsoon season and forecastable hazards issuance of press releases regarding hazards and preparedness plans of the government

c) Issue and publish disaster alerts on appropriate media forums

d) Coverage and publication of government initiatives on disaster risk reduction and management

e) Ensure media coverage and publication of PDMA and DDMA meetings for pre disaster preparations

During-Disaster

a) Coordination with PDMA and DDMA for announcement of warnings and updates on disasters

b) Publication of bulletins on government actions, facilities, relief and rescue efforts

c) Publication of camp management and relief distribution announcements

d) Publication of safety measures during disasters to minimize disaster domino effects

e) Communicate voice of affectees to concerned departments

Post-Disaster

a) Focus on problems being faced by the people of the affected area

b) Publish, broadcast /telecast programs highlighting strengths, weaknesses and scams in disaster response activities

c) Publish, broadcast /telecast programs highlighting government initiatives and collective response of NGOs, INGOs and other departments for relief and rehabilitation

2.9. Pakistan Meteorological Department (PMD)

Pre-Disaster

a) Update and upgrade forecast equipment

b) Timely and authentic forecast of rains, windstorms and other forecastable hazards

c) Timely transfer of information regarding abnormal weather conditions to PDMA

During-Disaster

a) Forecasting for any confluence disaster

b) Issuance of precautionary measures to avoid domino effects of disaster

Post-Disaster

a) Technical assistance in rescue and rehabilitation process

2.10. Police Department

Pre-Disaster

a) Coordinate with the DDMA in the pre-disaster planning

b) Participate in DDMA meetings

c) Capacity building of Police department regarding disaster risk management

d) Information dissemination through 15 helpline service to local residents

e) Prepare team for emergency intervention

f) Prepare plan for shifting to safer places and early warning system

During-Disaster

a) Co-ordinate with DEOC

b) Assistance in shifting of rescued/affected people to relief camps and hospitals

c) Provide protection and easy access to rescue and relief personnel/vehicles

d) Maintain law and order

e) Provide warning / instruction to travelers

f) Divert traffic on alternate routes as and when necessary

g) Ensure security to workers of NGOs and INGOs who perform duties for disaster response

h) Ensure safety and security of relief goods and maintain discipline during relief distribution process

i) Provide security in Relief Camps

Post-Disaster

a) Assist in relief and rehabilitation process

2.11. Revenue Department

Pre-Disaster

a) Assign representatives for DDMA, and participate in meetings

b) Information sharing regarding capacities and needs of Revenue department regarding disaster risk management

c) Capacity building of Revenue department regarding disaster risk management

d) Assessment of high prone areas and estimation of possible damage and needs for recovery in case of emergency

e) Arrangement of financial resources

f) Facilitate getting tax exemptions to institutions/NGOs/INGOs focus on disaster risk management

g) Collect and update population data at village level

During-Disaster

a) Coordination with the DEOC

b) Establish relief distribution centers

c) Accept relief donations and relief support

d) Timely release of funds

Post-Disaster

a) Allocation of funds for recovery and rehabilitation process

b) Assessment of damage of crops and livestock and settlement of applicable taxes accordingly in coordination with relevant departments

2.12. Armed Forces

Pre-Disaster

a) Coordinate with the DDMA in the pre-disaster planning

b) Prepare necessary equipment, labor, transportation and other materials for emergency interventions

c) Assist in evacuation of people to safe places

During-Disaster

a) Maintain liaison with the DEOC for vital inputs during response

b) Collect information and warn appropriate Army units for

engagement in safety, rescue and evacuation activities

c) Establish communication infrastructure and supplement the civil communication set-up if required

d) Coordinate all military activity required by the civil administration

e) Provision of medical care with the help of the medical teams, including treatment at the nearest armed forces hospital

f) Transportation of relief material

g) Provision of logistic back-up (aircrafts, helicopters, boats)

h) Assist in establishment of Relief Camps

i) Assist in evacuation of people to safe places during the disaster

Post-Disaster

a) Cooperate and coordinate with district authorities

b) Assist in rehabilitation process if required

2.13. Social Welfare and Community Development

Pre-Disaster

a) Coordination with NGOs and civil society organizations working for disaster risk management

b) Empower the extremely vulnerable people emphasizing women and children through public awareness involving respective departments for various fields such as Education, Health etc.

c) Capacity building of community based groups and volunteers engaged in disaster management activities

During-Disaster

d) Provide information about the disaster to the DEOC

e) Coordinate all NGOs / INGOs and civil society organizations working during the emergency response

f) Monitor progress of relief operations in the affected areas

g) In coordination with PDMA, Health, Revenue and other line departments, ensure delivery of relief to most

vulnerable segments of society such as children, orphans, widows, destitute

h) Assist and facilitate Damage and Needs Assessment teams from NGOs

i) Share human resources with DDMA

Post-Disaster

a) Monitor and follow up the status of the extremely vulnerable people

b) Assist and facilitate Damage and Needs Assessment teams from NGOs

c) Conduct impact assessment studies and analysis of strengths and weaknesses of stakeholders and disseminate learning to PDMA, DDMA and other concerned institutions

d) Facilitate institutions / NGOs/ INGOs which focus on rehabilitation activities

2.14. NGOs / INGOs

Pre-Disaster

a) Facilitate PDMA and DDMA for capacity building regarding disaster risk management

b) Capacity building of community groups regarding disaster risk management

c) Linkages with concerned departments and institutions for providing technical and financial resources regarding diverse sectors related to disaster management

d) Resource mobilization at local and international level

During-Disaster

a) Collaborate and facilitate in relief operations

b) Incorporate local and international expertise in disaster response

c) Facilitate establishment of temporary shelters and camps

d) Facilitate in overall disaster response in collaboration with concerned departments

e) Regular updates and alerts to local and international partners

f) Utilization of existing resources and further mobilization at local and international level

g) Assessment of losses using sphere standards

Post-Disaster

a) Collaborate and facilitate in rehabilitation activities

b) Incorporate local and international expertise in rehabilitation activities

c) Facilitate overall rehabilitation in collaboration with concerned departments

d) Impact assessment studies and sharing findings with PDMA, DDMA, local and international partners

e) Linkages with partners for sustainable resources mobilization

3. CENTRAL COMMAND AND CONTROL CENTRE

Coordination and collaboration in forecastable hazards and response to disasters is highly important to reduce impacts of the event. Likewise, reliable field information and situational awareness are integral in decision making for disaster management. Disasters are dynamic phenomena and so are the resulting situations. To collect field information, obtain reliable situation awareness and implement decisions and actions in disaster preparedness and response and for forecastable hazards, operationalization of central command and control center is highly desirable. The center will work 24/7 during response and preparedness under the control and guidance of PDMA at PDMA head office. Function and modus operandi of the center shall be;

a) PDMA shall declare and notify formation of Central Command and Control Centre for any major forecasted event or during disaster.

b) Senior officers (BPS-19 or above) identified by disaster management partners shall represent respective departments and work in center till emergency is declared as closed.

c) PDMA shall arrange all necessary equipment for communication, computing systems, output devices necessary for the center.

d) The Central Command and Control Centre shall be established during or after the following conditions;

   i. Cyclone above Category-2 is forecasted to landfall on any part of the coastal belt of Sindh.

   ii. Above normal rains (20mm per hour for duration in days e.g., more than 2 days) forecasted over major cities or important catchments affecting the province.

iii. If disaster extent spreads to multiple districts of the province.

iv. Human loss or injuries is high, and number exceeds to thousands.

v. The number of effected population and livestock exceeds in millions.

e) Depending on nature and type of disaster, PDMA can vary composition of Central Command and Control Centre.

f) Terms of Reference for operations of Center shall be;

i. The members of the Central Command and Control shall ensure both way information exchange on preparedness, damages, losses, relief, situational awareness, and other pertinent information relevant to their departments.

ii. The members shall ensure implementation of decisions taken during different tiers of management related to the event.

iii. The members shall share and ensure availability of possible man and material resources required in management of event.

CHAPTER 4

Disaster Alert and Warning

1. PREAMBLE

Disaster alerts and warning play a very critical role in forecastable hazards. In today's modern world, technology is proving catalyst in forecasting hazards with accuracy required for operational decision making. A range of hazards can be forecasted with accuracy which include, severe weather (heavy rains and snowfall, hot weather and heatwaves, hailstorms) cyclones and windstorms, tsunami, dust storms, lightning. thunderstorms, floods, and drought. Various other parameters are monitorable through satellites to derive information for forecasting or predicting hazards. A robust system for monitoring hazards and its integration with exposure, vulnerability and risk databases will be useful in disaster management and disaster risk reduction. Dissemination of alerts / warning and actions in anticipation of warnings are equally important parallel to hazard monitoring system for reducing potential disaster losses and damages.

In view of the importance of subject matter, a strong multi-tier system for early warning and dissemination is recommended. All concerned quarters mentioned against each action are required to implement the system / mechanism in true letter and spirit.

2. ALERT AND WARNING ISSUING AUTHORITY

Accuracy, reliability, and operational ability of alert and warning matters the most. False flags or inaccurate information often results in mistrust of public and decision makers. It is highly important that alert and warning should be accurate and authentic and should

be issued by single nodal agency to avoid circulation of misinformation and consequent chaos.

In the current information age, hundreds of sources are providing data and information on different thematic areas including hazards and disasters. Information openly floats on social media, mobile applications, and websites and at times fake / false flag information from pseudo experts start to circulate in public and create problems not only among general masses but hamper proceedings of the administrative echelons.

Keeping in view above circumstances, disaster warning and alerts and successive actions shall be taken after following steps;

a) Alert or warning is officially issued by Pakistan Meteorological Department

b) Forecast is made internationally renowned organization specialized in the subjects, however, information obtained through international sources shall be vetted by relevant experts and where necessary by Pakistan meteorological department before initiating necessary actions.

c) Local pseudo experts shall be strictly prohibited from issuing weather and warning related information on social media pages.

d) For territorial limits of the province, PDMA Sindh shall be the nodal department to issue alerts and warning and initiate successive actions for preparation.

e) If required, PDMA shall consult with NDMA for necessary coordination and issuance of alters and warnings.

Depending on requirement PDMA shall engage relevant subject experts for short period of time or as deemed necessary to enhance technical team and evaluation of development of severe weather or any forecastable hazard.

After issuance of alerts and warnings, all relevant departments of Government of Sindh or other entities working in provincial territory shall be liable to act as advised in alert and warning.

3. ALERT AND WARNING LEVELS

Alert and warning for all forecastable hazards shall fall any the of the category as given in Figure 5. Description and actions required on each alert and warning are;

a) If development of any hazard is insignificant or within locally manageable limits a **Low** (with green text) alert shall be issued, and no additional actions shall be required.

Figure 5. Categories of Hazards

However, development of hazard shall be monitored to determine its tendency.

b) If development of the hazard is significant and there is likelihood of any local disaster, **Guarded** (with blue text) alert shall be issued with actionable instructions for preparation to concerned departments and relevant actors.

c) If development of the hazard is incremental and it is likely to grow further or will remain for a longer period, **Elevated** (with Yellow Text) alert shall be issued with focused preparation and actions. This may include preparation of relief camp, medical camps, stocking of relief goods etc.

d) If high intensity / magnitude hazard is forecasted, then **High** (Golden Text) warning shall be issued with clear instruction for preparation. Preparation may include evacuation of locals to safe places.

e) **Severe** hazard alert shall be issued in Red text for preparation of all out efforts including evacuation of people to safe places.

It must be noted that short term forecasts are based on prevailing weather situations and computer modelling. Most the of data obtained for forecastable hazards is obtained through weather satellites and observing instruments on satellites and other platforms. It is not always necessary that a 7-day weather may behave exactly as forecasted. Forecast may possibly remain same or can change on each acquisition and processing of fresh datasets depending on prevailing weather conditions. Therefore, forecastable hazards, especially weather-related hazards require continuous monitoring and alert / warnings may vary according to weather conditions. For example, it is likely that a weather system forecasted as Low intensity may develop as Severe hazard over the time or vice versa.

Extra care shall be given to issue alerts and warnings and hazard shall be monitored throughout the entire course and alerts and

warning shall be altered and re-issued according to the emerging situation.

4. FORECASTABLE HAZARD INTENSITIES AND ACTION REQUIREMENTS

With modern technology some of the natural hazards can be forecasted with high accuracy. Necessary actions before onset of hazard can prevent losses and damages. Hazard intensities and actions matrix for all forecastable hazards is given below for necessary actions by concerned disaster management partners;

4.1. Rain

Sr #	Rain Intensities	Possible Impacts	Alert / Warning Level	Actions to be taken
1.	**Drizzle**, very small droplets.	Nil	Low	No action required
2.	**Slight (fine) drizzle**: Detectable as droplets only on the face, car windscreens and windows.	Nil	Low	No action required
3.	**Moderate drizzle**: Windows and other surfaces stream with water.	Nil	Low	No action required
4.	**Heavy (thick) drizzle**: Impairs visibility and is measurable in a rain gauge, rates up to 1 mm per hour.	Nil	Low	No action required
6.	**Slight rain**: Less than 0.5 mm per hour.	Nil	Low	No action required
7.	**Moderate rain**: Greater than 0.5 mm per hour, but less than 4.0 mm per hour.	Water ponding in low laying areas	Guarded	Standby / preparation for deployment of water pumps at chock, low laying, problematic areas

Sr #	Rain Intensities	Possible Impacts	Alert / Warning Level	Actions to be taken
8.	**Heavy rain**: Greater than 4 mm per hour, but less than 8 mm per hour.	Water ponding in low laying areas	Guarded	Standby / preparation for deployment of water pumps at chock, low laying, problematic areas. Where needed deployment of machines
9.	**Very heavy rain**: Greater than 8 mm per hour.	Water ponding in low laying areas	Elevated	Deployment of water pumps at critical points
10.	**Slight shower**: Less than 2 mm per hour.	Water ponding in low laying areas	Guarded	Standby / preparation for water pumps
11.	**Moderate shower**: Greater than 2 mm, but less than 10 mm per hour.	Water ponding low laying areas	Elevated	Standby / preparation for water pumps at chock, low laying, problematic areas. Where needed deployment of machines
12.	**Heavy shower**: Greater than 10 mm per hour, but less than 50 mm per hour.	Flooding and building collapses	High / Severe (for low laying areas)	Deployment of man and material resources and vigilance of critical areas, chock points, low laying areas. Deployment of rescue and relief resources and necessary administrative arrangements.
13.	**Violent shower**: Greater than 50 mm per hour.	Flooding and building collapses	Severe	High level preparation, deployment of water pumps, man and material resources. Deployment of rescue and relief resources, establishment of shelters and camps, arrangements for evacuation of people from low lying areas, setting of relief

Sr #	Rain Intensities	Possible Impacts	Alert / Warning Level	Actions to be taken
				camps, mobilization of NGOs and other partners.

These alert and warning levels shall be provoked on forecasts over territorial boundaries of the province. However, a large land of Balochistan province drains into Sindh through Hamal and Manchar lake. Therefore, in addition to provincial territory, forecasts over shared basins shall also be considered and necessary alerts and warnings for flash floods shall be issued to public residing in respective regions. Interprovincial coordination mechanism shall be established between the provinces for sharing of information on water flows.

4.2. Cyclone

Cyclones in Arabian Sea develop frequently and fall inland in either coast of India, Pakistan, or Oman. The low depression formed near Mumbai or coast of Gujrat are likely to travel to coastal belt of Pakistan. Formation of cyclones till their landfall can be forecasted with accuracy, hence, constant monitoring and initiation of timely actions can prevent losses and damages. Intensity-wise actions are tabulated below which shall be taken by concerned quarters;

Sr #	Intensity	Possible Impacts	Alert / Warning Levels	Actions to be taken
1.	**Category 1**: Wind (mph): 74 - 95	Damage: Minimal - No significant structural damage, can uproot trees and cause some flooding in coastal areas.	Guarded	Necessary preparation, issuance of alerts, arrangement to avoid coastal flooding and impacts
2.	**Category 2**: Wind (mph): 96 - 110	Moderate - No major destruction to buildings, can uproot trees and signs. Coastal flooding can occur. Secondary effects can include the shortage of water and electricity.	Guarded	Necessary preparation, issuance of alerts, arrangement to avoid coastal flooding and impacts.
3.	**Category 3**: Wind	Extensive - Structural damage to small buildings and serious	High	Issuance of warnings, preparation of relief camps,

Sr #	Intensity	Possible Impacts	Alert / Warning Levels	Actions to be taken
	(mph): 111 - 129	coastal flooding to those on low lying land. Evacuation may be needed.		evacuation planning, rescue and relief operations, temporary medical facilities, and other administrative arrangements
4.	**Category 4**: Wind (mph): 130-156	Extreme - All signs and trees blown down with extensive damage to roofs. Flat land inland may become flooded. Evacuation probable.	Severe	Issuance of warnings, preparation of relief camps, evacuation planning, rescue and relief operations, temporary medical facilities, and other administrative arrangements, call for partner's supports
5.	**Category 5**: Wind (mph): greater than 156	Catastrophic - Buildings destroyed with small buildings being overturned. All trees and signs blown down. Evacuation of up to 10 miles inland	Severe	Issuance of warnings, preparation of relief camps, evacuation planning, rescue and relief operations, temporary medical facilities, and other administrative arrangements, call for partner's supports

4.3. Heatwaves

Impacts of heatwaves are different than other natural disasters. Tangible losses and damage caused by heatwaves are comparatively low, however, heatwaves produce major impact on routine life and business. Resources like water and electricity are consumed more than normal, electricity outrages grow for longer period of time, crops undergo water stress and routine life hampers due to hot weather.

When daily temperatures exceed above normal and following conditions are met , a heatwave shall be declared;

Heatwave: Actual Temperature ≥ 45^0C

Severe Heat Wave: Actual Temperature ≥47^0C

a) Circulation of heatwaves alerts in public through different means

b) Circulation of heatwave prevention material for public awareness

c) Circulation of material on prevention of heatstroke

d) Mobilization of NGOs and other partners for establishing heatwave camps in busy city centers

e) Readiness of health facilities for managing heatstroke patients

Sr #	Category	Impact	Alert / Warning Level	Action to be taken
1	**Normal Day**: Maximum Temperatures are near normal	No Impact	Low	-
2	**Heatwave**: Actual Temperature exceeds 45^{0}C	Moderate temperature. Heat is tolerable for general public but moderate health concern for vulnerable people e.g., infants, elderly, people with chronic diseases	Guarded	1. Circulation of awareness messages with following precautionary measures; • Avoid heat exposure. • Wear lightweight, light-colored, loose, cotton clothes. • Cover your head: Use a cloth, hat or umbrella
3	**Severe Heatwave**: • Actual Temperature exceeds 47^{0}C • Heatwave conditions persists for ≥2 days	High temperature. Increased likelihood of heat illness symptoms in people who are either exposed to sun for a prolonged period or doing heavy work. High health concern for vulnerable people e.g.,	Elevated	1. Circulation of awareness messages with following precautionary measures; • Avoid heat exposure. Avoid dehydration. • Drink sufficient water

		infants, elderly, people with chronic diseases.		• Use ORS, homemade drinks like lassi, lemon water, etc. to keep hydrated 2. Establishment of heatwave camps in busy and congested business centers. 3. Facilitation in medical facilities for treatment of heat related diseases
4	**Extreme Heatwave**: • Actual Temperature exceeds 47^{0}C • Heatwave conditions persists for ≥6 days	Very high likelihood of developing heat illness and heat stroke in all ages.	High / Severe	1. Circulation of awareness messages with following precautionary measures; • Avoid heat exposure. Avoid dehydration. • Drink sufficient water • Use ORS, homemade drinks like lassi, lemon water, etc. to keep hydrated 2. Establishment of heatwave camps in busy and congested business centers.

				3. Facilitation in medical facilities for treatment of heat related diseases

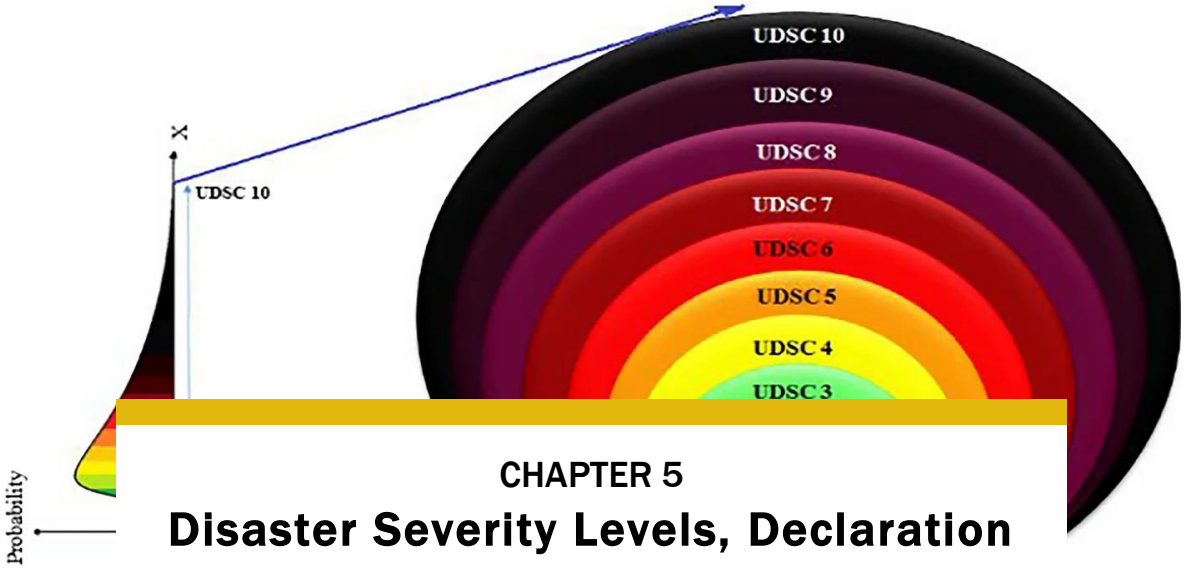
4.4. Riverine Flood

Sindh province is in tail of river Indus and water crosses many barrages before reaching Guddu, therefore, sufficient information on water flows, flow timings, etc., become available for decision making on flood preparedness. Each barrage in Sindh has declared flood levels and accordingly alerts, warnings and actions shall be;

Sr#	Reach	Flood limit categorization	Possible impacts	Alert / Warning Level	Actions to be taken
1.	Guddu	**Low**: 2 lac cusecs	Nil	Low	No action required
		Medium: 3.5 lac cusecs	Nil	Low	No action required
		High: 5 lac cusecs	Inundation of crops and villages near river flows	Guarded / Elevated	Announcement for evacuation of flood plain, preparation for relief camps
		Very High: 7 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	High	Vigilance of critical embankment, evacuation of people, establishment of relief camps
		Extremely High: 9 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	Severe	Vigilance of critical embankment, evacuation of people, establishment of relief camps, deployment of machinery, man and

Sr#	Reach	Flood limit categorization	Possible impacts	Alert / Warning Level	Actions to be taken
					material resources on critical embankments
2.	Sukkur	**Low**: 2 lac cusecs	Nil	Low	No action required
		Medium: 3.5 lac cusecs	Nil	Low	No action required
		High: 5 lac cusecs	Inundation of crops and villages near river flows	Guarded / Elevated	Announcement for evacuation of flood plain, preparation for relief camps
		Very High: 7 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	High	Vigilance of critical embankment, evacuation of people, establishment of relief camps
		Extremely High: 9 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	Severe	Vigilance of critical embankments, evacuation of people, establishment of relief camps, deployment of machinery, man and material resources on critical embankments
3.	Kotri	**Low**: 2 lac cusecs	Nil	Low	No action required
		Medium: 3 lac cusecs	Nil	Low	No action required
		High: 4.5 lac cusecs	Inundation of crops and villages near river flows	Guarded / Elevated	Announcement for evacuation of flood plain, preparation for relief camps

Sr#	Reach	Flood limit categorization	Possible impacts	Alert / Warning Level	Actions to be taken
		Very High: 6.5 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	High	Vigilance of critical embankment, evacuation of people, establishment of relief camps
		Extremely High: 8 lac cusecs	Inundation of crops and villages in flood plain and possibility of embankment breaching	Severe	Vigilance of critical embankments, evacuation of people, establishment of relief camps, deployment of machinery, man, and material resources on critical embankments



CHAPTER 5

Disaster Severity Levels, Declaration and Management

1. PREAMBLE

A natural disaster can be land based (e.g., earthquakes), water based (e.g., river floods), atmospheric (e.g., tornadoes), biological (e.g., pandemics), extraterrestrial based (e.g., comet strikes), or any combination of these (e.g., undersea earthquake and tsunami). Although these disasters are different, their impacts on humans and habitats are similar. All natural disasters can cause loss of life and damage to humans and their possessions, and they disturb people's daily lives.

Disaster magnitude or intensity can vary; however, impacts of disaster are largely dependent on disaster – human interaction. The key to understanding disaster is by recognizing that disasters are an indicator of development failures, meaning that disaster risk is a measure of the sustainability of development. Hazard, vulnerability, and exposure are influenced by several risk drivers, including poverty and inequality, badly planned and managed urban and regional development, climate change and environmental degradation. It is highly likely that an earthquake of severe magnitude striking in a thinly populated region produces less human impact as compared to high magnitude earthquake in thickly populated region.

Disasters scales can vary from local to regional and multi-country scales. Natural disasters are often described using many objective factors of severity, e.g., deaths, injuries, and property damage.

The severity of natural disasters increases as the impact on humans and their possessions

increases. In contrast, severity decreases the more a region is prepared for a disaster. Therefore, severity relates to all factors that can be grouped as follows:

a) Socioeconomic factors that reflect impact to humans and their possessions: number of fatalities, injuries, missing persons, homeless persons, evacuees, people affected by the disaster, the cost of damage (damage to property, crops, and economic damage), etc.

b) Strength-measuring factors that reflect the power and intensity of an event: magnitude, duration, speed, location, distance from disaster site to affected populated area(s), etc.

c) Preparedness factors that reflect a region's preparedness: available technology, resources, whether the area(s) could be evacuated before being affected, mitigation methods, response rate, etc.

The determination of disaster severity level is highly important for management and resource mobilization. A consistent scale is needed to understand the disaster continuum and to develop a platform for a reliable and transparent data management process that facilitates comparisons between different disasters. For this purpose, Universal Disaster Severity Classification Scheme (UDSCS) has been adopted for declaring disaster severity levels in Sindh province.

2. DISASTER SEVERITY LEVELS

Disaster severity levels are used on tangible impact factors such as fatalities, injuries, homeless, affected population, and cost of damages. These factors have been sub-grouped into human factors (H) (e.g., fatalities, injuries, missing persons, homeless persons, evacuees, and affected population) and damage factors (D) (e.g., cost of damage, damage to property, crops, and economic damage). A 0–10 level system is used to denote the level of disaster severity. The US dollar has been used as currency for denoting range of damages for better understanding of partners involved in different phases of disaster management in the province. The disaster severity scale is tabulated below;

Severity Level	Human Factors(H) (Range: Persons)	Damage Factors(D) (Range: USD)
0	1	1
1	1 - 10	1 - 5000
2	10 - 100	5,000 - 50,000
3	100 - 1,000	50,000 – 500,000
4	1,000 - 5,000	1M - 5M
5	5,000 - 10,000	5M - 50M
6	10,000 – 100,000	50M – 0.5B
7	100,000 - 1M	0.5B - 5B
8	1M - 10M	5B - 50B
9	10M – 50M	50B – 0.5T
10	50M and above	0.5T and above
M= Million	B= Billion T=Trillion	

Note: *Disaster scale shall be declared on occurrence of either of criteria the i.e., Human Factors or Damage Factors within ranges as specified against each level /category of disaster.*

Color Scheme for Disaster Severity Levels

Severity Level	Color code
Level 0	White
Level 1	Blue
Level 2	Dark Green
Level 3	Light Green
Level 4	Yellow
Level 5	Dark Yellow
Level 6	Red
Level 7	Dark Red

Level 8	Light Purple
Level 9	Dark Purple
Level 10	Black

Qualitative Classification of Disaster Severity Levels with Color Codes and Description

Severity Level	Nomenclature	Definition
Level 0		
Level 1	Emergency	*A sudden natural event that causes damage, injuries, and some fatalities*
Level 2	Disaster Type 1	*A major natural event that causes significant damage, many serious injuries, and many fatalities*
Level 3	Disaster Type 2	
Level 4	Calamity Type 1	*A large-scale natural disturbance that causes severe destruction, a major number of injuries, and great number of fatalities*
Level 5	Calamity Type 2	
Level 6	Catastrophe Type 1	*A very large-scale natural disturbance that causes widespread destruction, a massive number of injuries, and an extensive loss of life*
Level 7	Catastrophe Type 2	
Level 8	Cataclysm Type 1	*An extremely large-scale natural upheaval that causes devastation, an uncountable number of injuries, and unimaginable loss of life*
Level 9	Cataclysm Type 2	
Level 10	Partial or Full Extinction	*A world-scale natural upheaval that causes universal devastation, partial or full extinction of humans*

3. DISASTER SEVERITY LEVELS AND MANAGEMENT

Nature and severity of natural or manmade disasters varies and some events require management at local level for swift and efficient response. In view, disasters of different severity levels shall be managed in following manner;

Severity Level	Nomenclature	Definition	Management Tier
Level 0			*Local communities / Union Council Disaster Management Committee / Taluka Disaster Management Committee*
Level 1	Emergency	*A sudden natural event that causes damage, injuries, and some fatalities*	
Level 2	Disaster Type 1	*A major natural event that causes significant damage, many serious injuries, and many fatalities*	*Concerned District Disaster Management Authorities / UDMC /TDMC*
Level 3	Disaster Type 2		
Level 4	Calamity Type 1	*A large-scale natural disturbance that causes severe destruction, a major number of injuries, and great number of fatalities*	*PDMA with the support of DDMA (s) / TDMC / UDMC*
Level 5	Calamity Type 2		
Level 6	Catastrophe Type 1	*A very large-scale natural disturbance that causes widespread destruction, a massive number of injuries, and an extensive loss of life*	*PDMA with support of NDMA and international partners through DDMA / TDMC / UDMC*
Level 7	Catastrophe Type 2		
Level 8	Cataclysm Type 1	*An extremely large-scale natural upheaval that causes devastation, an uncountable number of injuries, and unimaginable loss of life*	*PDMA with support of NDMA and international partners through DDMA / TDMC / UDMC*
Level 9	Cataclysm Type 2		
Level 10	Partial or Full Extinction	*An upheaval that causes partial or full extinction of humans*	-

4. DISASTER DECLARATION

Regarding natural disasters, disaster shall be declared as per the National Calamity Act 1958 and successive amendments. Following shall be considered before declaration of the emergency / disaster;

a) Union council shall be benchmark for determination of initial losses and damages;

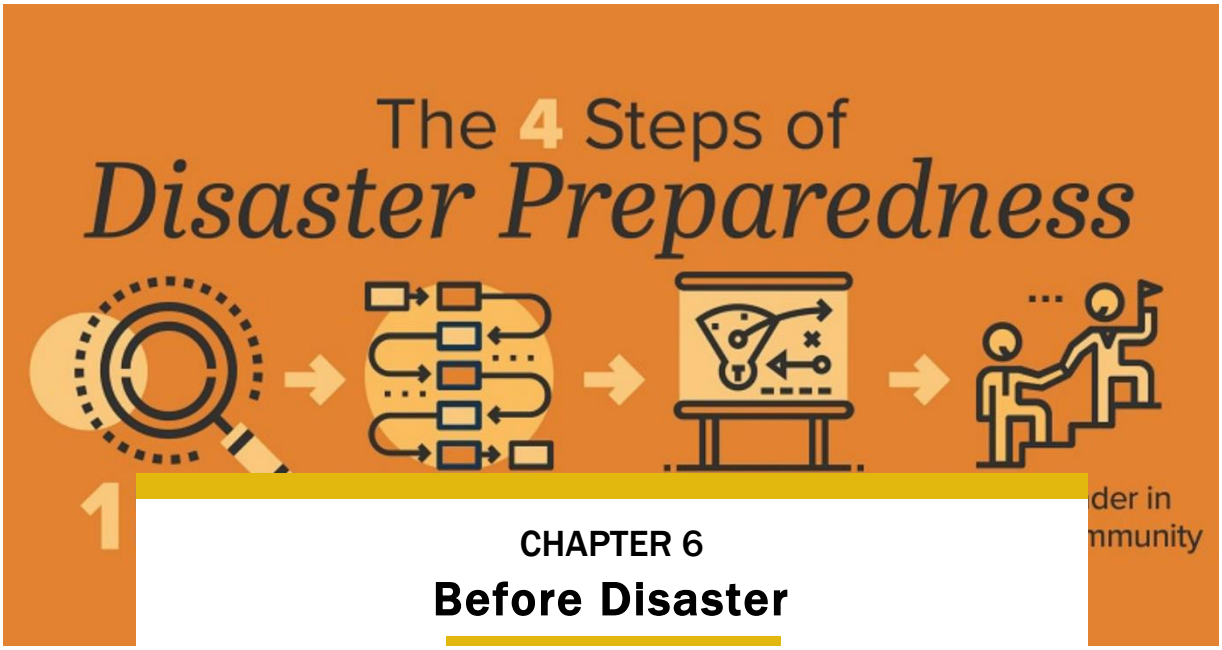
b) If more than 50% residing population or livelihood sources or area (cropped area, access roads, public amenities etc.) of UC is affected by any type of natural disaster;

c) Successive administrative hierarchies such as Taluka and District shall be declared disaster hit if number of affected UC exceeds 50% of the total UC within respective administrative hierarchy.

d) Appended procedure shall be followed for declaration of the emergency / disaster.

e) District Disaster Management Authority (DDMA) shall approximate initial losses and damages in respective disaster hit jurisdiction and shall report in writing to Director General, Provincial Disaster Management Authority for declaration of disaster.

f) Office of the DG, PDMA shall compile all such reports / requests received through DDMA and shall recommend to Secretary to Government of Sindh, Rehabilitation Department for declaration of disaster in relevant administrative jurisdiction



CHAPTER 6

Before Disaster

1. PREAMBLE

Hydro-meteorological hazards like rains, cyclones, thunderstorms, heatwaves, drought, winds, ocean tides and secondary hazards like floods and tsunami can be forecasted with the assistance of modern technology and relevant models. However, reaction time for disaster response is quite important for executing necessary preventive measures. With the use of modern technology and modelling techniques, all the above hazards can be forecasted well before onset with better accuracy. Timely preventive and preparedness measures can greatly reduce losses and damages. Preventive and preparedness actions include all structural and non-structural measures. It is also important to realize that, without or with improper protective and preventive structures, non-structural measures will not produce desired results and outcomes. Therefore, it is prime responsibility of all concerned departments to ensure that all man and material resources and infrastructure is dependable during the disasters. The concerned departments shall ensure that all measures elaborated in District Disaster Management Plans and other actions deemed necessary by the departments are set up before or after a forecast is issued for possible disaster.

2. PREPAREDNESS FOR MONSSON

Hydrological disasters are the most disturbing and frequent natural disasters in Sindh which include riverine, urban, and flash floods and are associated with yearly monsoon season. Lessons learnt after each spell of monsoon are sufficient for necessary

preparation by the concerned and relevant departments, authorities, and boards. Preparedness plans are already given in District Disaster Management Plans with roles and responsibilities of the concerned departments. Specifically for monsoon (which bring frequent disasters in Sindh) preparedness, following mechanism shall be followed;

Type of Hazard / Disaster	Primary Responsible Department	Secondary / Support Department	Actions
Riverine and Flash floods	Irrigation Department / SIDA	PDMA shall extend its resources only in exceptional cases if and where deemed necessary	• Inception of flood protective and other infrastructure • Identification of vulnerable points in flood protection infrastructure • Preparation of inventory of available resources which can be utilized in emergency. • Ensure that flow monitoring mechanism for waterways, specially entering in towns and cities are properly working and water flow levels are monitored and reposted for safety of cities and town. • Ensure availability, mobilization, and deployment of resources at vulnerable points as safety measure in anticipation of any breach. • Cleaning of chock points in drainage system • Shall prepare contingency plan and share with PDMA
Urban Floods	Local Government, Water and Sewerage Boards, Development	PDMA shall extend its resources only in exceptional cases if and were deemed necessary	• All concerned authorities shall ensure that sewerage and drainage system is operational and in ready condition. • All chock points in drainage system are cleared

Type of Hazard / Disaster	Primary Responsible Department	Secondary / Support Department	Actions
	Authorities, Metropolitan corporations (where applicable)		• Dewatering pumps and machinery are inspected and operational. • Ensure that machinery installed for dewatering from underpasses is operational. • Ensure that backup power supply system for operation of machinery is ready and available • Ensure that all man and material resources are mobilized and deployed at permanent problematic sites • Shall prepare contingency plan and share with PDMA

As far support of PDMA is concerned, the relevant departments / authorities / boards or any other relevant entity shall ensure that possibilities of man and material support and coordination required from PDMA is clearly chalked out and shared with PDMA before start of monsoon season for necessary arrangements by PDMA. However, in all circumstances, concerned entities shall be prime responsible for disaster response excluding relief and initial recovery.

Preparedness measures along with roles and responsibilities of the relevant departments have been given in District Disaster Management Plans prepared by PDMA. All departments shall ensure that plans and actions are implemented in accordance with their spirit.

3. CONTINGENCY PLANNING

Contingency planning is important for resource allocation and mobilization. All direct and indirect partners in provincial disaster management shall prepare departmental contingency plans for management of emergency / disaster. Following are the strategic guidelines for preparation of contingency planning;

a) Contingency planning should be as realistic as possible, and scenario based

e.g., if a riverine flood of certain cusec occurs in Indus, how much population is likely to be affected, what resources are available to manage the situation, what additional resources will be required to manage the situation, how many and where camps will be required to facilitate displaced population, what facilities will be required and how camps will be managed, how much relief will be required for response and initial recovery. Any other pertinent information deemed necessary shall also be provided by concerned departments.

b) All efforts shall be made by the disaster management partners to prepare a single and comprehensive contingency plan for the entire province.

c) Separate contingency and situation-based plans for all common disasters in the province shall be prepared and updated as per requirements

d) All necessary digital databases shall be prepared and maintained by disaster management partners for successive updation of contingency plans.

e) PDMA Sindh shall coordinate with all disaster management partners for preparation of departmental disaster management and contingency plans and departments shall be responsible for preparation and updation of plans.

4. PRE-DISASTER COORDINATION

In all circumstances, PDMA Sindh shall be nodal entity for internal and external coordination. In case of small-scale disaster, and if external support is required by the DDMA(s), DDMA shall request for assistance through PDMA. In exceptional circumstances, if external assistance is of urgent nature, DDMAs can request for assistance to external entity keeping PDMA in loop.

Before onset of any forecasted hazard, PDMA shall consult and in close coordination with forecasting agency continue coordination for monitoring of hazard. If hazard is confirmed and intensity of hazard is above the acceptable risk and likely to turn into disaster, PDMA shall issue advisories /alerts /warning according to the situation and shall request the disaster management partners for necessary preparation and actions. All required man and material resources shall be engaged for management of disaster to reduce losses and damages. If hazard or likely disaster is beyond the provincial disaster management capacity, then PDMA shall coordinate with

NDMA and other partners for required support.

5. DISSEMINATION OF ADVISORIES / ALERTS AND WARNINGS

In addition to issuance of advisories / alters and warning to disaster management partners for necessary preparation, PDMA shall ensure all possible means to reach to population likely to be affected by forecasted hazards. PDMA shall ensure to use robust mechanism for public outreach. Means can include mobilization of DDMAs, TDMC, UDMC, direct contact with notable of the area, welfare and volunteer organization, mobile and short messaging services, media and social media platform or any advanced technological solutions. For dissemination of such information, PDMA shall develop database of government officials, notable persons living in disaster prone areas, volunteer, and non-governmental organizations etc.

6. EVACUATION

Evacuation is the last resort to save human and livestock lives. If the threat of any natural disaster reached to High and Severe levels, process of evacuation shall take place. Physical public reach out shall be carried out by concerned UDMC, TDMC, DDMA on the issuance of High and Severe level warnings issued by PDMA. Following strategic guidelines shall be adopted for initiation of evacuation;

a) PDMA shall closely liaise with forecasting departing regarding potential threat;

b) PDMA shall inform and brief Chief Executive of Province on likely situation through proper channels;

c) After consultation with Chief executives / higher authorities PDMA shall issue advisories for evacuation to concerned DDMAs;

d) DDMAs shall ensure physical public reach out for informing communities at risk and shall arrange transportation and other facilities for evacuation;

e) Priority shall be given to elderly, disabled, women and children during the evacuation process;

f) Sindh Emergency and Rescue Services shall be deployed for safe evacuation of people;

g) Relief camps shall be established at suitable locations keeping in view accessibility, safety, and security of the displaced peoples;

h) No schools, other education facilities and government facilities shall be allowed for establishment of relief camps;

i) PDMA shall mobilize all possible resources including government, non-government, philanthropist and volunteer organization for camp facilitation and management;

j) PDMA in consultation and collaboration with DDMA shall notify camp management committees comprised of government officials, NGOs, volunteers, and representatives of affected communities;

k) Health department shall deploy mobile health facilities in camps for health-related issues;

l) Concerned police office shall ensure security of the camp premises;

m) PDMA shall ensure availability of food and other necessary arrangements in camps through government or partner sources

n) Camps shall be established at location where sufficient space is available to accommodate livestock of the displaced persons;

o) Livestock department shall deploy resources for treatment / necessary vaccination of livestock present in camps;

p) If evacuation is beyond the provincial capacity, then NDMA and tri-services shall be requested during rescue and evacuation process;

q) PDMA shall mobilize resources to ensure that women and girls are safe from sexual harassment and shall arrange necessary hygiene and sanitation items for women, girls, children, and infants. Women Development Department and Child Protection Authority shall deploy resources to ensure safety and wellbeing of women and children in relief camps;

r) PDMA shall ensure that the presence of potable water, lighting, and toilet facilities are available in camps. Regarding camp facilities special care shall be given to women, children, elderly, and disabled persons;

s) Relief camps shall be maintained till threat or consequent effects are over;

t) UDMC, TDMC and DDMA shall conduct preliminary damage survey

and shall share with PDMA. Based on survey, PDMA shall provide necessary relief and temporary shelters to individual families whose houses are damaged.

u) Concerned camp management committees shall maintain all relevant record of camps including number of persons, count of families, count of women, children, elderly, and disabled person and shall share with PDMA on regular basis.

v) Locations of camps shall be made public for all those individuals, philanthropist organization, NGOs and volunteer interested in in-kind or service support in camps.

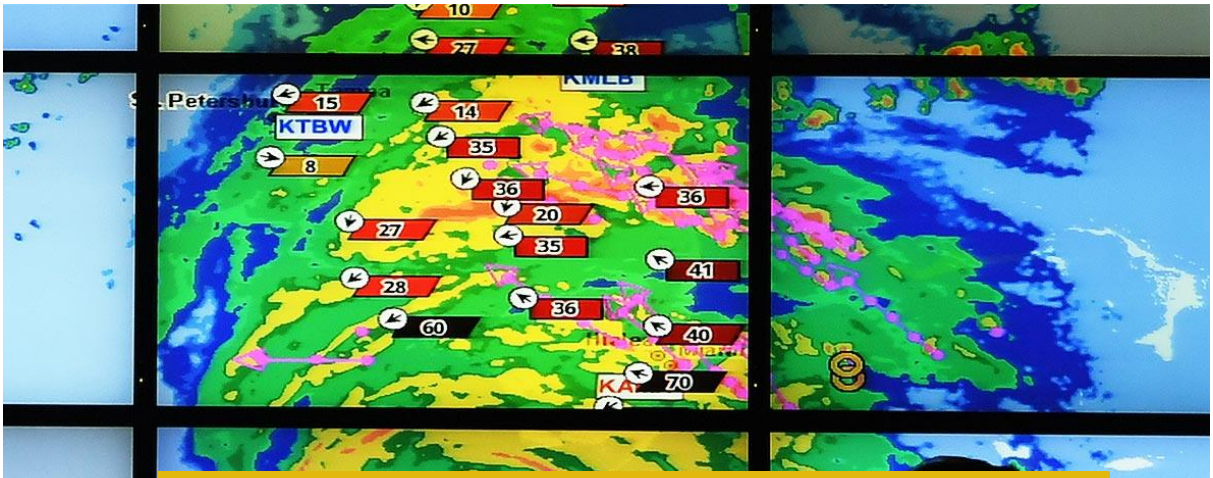
w) To avoid duplication and wastage of resources, the camp management committees shall inform and enlist all those items which are essentially required in camps and this information along with camp number / location shall be publicized on PDMA websites for people / organizations interested to support disaster affectees.

7. PROCUREMENT OF RELIEF

PDMA shall procure essential non-food items based on case load identified in contingency plans through normal procedure. Proper stock inventory shall be maintained by PDMA, and stock shall be available in a ready position for disbursement. In addition, all machinery and equipment shall be inspected for ready position.

8. INVENTORY OF RESOURCES

PDMA shall arrange to collect district-wise inventory of machinery and equipment available with different departments which can be used to control disaster or can be used in rescue or relief. All departments shall be responsible to provide such information. In addition to government resources, potential private service providers shall be identified and database of such firms / companies / individuals shall be maintained for any possible engagement as per demand. PDMA shall ensure to develop digital and online mechanism for complication of such information. Other than machinery and equipment, all potential merchants shall be identified, and database shall be maintained for engagement of their services during disaster /emergency.



CHAPTER 7

During Disaster

1. PREAMBLE

Emergencies and disasters create panic and pressure on disaster managers and other government tiers. It is highly important to manage disasters in a composed and systematic way to ensure reduced losses, and effective and efficient management of resources. Natural disasters are unavoidable and certainly bring difficult times for the public, management, and other partners. Media and social media must be encouraged to align with efforts of disaster management authorities for all out and productive response during the disasters. Disaster management requires joint efforts of all strata of social fabric including effected communities. During a disaster spirit of all stakeholders shall be to facilitate affected populations and bring their life back to normal in shortest possible time. Effective management of disaster will lessen the burdens and sufferings of affected population.

2. COMMAND AND CONTROL CENTRE

If warning for any possible threat is issued or any unprecedented disaster has occurred a Command-and-Control Centre headed by DG, PDMA shall be established in PDMA HQ for monitoring of situation and other disaster response efforts. The Command-and-Control Centre shall be composed of;

a) PDMA

b) Irrigation

c) Local Government and municipal authorities

d) Development Boards and Authorities (Depending upon location of disaster)

e) Health

f) Livestock

g) Agriculture and Food

h) Social Welfare

i) Sindh police

j) Public Health

k) S&GD

l) NDMA and Tri Services (if required)

m) Representation from philanthropist organizations and NGOs

3. TORS FOR COMMAND-AND-CONTROL CENTRE

a) Initial damage and losses assessment through departmental sources

b) Daily situational reports through departmental sources

c) Determination of rescue and relief requirements

d) Facilitation in management of relief camps

e) Liaison between PDMA, DDMA on emerging situations and requirements

f) Data and information sharing between relevant departments and PDMA

g) The Control Centre will work 27/7 till it is declared closed

Note: *Government officers not below than BPS-19 shall be detailed in Command-and-Control Centre till disaster and its effects are over or DG PDMA declares closure of operations of Command-and-Control Centre.*

4. ESTABLISHMENT OF FACILITATION CENTERS

Keeping in view severity of disaster temporary facilitation centers for disaster affectees shall be established within premises of Union Council offices, Assistant Commissioner offices or any other feasible and suitable location. Distribution of relief and temporary shelters shall be carried out through these facilitation centers. DDMAs shall declare facilitation centers in their jurisdictions and inform PDMA. PDMA shall ensure the required supply of relief goods at facilitation centers.

5. OPERATING PROCEDURE OF FACILITATION CENTERS

Following operating procedure shall be adhered and followed during execution;

a) Locations of Facilitation Centers shall be publicized for information of masses;

b) Disaster affectees will visit facilitation centers and register themselves with necessary information such as nature of damage or losses, number of family members (with segregation of gender and age), name of village, CNICs and contact number etc. Digital proforma for registration shall be devised by PDMA / DDMAs.

c) Once the necessary details of affectees are registered the authorized officer / official of UC / Assistant Commissioner office shall hand over relief goods to individual according to family composition.

d) Details of relief provided shall be entered in digital proforma for online / offline sharing with DDMA and PDMA.

Note: *During time PDMA shall arrange to develop online applications on appropriate platform for registration of affectees and with ability to generate token system which can be used by affectees for receiving of relief good and other compensations if applicable.*

6. SECURITY OF FACILITATION CENTERS

To avoid unwanted incidents like snatching of relief and other likely situations, the concerned police station shall deploy necessary arrangements for safety, security, and maintenance of discipline in facilitation centers.

7. AVAILABILITY OF RELIEF GOODS

All efforts shall be made by PDMA to preposition relief goods to expected disaster hit administrative jurisdictions before onset of disaster to avoid hassle and rush. During disaster, PDMA warehouses shall work on 24/7 basis till completion of activities. Prior stocked or fresh orders shall be received at PDMA warehouses for necessary record keeping before on demand disbursements.

8. DEMAND AND SUPPLY OF RELIEF GOODS

Keeping in view damages and losses and initial assessment, DDMA (s) of calamity hit jurisdiction shall demand in writing for supply of relief goods. Such requests should be comprehensive to include item-wise demand against damages. PDMA shall assess those demands and considering overall provincial scenario shall disburse demanded items in required quantity or can

hold the demand to meet parallel requirements received from other districts till sufficient supplies are made available at PDMA.

9. TRANSPORTATION OF RELIEF GOODS

PDMA shall arrange transportation of relief goods to calamity hit district (s) and goods shall be handed over to the designated person of DDMA (s). DDMA (s) shall be responsible for receiving relief goods and shall immediately acknowledge the receipt through prescribed means. In case transportation resources of PDMA are exhausted, DDMA (s) shall arrange transportation through departmental sources. As and when required, Sindh police shall provide security during transportation of goods to designated places to avoid snatching incidents. DDMA (s) shall be responsible for unloading relief at the earliest and stock relief goods at safe places.

10. DISTRIBUTION OF RELIEF AMONG AFFECTEES

DDMA (s) shall supervise the distribution of relief among disaster affectees, and all efforts shall be made to ensure that judicious distribution is taking place at designated sites. A proper record of beneficiaries shall be maintained to avoid wastage of resources. PDMA shall arrange digital online / offline mechanism for distribution of relief for maintaining transparency.

11. STANDARD RELIEF PACKAGE OF NON-FOOD ITEMS

Standard package may vary according to nature of disaster, season, and other possible variables, however following strategic guidelines shall be adhered for non-food relief package;

a) x1 tent of sufficient dimensions to accommodate average family of 6 persons

b) x1 Chatai for flooring / Plastic sheets

c) x1 cooler / container for drinking water

d) x1 battery torch

e) x2 steel Thaal

f) x6 foldable mosquito nets

g) x6 blankets (depending on the weather)

h) x2 Towels

i) x2 washing and dish washing soaps

j) x2 packets of feminine sanitary items

Except disposable items, all items shall be procured keeping in view their durability and re-usability.

Note: *Indicated package shall only be distributed among affectees residing in their native places but their houses are fully or partially damaged. Displaced affectees shall be accommodated in designated shelters / camps and camp management committees shall ensure availability of essential items in-line with above package through government / non-government channels.*

12. STANDARD RELIEF PACKAGE OF FOOD ITEMS

On similar lines of non-food items, guidelines for food items are as follows;

a) 30 Kg flour for average family of 6 persons (for one month)

b) 05 Kg rice

c) x2 Kg of pulses of two varieties (chickpeas and mong)

d) x3 Kg Cooking Oil or Ghee

e) x1 Kg Tea

f) x3 Kg Sugar

g) x2 Kg dry milk

h) x1 Kg Salt

i) x.5 Kg Red Chilies

Note: *Indicated packages shall only be distributed among affectees residing in their native places but their houses are fully or partially damaged. Displaced affectees shall be accommodated in designated shelters / camps and camp management committees shall ensure availability of essential items in-line with above package / cooked food through government / non-government channels.*

13. AUTHORIZED RELIEF DISTRIBUTORS

Disasters accompany a pressing working environment for management and workload of disaster management entities and partners grow exponentially. However, in all circumstances, requisition for distribution of relief shall be managed by District Disaster Management Authorities or through their designated officers / offices. In situations where affectees directly approach PDMA, DG PDMA, Director Operations PDMA or any other designated officer shall authorize relief distribution to affectees. Necessary information of affectees shall be collected on distribution of relief. However, scope of distribution of relief by PDMA shall be limited to approaching affectees only. NGOs and other alike partners shall also be authorized to distribute relief, however, to avoid duplication of efforts and wastage of resources, such entities shall be encouraged

to distribute relief in coordination with PDMA and DDMAs.

14. DESIGNATED SITES FOR RELIEF DISTRIBUTION

Facilitation Centers shall be the primary place for distribution of relief. However, considering unforeseen factors, relief can be distributed in other safe and secure places identified by the DDMAs. However, in all circumstances, relief distribution shall not be allowed and carried out along roadsides or in villages to avoid various unwanted situations. The NGOs and other philanthropist organizations shall be encouraged to conduct relief distribution activities at declared and designated places.

15. CURBING OF HABITUALLY AND SELLING OF RELIEF GOODS

Judicious and equitable distribution shall be basic principle of relief distribution. Habitual and pretending affectees, in all circumstances, shall be curbed to receive relief multiple times from various sources. At a later stage, such habitual individuals /people sell out relief to local shops which is against the interests of genuine affectees. Receiving relief more than requirement and selling shall be considered social crime and legal actions shall be carried out against sellers and purchasers.

CHAPTER 8

Post Disaster Recovery and Rehabilitation

1. PREAMBLE

Hazards always produce disastrous results in weaker human settings. On every disaster event, government divert development funds to disaster response and rehabilitation. Appropriate disaster risk reduction strategies shall be the priority while developing rehabilitation initiatives and shall be applicable to rehabilitation of public infrastructure and damaged houses. In failure to implement such strategies, perpetual cycle of development and rehabilitation will continue to divert development funds and ultimately hamper overall growth and development of the province.

2. STRATEGIC GUIDELINES FOR REHABILITATION OF INFRASTRUCTURE

2.1. Roads:

Roads are normally damaged due to the presence of water over or along the roads for a longer period. Rehabilitation of roads must be carried out with proper drainage along the roads to avoid damage in future. For new schemes related to road construction, specific emphasis shall be given to ensure provision of proper drainage along the roads. Roads intersecting natural gradients must be ensured to have proper culverts to pass water.

2.2. Building and other infrastructure:

In addition to safety measures for other disasters such as earthquakes and fire,

infrastructure development in hazards prone areas shall be avoided. While initiating the new schemes, proper hazard risk assessment of the project areas shall be carried out before approval of schemes. Regarding rehabilitation of damaged buildings, in addition to reconstruction / rehabilitation, the root causes of damages shall be identified and addressed in rehabilitation scheme.

2.3. Compensation for damaged homes:

Generally earthen homes and old homes of people get damaged during rains and floods and the government provides compensation to affectees for reconstruction of homes. For adopting build back better principal following strategic guidelines shall be followed while initiating rehabilitation schemes;

a) A senior management forum shall be established to manage the rehabilitation process. Chief Minister or Chief Secretary shall decide composition of forum. DG PDMA or any designated officer shall be an integral part of the forum.

b) A detailed damage assessment survey shall be conducted to determine the exact nature and extent of damage. Depending upon survey result, separate amount shall be decided for different nature of damages i.e., fully, partial, boundary wall, livelihood source (shop, small business, damage to earning resource etc.).

c) Support in cash shall be given to deserving affectees through appropriate channels as decided by the competent forum for monitoring of transactions, reconstruction, transparency and accountability.

d) Durable, long lasting, cost effective and disaster withstanding home construction designs and materials shall be approved by competent forum for rehabilitation.

e) In addition, following must be ensured before release of cash compensation,

f) Reconstruction is not taking place in low lying areas and waterways

g) The rehabilitated house is being constructed on sufficient elevation for protection from flowing water

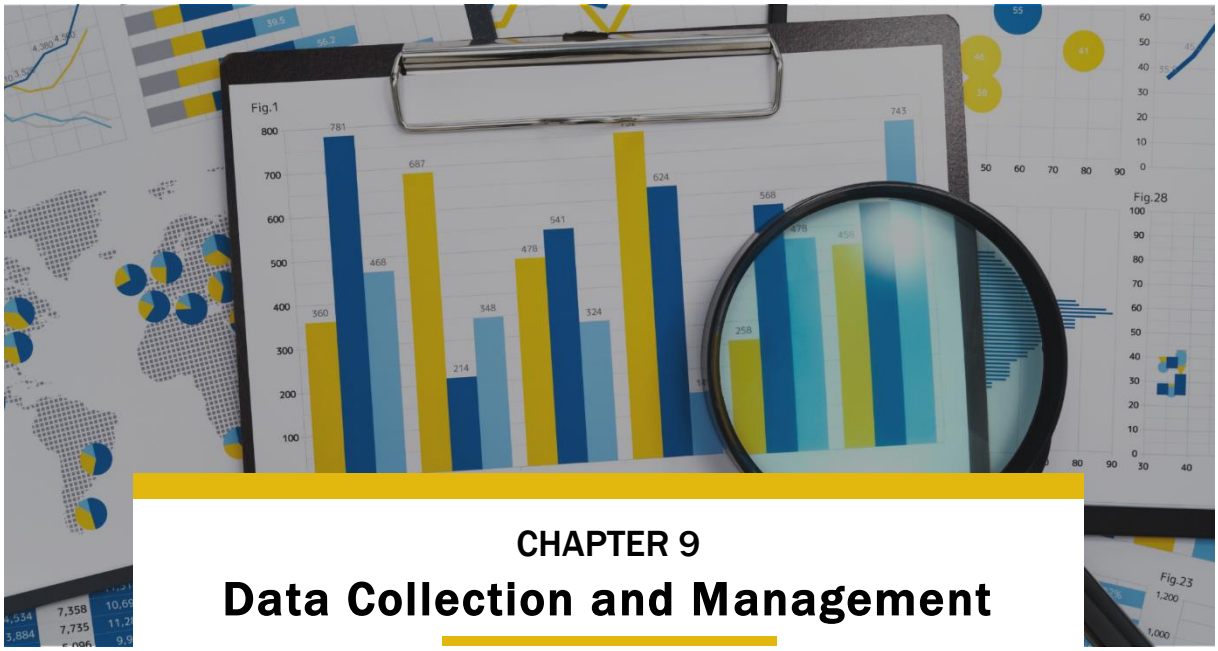
3. INELIGIBLE DISASTER AFFECTEES

Affectees living within flood plains, waterways, natural depressions, illegal

occupants on sewage and drainage channels and illegal occupants of government lands shall not be eligible for cash compensation for rehabilitation.

4. CROP DAMAGE COMPENSATION

Small land holding farmers not owing more than 15 acres of land shall be entitled for cash / in kind compensation. In kind compensation shall include crop seeds for the next sowing crop. For large land holding farmers, government shall waive necessary duties and taxes. Feasibility studies for disaster financing, specially interest free loans, insurance and other possible mechanism shall be carried out by PDMA with relevant stakeholders to cover frequently occurring disasters. Such studies shall be focused on compensation of small business and livelihood resources including livestock, fisheries, and alike sources.



CHAPTER 9

Data Collection and Management

1. PREAMBLE

Data and information are key in disaster management and all operations rely on timely and accurate information provided by the relevant quarters. Various data and information such as preliminary damages and losses, affected population, livestock losses etc. are immediately required to organize resources and response. In absence or inaccurate data response will be unorganized, deficient, or over resourced. Hence, all efforts shall be made for collection of standardized, accurate and timely data and its sharing. Other than mentioned data sets, details of response operations carried out by different government and non-government forums is also critical to reconcile response and realign response where required. For these purposes, standard data sharing platforms shall be developed to bring consistency and homogeneity in data and information sharing.

2. PORTALS / PLATFORMS FOR DATA SHARING

PDMA shall arrange portals and necessary applications for;

a) Collection of damages and losses

b) Collection of response efforts by different forum including government and non-government forums

c) Collection of detailed damage assessment

d) Collection of relief beneficiary information

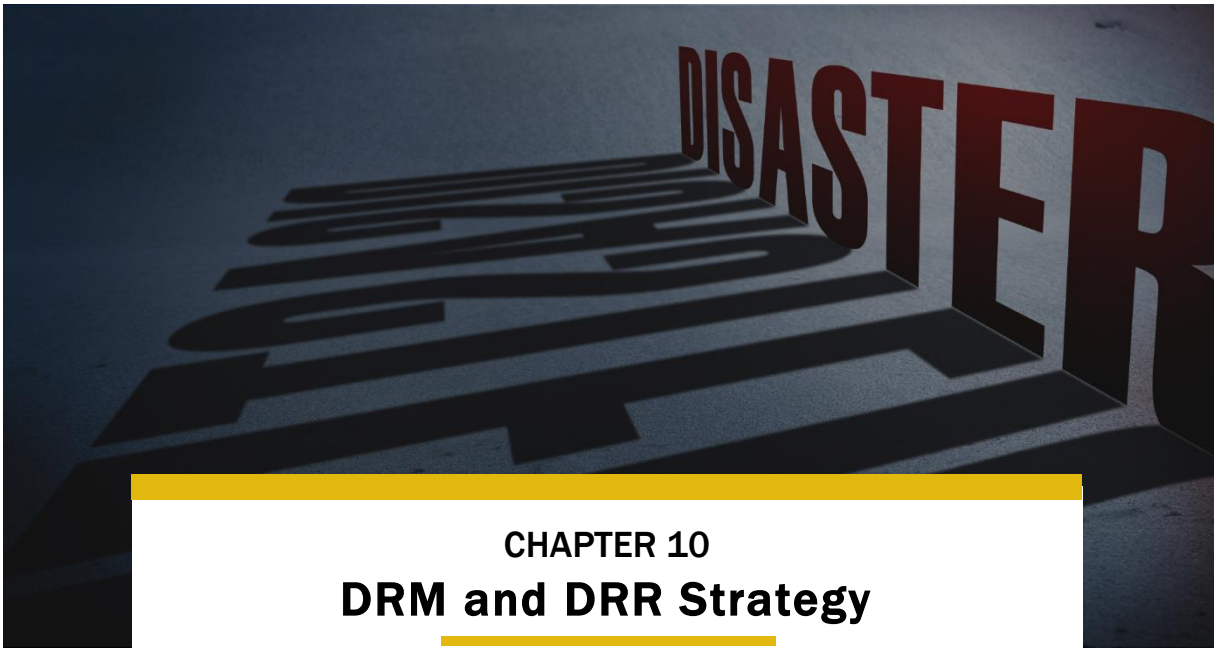
For standardization of data, data collection templates shall be developed by PDMA and shall be shared with all stakeholders for seeking their inputs before finalization of templates.

3. DIGITAL TRANSACTION AND RECORD OF RELIEF RECEIVING AND DISTRIBUTION

As per practice, relief from PDMA and other organizations is distributed among disaster affectees through DDMAs. The record of goods receiving and distribution among affectees is kept through conventional record keeping methods. PDMA shall arrange to digitalize the whole process of relief distribution for better and transparent management of records.

4. RESPONSIBILITY OF DATA SHARING

In all circumstances, data sharing stakeholders shall be responsible for accuracy and timely provision of data, information, and records.



CHAPTER 10

DRM and DRR Strategy

1. PREAMBLE

Natural hazards are elements of physical environment which have potential to harm humans and ecology and are caused by forces beyond control of humans. Natural hazards are atmospheric, hydrologic, geologic phenomena which can generate primary and secondary impacts depending on their location, severity, and frequency and have the potential to affect humans, their structures, or their activities adversely. Natural hazard is only hazardous when it interacts with humans and human ecology, thus; has an element of human involvement. A **physical event**, such as a cyclone, that does not affect human beings is a natural phenomenon but not a natural hazard. A natural phenomenon that occurs in a **populated area** is a **hazardous event**. In areas where there are no human interests, natural phenomena do not constitute hazards, nor do they result in disasters.

2. EXISTING HAZARD RISK PROFILE OF PROVINCE

Physiographicaly the Sindh province can be divided into 6 broad regions i.e.

a) Western Valley

b) Khirthar mountains

c) Kohistan or Kachho

d) Eastern Valley

e) Thar Desert and

f) Delta

Due to different characteristics of each region, hazard profile of the regions is slightly different from each other. Based on historical events, major existing natural hazards of the province include, floods, cyclones, drought, heatwaves, earthquake and tsunami. Hazard profile is of the province is shown below Table.

Type of Hazard	Hazard Level
River Floods	High
Urban Floods	High
Coastal Floods	High
Cyclones	High
Drought	High
Heatwaves	High
Earthquake	Medium
Tsunami	Medium

Sea-water intrusion is also slow-onset natural hazard for the province along-with water scarcity.

3. POSSIBLE FUTURE HAZARD RISKS

Climate change is likely agent to bring unprecedented changes in weather patterns and consequential changes in hydro-metrological hazard risk at global scale and province is Sindh cannot be excluded to embrace hazard risks. Climate change, if left unchecked, will increase the likelihood of severe, pervasive and irreversible impacts on people and ecosystems.

The annual mean temperature in Pakistan is expected to rise by 3°C to 5°C for a central global emissions scenario by the end of this century, Average annual rainfall is not expected to have a significant long-term trend, but is expected to exhibit large inter-annual variability. Sea level is expected to rise by a further 60 centimeters by the end of the century and will most likely affect the low-lying coastal areas south of Karachi toward Keti Bander and the Indus River delta. Under future climate change scenarios, Pakistan is expected to experience increased variability of river flows due to increased variability of precipitation and the melting of glaciers. Demand for irrigation water may increase due to higher evaporation rates. Mortality due to extreme heat waves may increase. Urban drainage systems may be further stressed by high rainfall and flash floods. Sea level rise and storm surges may adversely affect coastal infrastructure and

livelihoods. Additionally, severe water-stressed conditions in arid and semi-arid regions is expected due to reduced rainfall, increased temperature, and depletion of soil moisture.

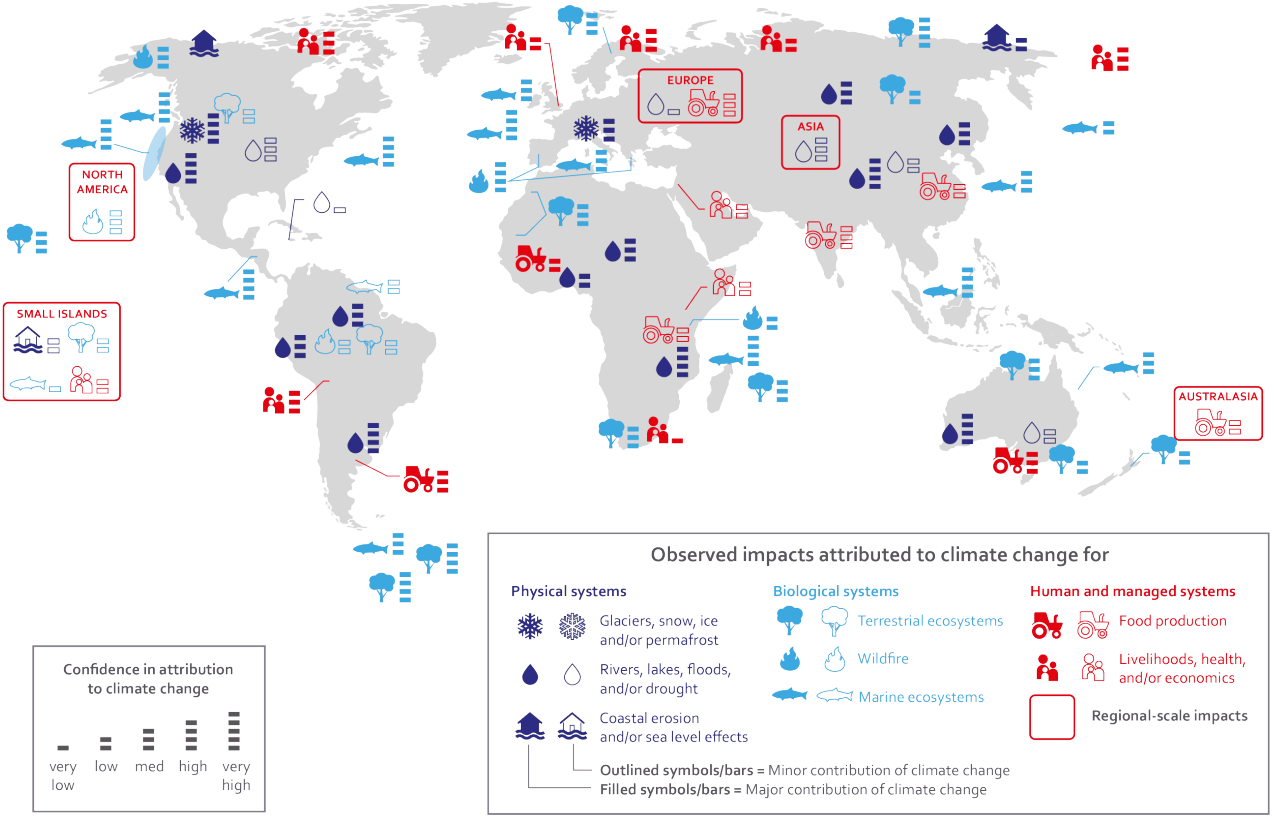


Figure 6. Global Climate Change Impact Map

Global climate change impacts given in Intergovernmental Panel on Climate Change (IPCC) report of 2014 are shown in Figure 6 below. Asia is likely to face climate change impacts in High range as depicted in the figure in terms of river flows, floods, drought, food production, livelihood and health.

The climate change is also affecting sea surface temperature in Indian Ocean which is likely to continue in current GHG emission scenario. A report titled 'Assessment of Climate Change over the Indian Region' published on June 17, 2020 prepared of Ministry of Earth Sciences, India points out Increasing Sea surface temperatures in the tropical Indian Ocean and an increase in frequency of very severe cyclones in the region. This trend is likely to affect the coastal belt of Sindh. During monsoon 2020 and 2022 the southern arm of monsoon system remained active and brought heavy downpour over coastal cities of Sindh including Karachi and rest of the province.

4. STRATEGIC PLAN FOR DISASTER RISK MANAGEMENT AND DISASTER RISK REDUCTION

4.1. Policies, Reforms, and Institutional Strengthening

Intervention	Action Plan	Likely Benefits	Nature
Institutional Strengthening of PDMA and DDMAs	• Institutional expansion in PDMA in terms of professional, qualified and dedicated staff in officer and staff cadre for PDMA HQ and regional offices. • Induction of dedicated staff for disaster management activities at district level. • Delegation of resources and powers to DDMAs.	Service delivery of PDMA will improve significantly and PDMA will be able to focus on preparation and mitigation phase of disaster management.	Short term
DRR Mainstreaming in Development Planning	• Planning and Development Board, Government of Sindh may hire qualified professionals in disaster management to securitize development projects in view of present and future hazards risks.	Inclusion of DRR in development sector will ensure sustainable development and will reduce the disaster response efforts to affordable limits	Short and medium
Disaster Risk Management and Reduction Planning by all sectoral departments	• In true sense disaster management would only be possible when all stakeholders' departments will play their due role. • All departments with stakes in cities and rural areas to prepare departmental disaster management plans	Reduced losses and response efforts	Short and medium

Intervention	Action Plan	Likely Benefits	Nature
	in line with PDMA and NDMA Plans.		
Public Participation in Disaster Management	• Institutionalization and strengthening of community-based disaster risk management and reduction. • Formulation and strengthening of community-based disaster management committees at local level • Development of government patronized community volunteers at local level • Development of database of local influential	Improved mitigation and response	
Preparation of policy on Landuse Management and rival of natural drainage system	• Relevant department to prepare landuse policies / laws for safer future e.g., policy / law of landuse in Indus flood plain will restrict human activities and reduce bund breaching risks.	Improved riverine flood mitigation	Short, medium and long term
Disaster Insurance and Disaster Risk Financing	• PDMA to conduct feasibility studies / pilot project in collaboration with local and international institutions to	Less disaster burden on poor and marginalized population.	Medium and short term.

Intervention	Action Plan	Likely Benefits	Nature
	device mechanism for disaster risk insurance		

4.2. Incubation of technology in Disaster Management (Forecasting, Early Warnings)

Intervention	Action Plan	Likely Benefits	Nature
Installation of Tsunami Cyclone, heavy rain warning dissemination systems	• Met department may enhance forecasting system • Installation of warning dissemination systems (both human and technology based) in coastal belt of Sindh. • For heavy rains, strong and reliable mechanism for dissemination of warnings for rest of the province.	Reduced life and livestock losses.	Short and medium term
Rain warning dissemination for torrential flood regions (Kachho and Khirthar Range)	• Installation of early warning system dissemination system and strengthening of human based warning dissemination mechanism	Reduced life and livestock losses.	Short and medium
Installation of digital gouges and GSM based dissemination systems	• Installation of digital flow monitoring digital gauges at all hill torrents emanating towards populated areas including Kachho, Khirthar range and Indus River	Reduced life and livestock losses.	Short and medium term

Intervention	Action Plan	Likely Benefits	Nature
Monitoring of vulnerable bunds and river flows at highly vulnerable locations through areal drones	• Monitoring of highly vulnerable points through drone technology	Reduced life and livestock and agricultural losses.	Short term
Geomorphological mapping and study of Indus Flood Plain	• Human interventions have greatly impacted the Indus flood plain so the behavior of flood water flow, Therefore, geomorphological study of present flood plain will greatly help in understating of river flow and possible breaching in bunds.	Reduced life and livestock and agricultural losses in settled areas	Short term
Installation of automatic met observations station at DC and AC offices across the province.	• Stations will greatly help in data collection, improve forecasting and seamless data dissemination on weather conditions across the province.	Facilitation in prediction of weather and early warnings and organizing response.	Short and medium term

4.3. Structural reforms

Intervention	Action Plan	Likely Benefits	Nature
Revival of natural drainage system, improvement of sewerage system and establishment of separate storm water systems in cities and towns	• Relevant departments may prepare and implement plans	Reduced life and property and intangible losses	Short, medium and long term

Intervention	Action Plan	Likely Benefits	Nature
Construction of delay action dams on nallas / rivers emanating from Khirthar range	• Irrigation department to conduct feasibility study and prepare plan for implementation	• Reduced disturbance in cities specially in Karachi • Improved availability of water in rain fed areas • Recharge of ground aquifer	Medium and long term
Establishment of multi-purpose permanent shelters	• Establishment of permanent shelters in high flood and cyclone prone areas (Kachho, selected areas for riverine flood and shelters in Sujawal, Thatta and Badin districts.	Improved services and management of displaced population.	Medium and long term
River training	• Irrigation department may conduct river training (withing flood plain and present flood protective bunds) feasibility studies and plan river training before occurrence of floods in river Indus and other sizable rivers to protect flood protective infrastructure	• Reduction in expenditure incurred on maintenance of bunds. • Reduced bund breaching risks	Medium and long term
SOP / Policies on construction design and materials	• Studies be conducted by relevant departments for redesigning of linear features like roads, railway lines, irrigation channels for future projects. In most of the circumstances these features prove major obstacle in flow of rain / flood water in urban and	Improved natural drainage.	Medium and long term.

Intervention	Action Plan	Likely Benefits	Nature
	rural setting. Construction of elevated roads than surrounds without proper drainage cause water accumulation in surrounding areas.		

CHAPTER 11

Key Administrative Measures in Disaster Risk Reduction

1. PREAMBLE

Preplanning and mainstreaming disaster risk reduction is the only solution to manage frequently occurring disasters in Sindh. It is essential to plan development schemes wisely to minimize existing disaster risk and ensure that development shall not develop new disaster risks in the system. In failure to such implementation, efforts and resources will be invested in adhoc and temporary disaster response measures. In changing climatic scenarios, it is utmost important to consider disaster management as a development planning issue.

2. SCRUTINY OF DEVELOPMENT PROJECTS

All infrastructure related development schemes shall be scrutinized in terms of existing and future disaster risks. Planning and Development Board, GoS shall ensure provision of such scrutiny of scheme PC-1 and shall consult with PDMA about disaster risks. No development schemes shall be approved until completion of necessary

disaster risk assessment associated with the development scheme.

3. DEVELOPMENT OF DISASTER MANAGEMENT PLAN AND DISASTER RISK REDUCTION PLANS

All relevant departments of government of Sindh and other entities working operating within provincial jurisdiction shall prepare respective departmental disaster management, risk reduction and contingency plans in line with PDMA and NDMA plans and guidelines. All industrial and manufacturing chemical business units are required to prepare accidental emergency and disaster plans in their respective domains.