



# **Sharing of Experiences and Best Practices on Proactive Planning Addressing Critical Infrastructure Vulnerability in Pakistan**

“Mainstreaming Disaster Management in Infrastructure Sector”

SAARC Disaster Management Center

8 – 12 January, 2018

By

M. Idrees Mahsud

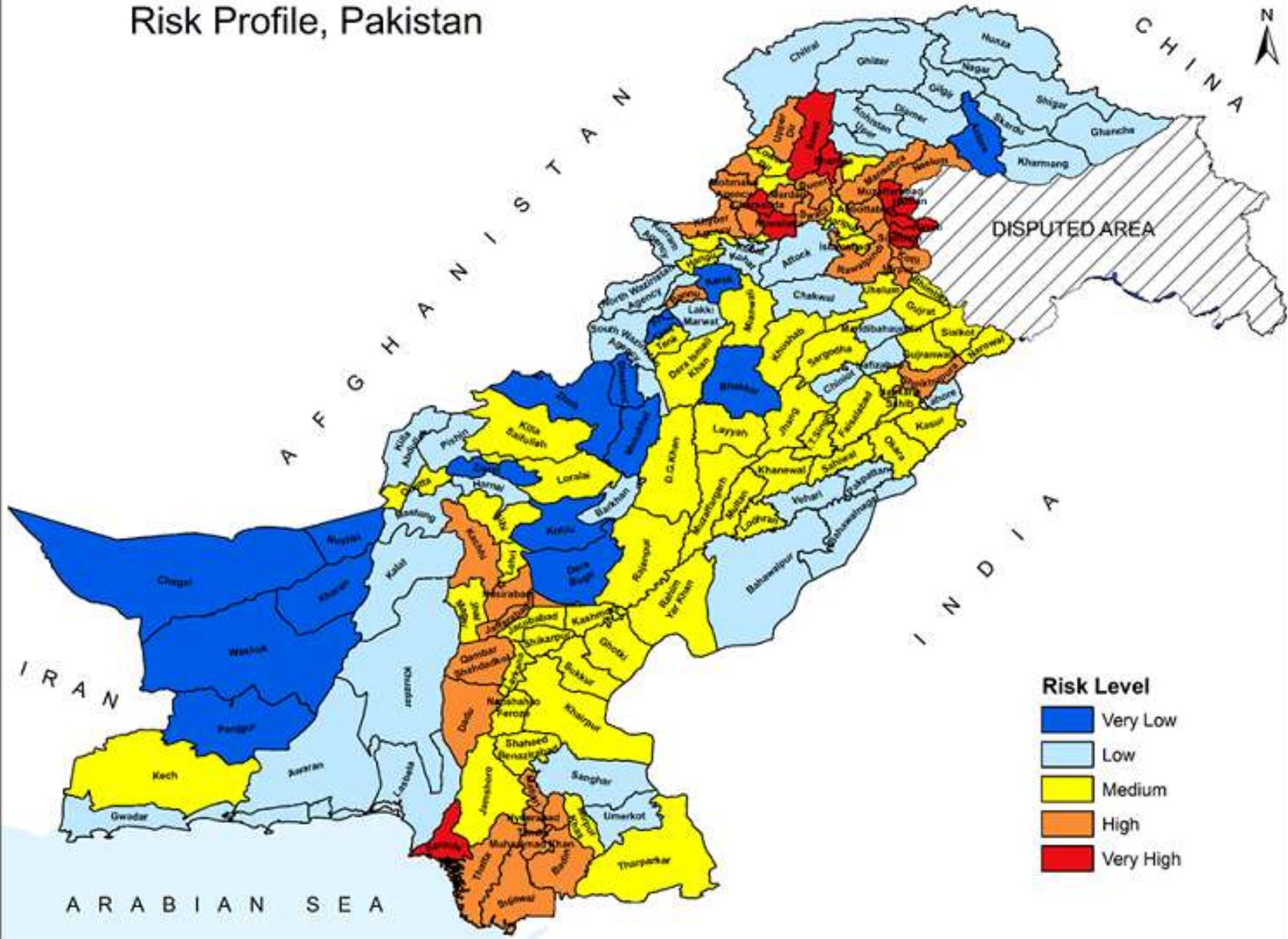
Member (DRR), NDMA, Pakistan



# Pakistani Context

- Disaster Risk Profile
- History of Disasters
- Critical Infrastructure – Responsibilities
- Development Framework
- Mainstreaming DRR in Development Process
- Existing Policies, Institutional Mechanisms & Legislative Structure in Pakistan

# Risk Profile, Pakistan



# Pak – Major Earthquakes

2015, 8.1  
M

Hindu Kush

2005, 7.6  
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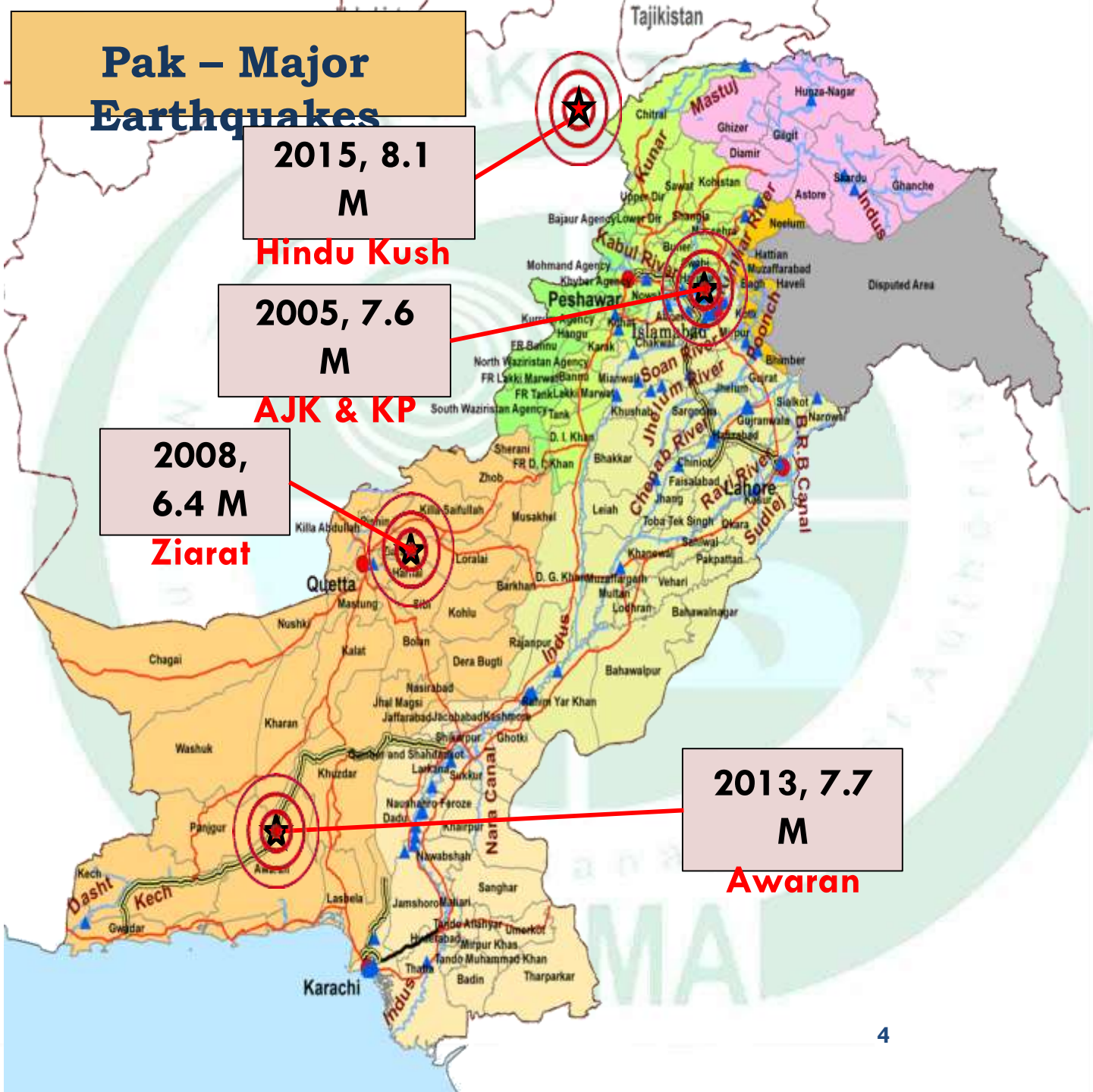
AJK & KP

2008, 6.4  
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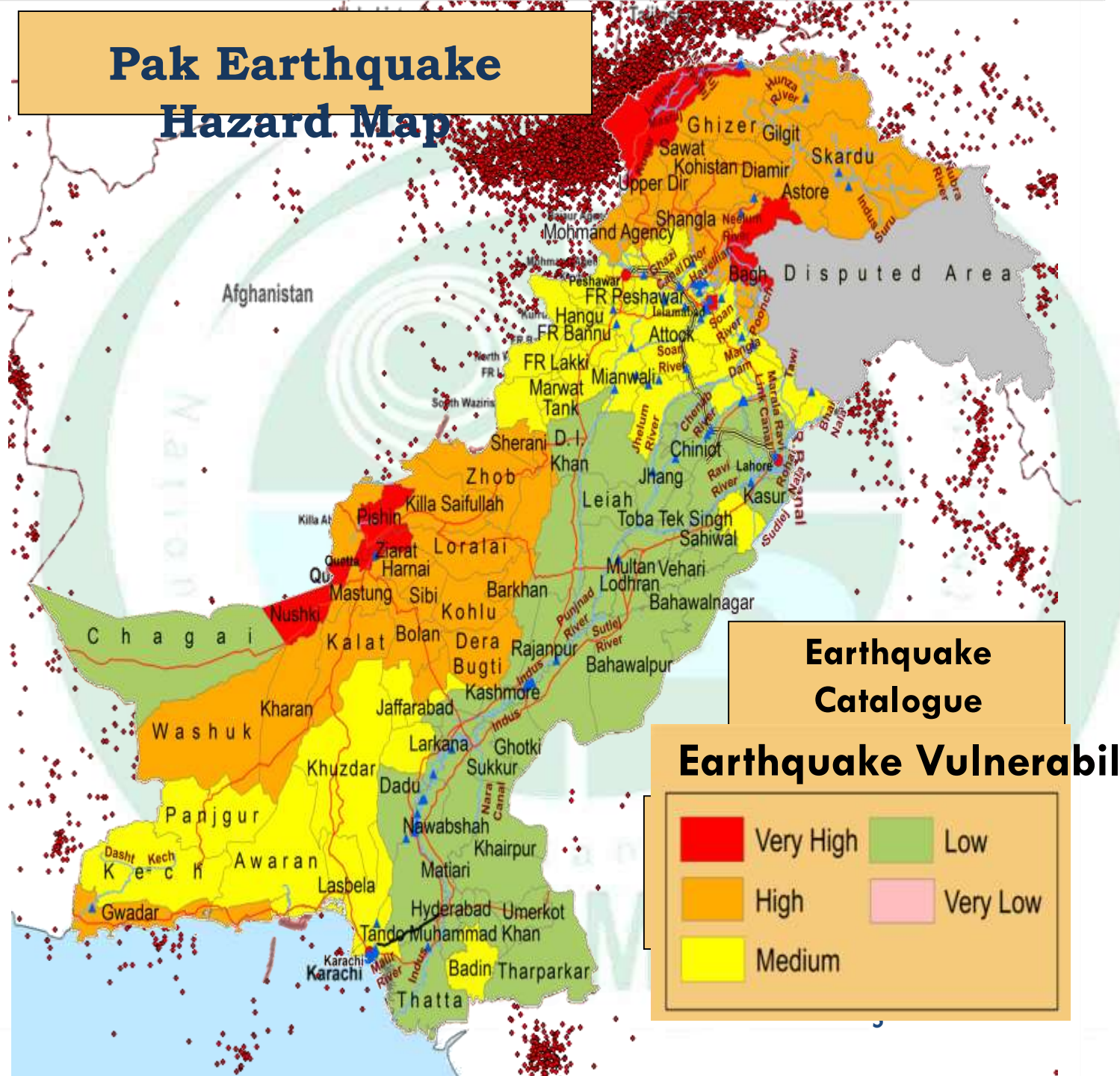
Ziarat

2013, 7.7  
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Awaran

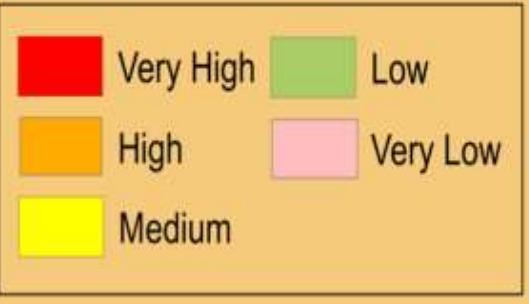


# Pak Earthquake Hazard Map

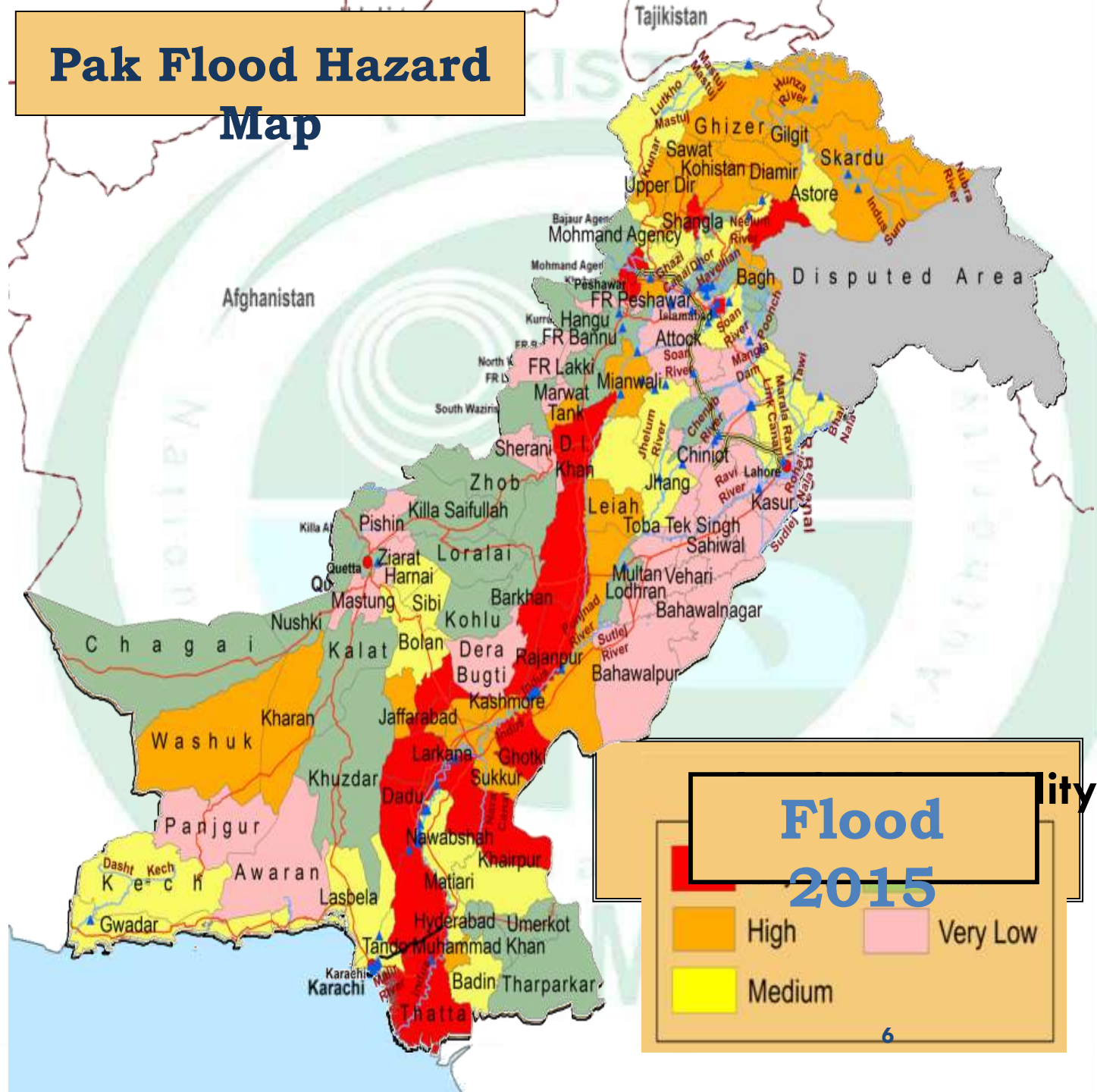


## Earthquake Catalogue

## Earthquake Vulnerability



# Pak Flood Hazard Map



**Flood Hazard Legend**

**Flood 2015**

- High (Red)
- High (Orange)
- Medium (Yellow)
- Very Low (Pink)

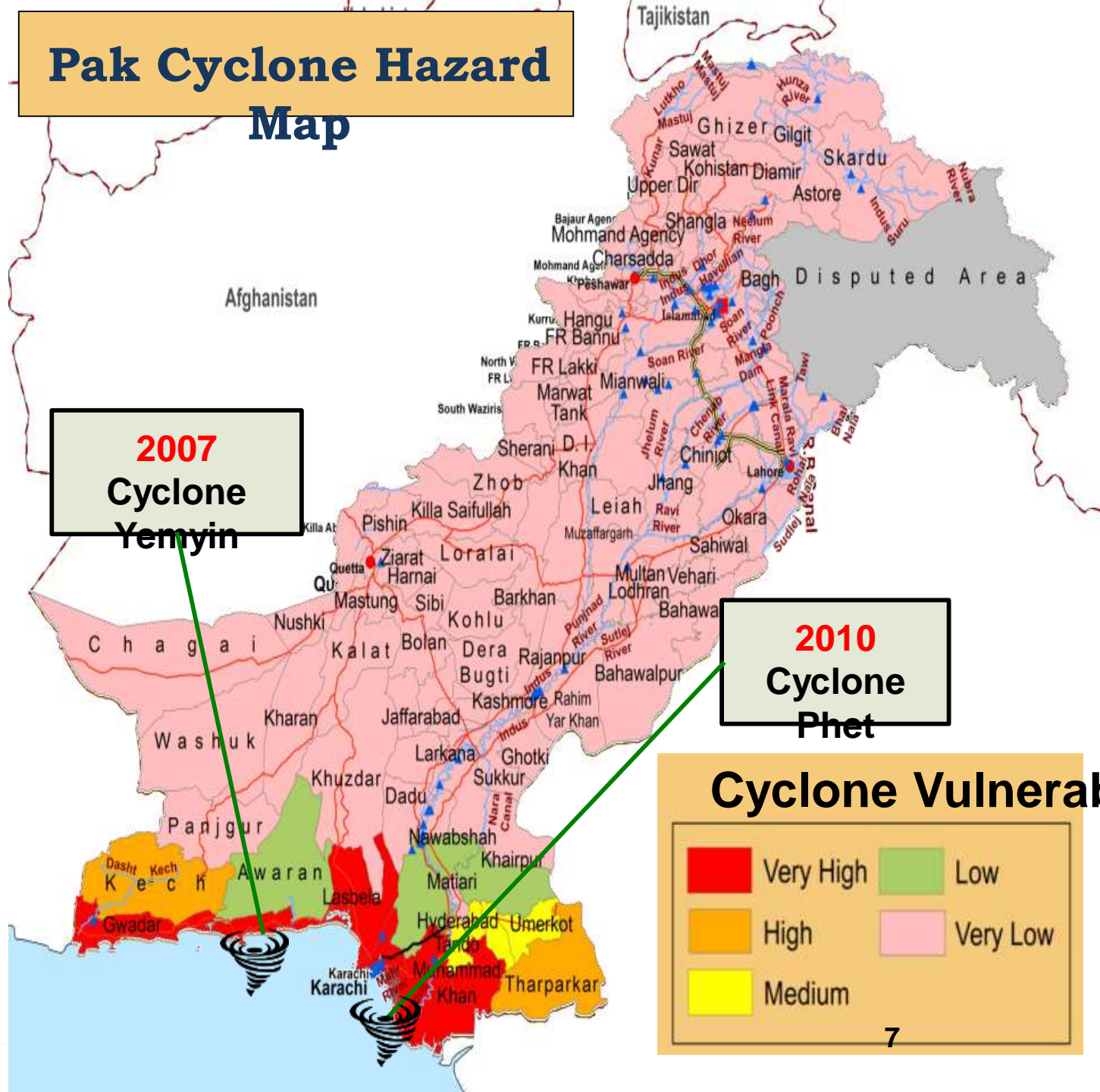
6

# Pak Cyclone Hazard Map

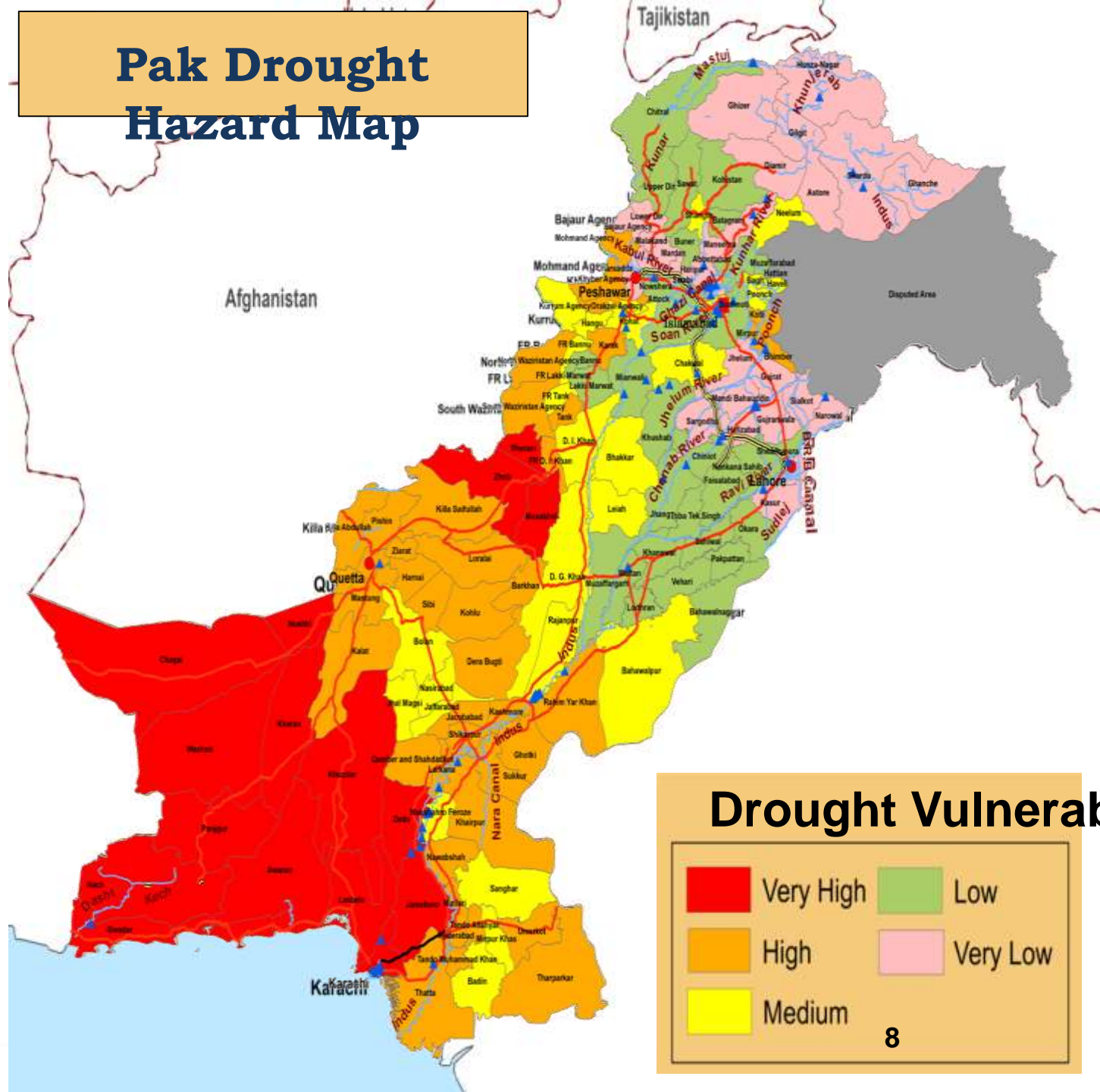
**2007  
Cyclone  
Yemrin**

**2010  
Cyclone  
Phet**

## Cyclone Vulnerability



# Pak Drought Hazard Map

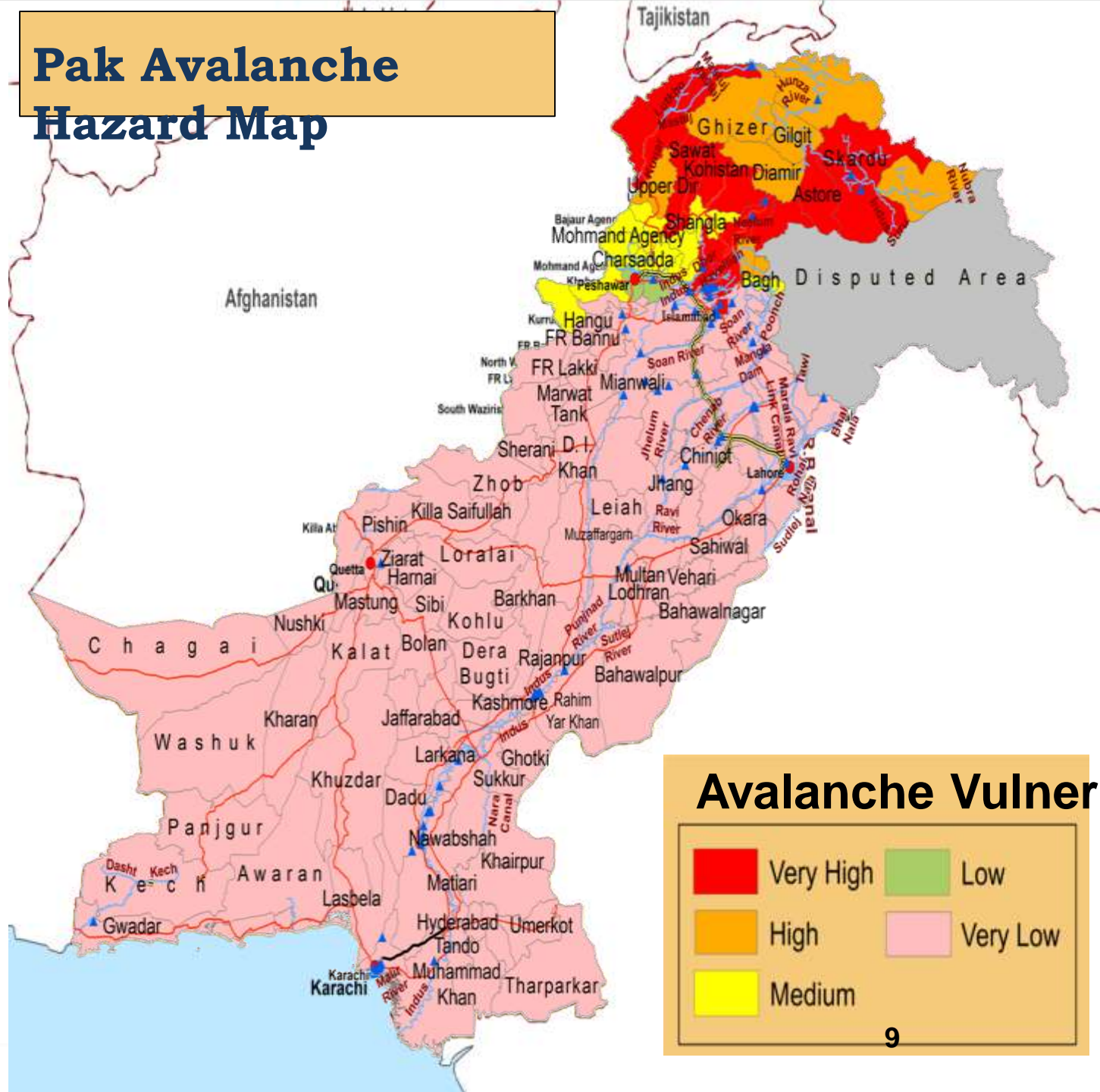


## Drought Vulnerability

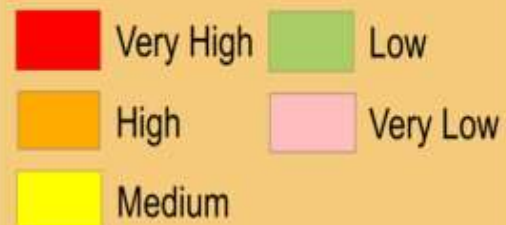




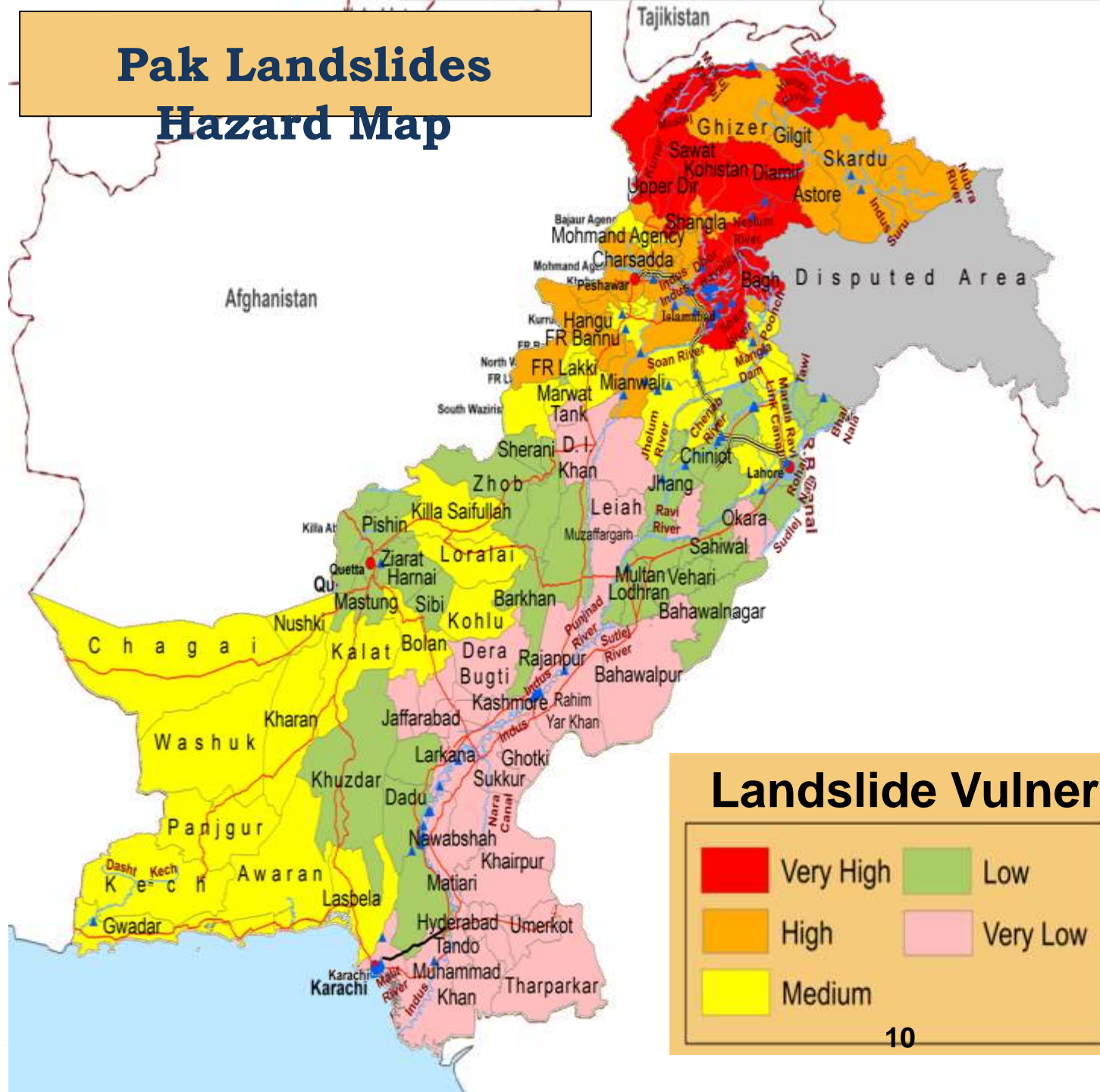
# Pak Avalanche Hazard Map



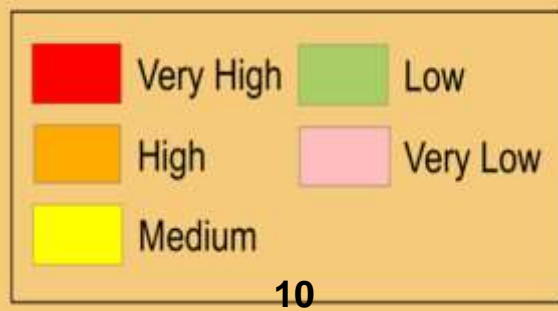
## Avalanche Vulnerability



# Pak Landslides Hazard Map



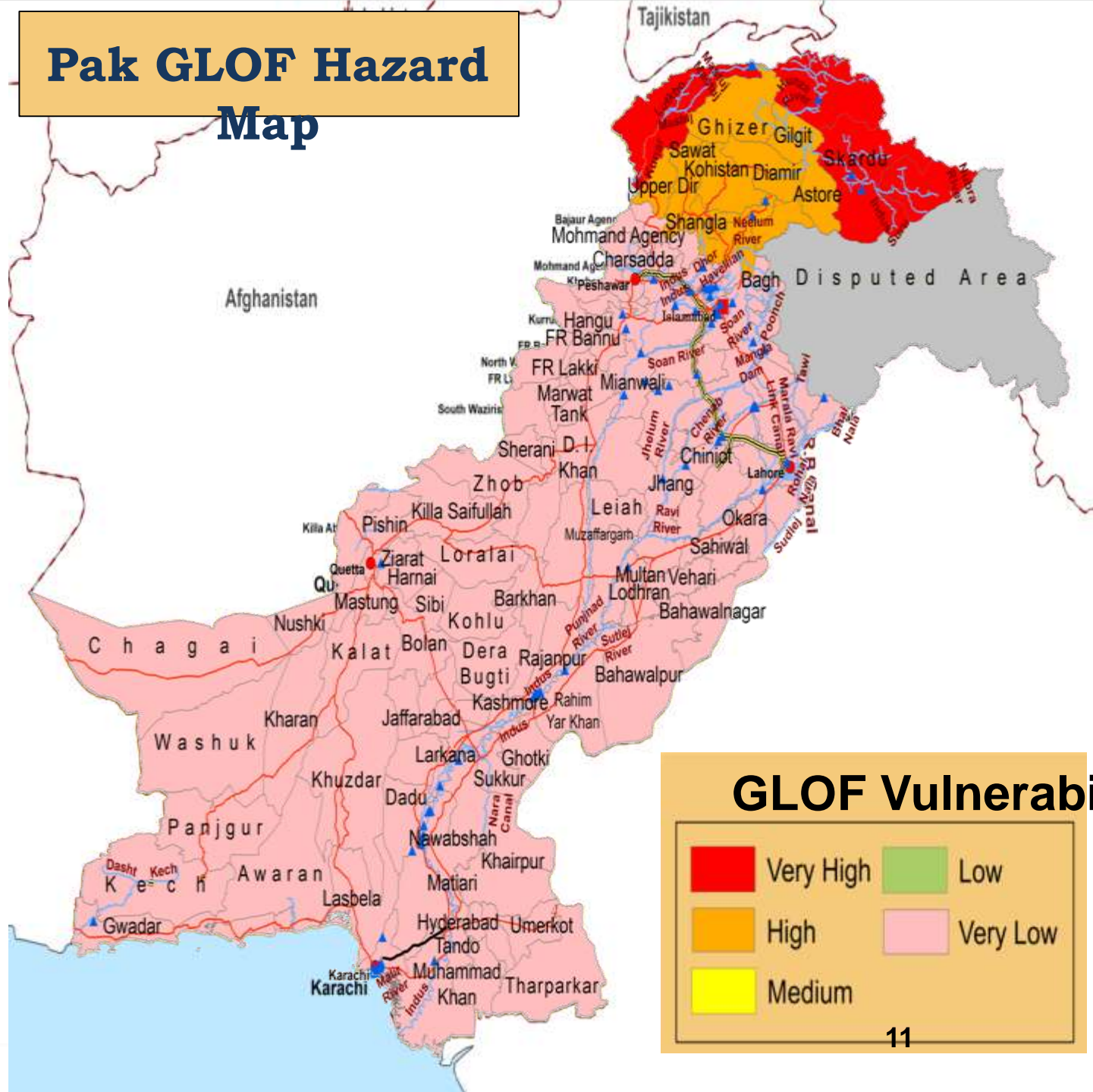
## Landslide Vulnerability



10



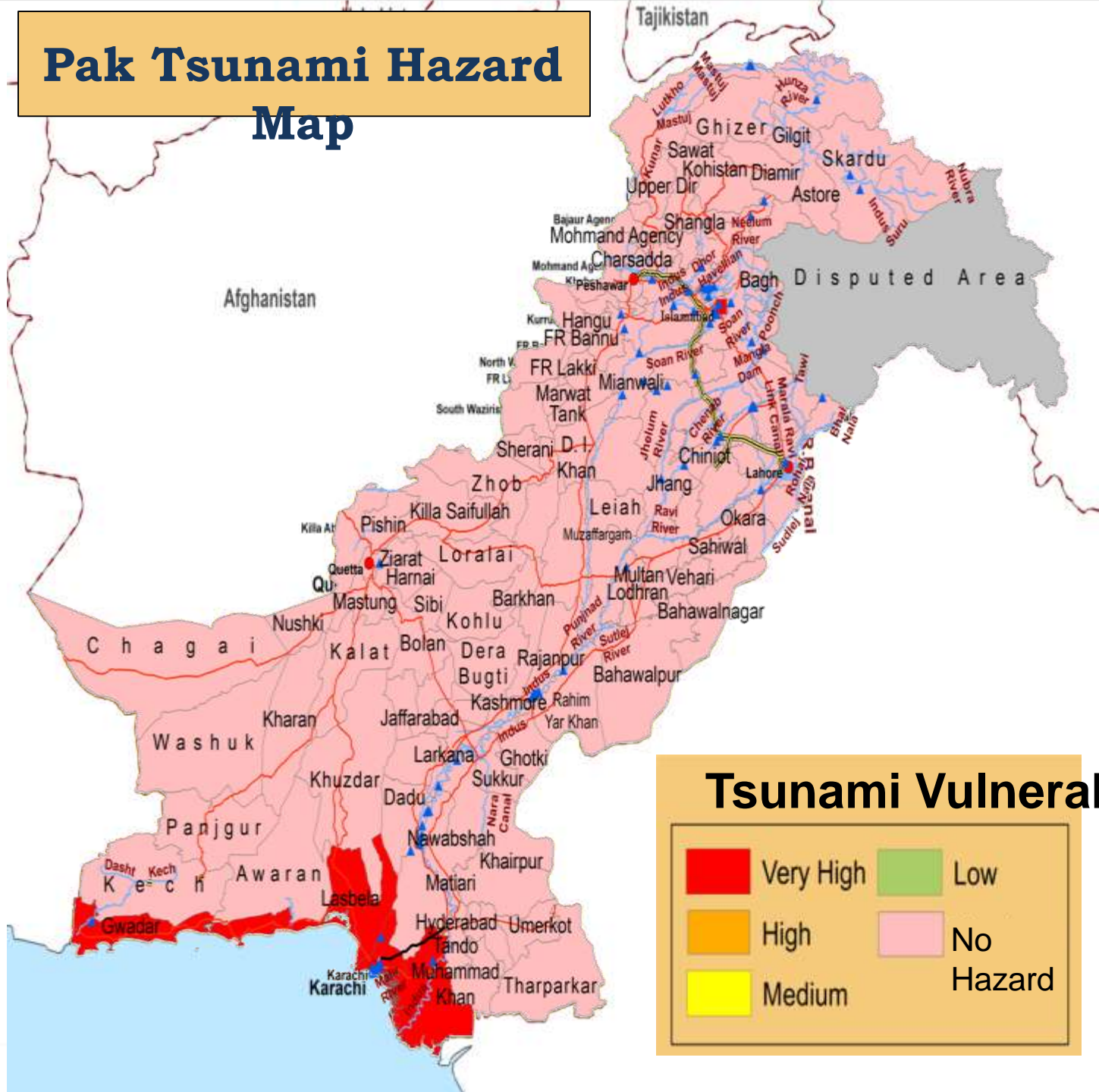
# Pak GLOF Hazard Map



## GLOF Vulnerability



# Pak Tsunami Hazard Map



## Tsunami Vulnerability





# History of Disasters – Major Recent Disasters in Pakistan

- Hindu Kush Earthquake 2015
- Drought 2014 - present
- Awaran Earthquake 2013
- Pakistan Devastating Floods (2010 / 2011 / 2012)
- Attabad Landslide
- Phet Cyclone (June 2010)
- IDPs crises (April-May 2010)
- Ziarat Earthquake (October 2008)
- Floods (July 2008)
- Yemyin Cyclone (June 2007)
- Kashmir Earthquake (Oct 2005)





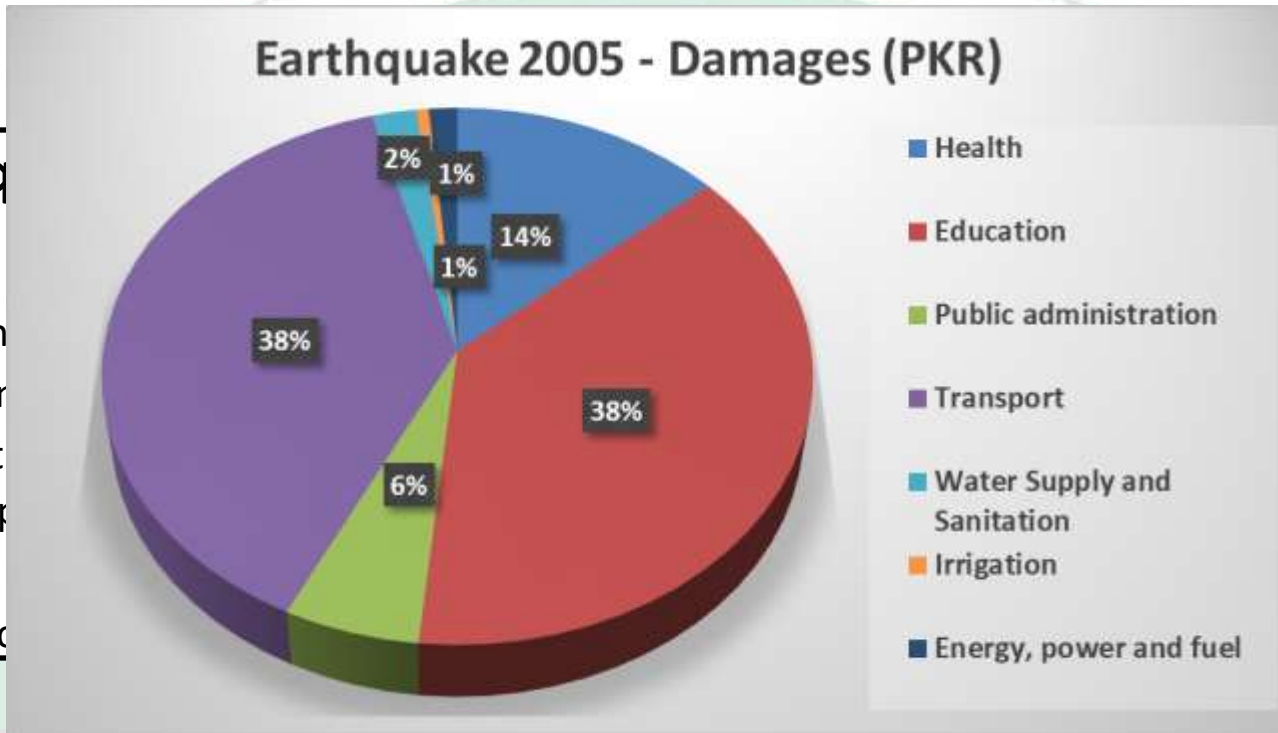
# History of Disasters - Critical Infrastructure Damages

- The 2005 earthquake destroyed 388 of the 796 health services in the affected area causing a multiple disease outbreak. Over 17,000 school-age children perished and about 20,000 injured in the collapsed schools. Out of 9000 schools in the earthquake affected area 4844 educational buildings were destroyed. A total of 1,146 km of roads managed by Public Works Department were destroyed, representing 45 percent of PWD-managed roads in AJK.
- In July-August 2010, Pakistan experienced floods that affected 20 million people in 78 districts, killed 1800, damaged or destroyed 514 health facilities out of 9,271 health facilities across the country (5.3 percent of the total).

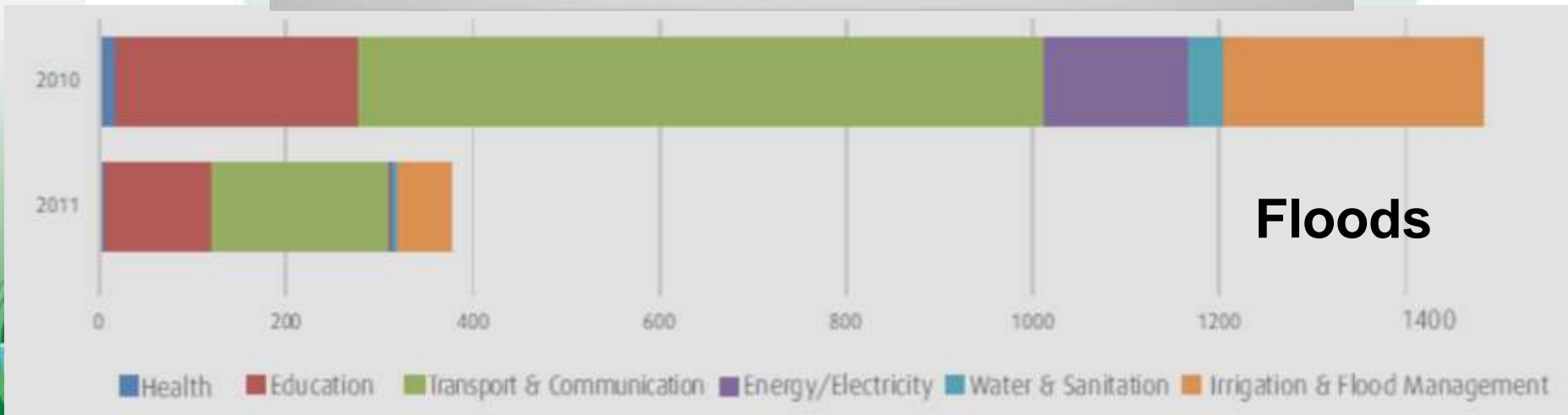
# History of Disasters - Critical Infrastructure Damages

## Earthquake

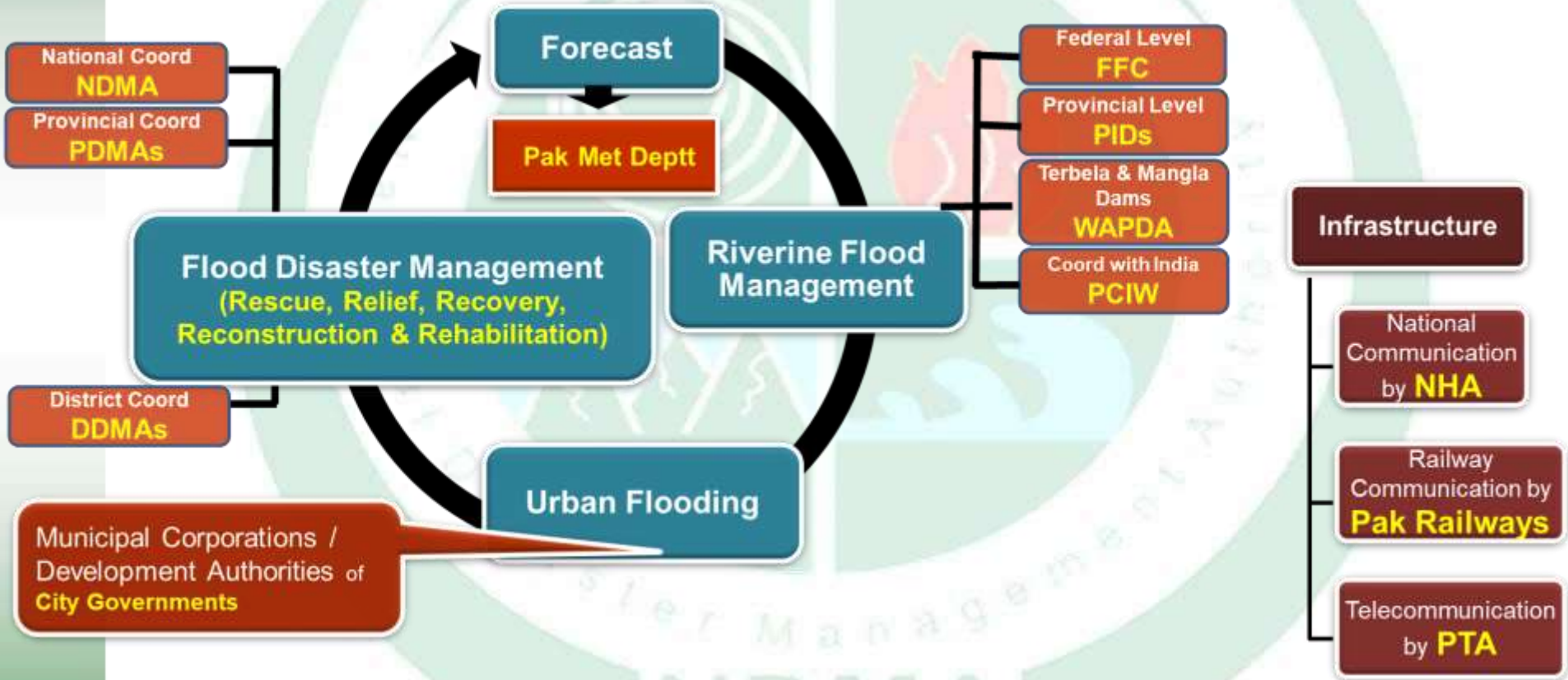
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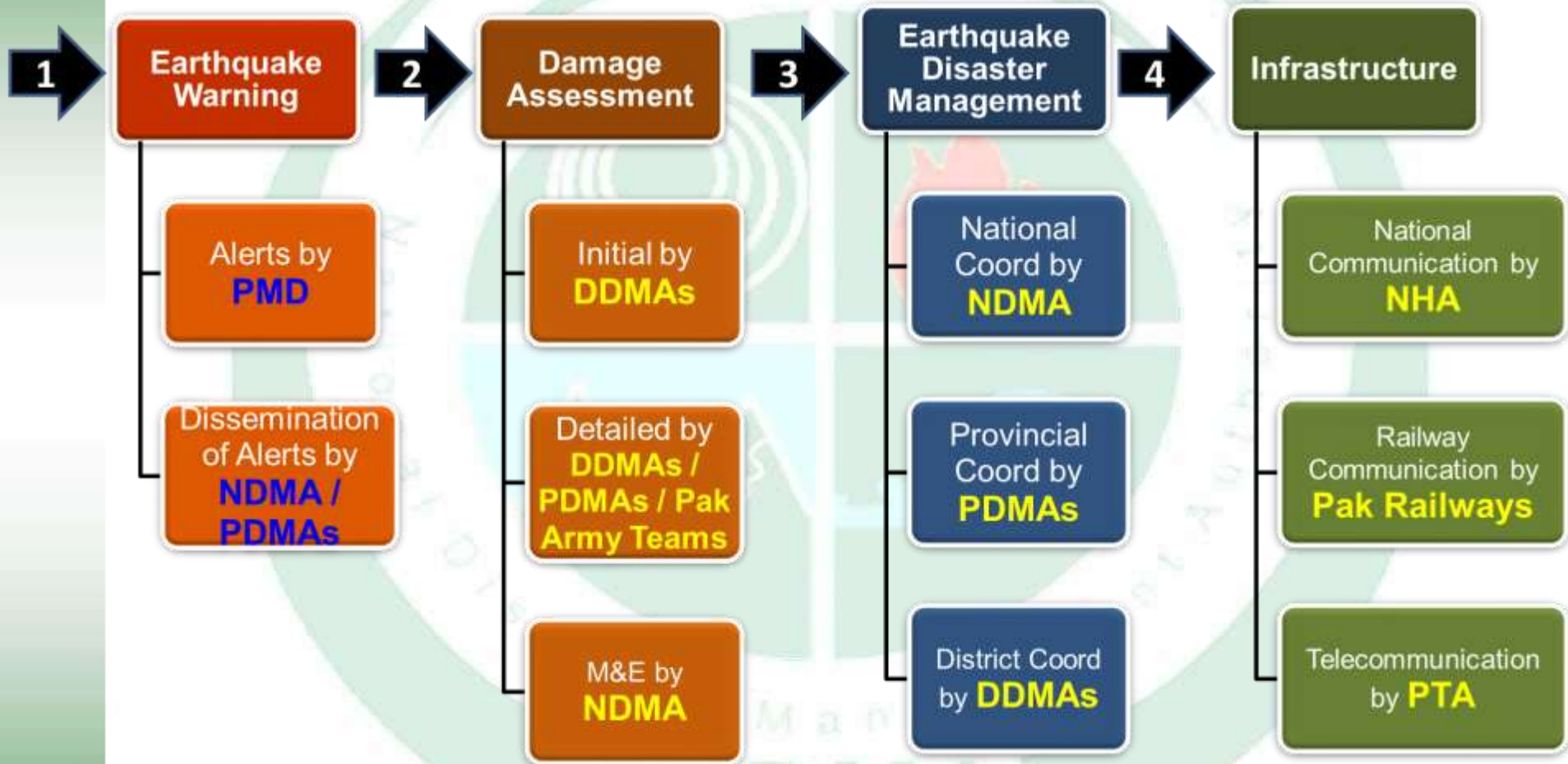


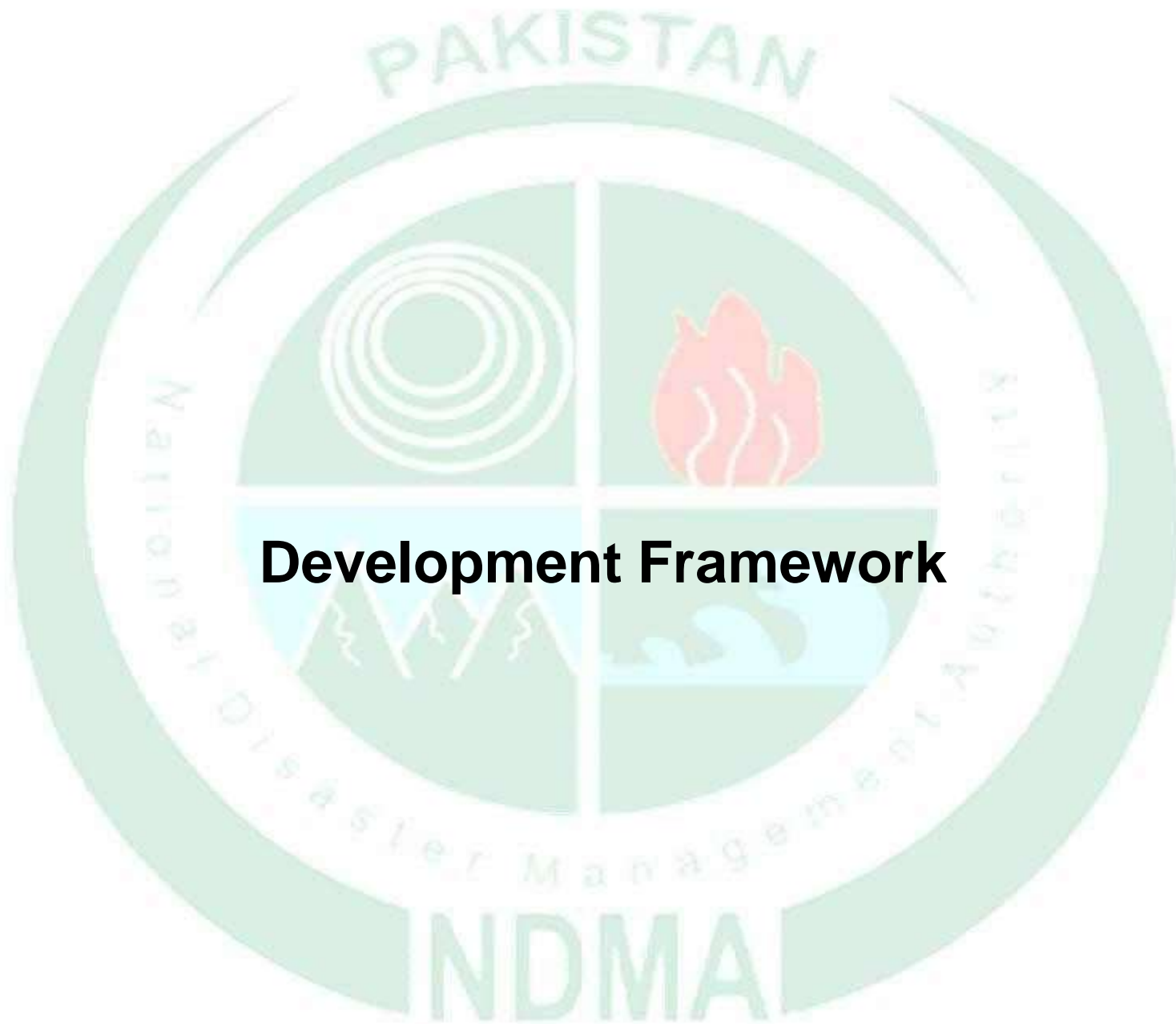
# Responsibility Matrix – Flood





# Responsibility Matrix – Earthquake

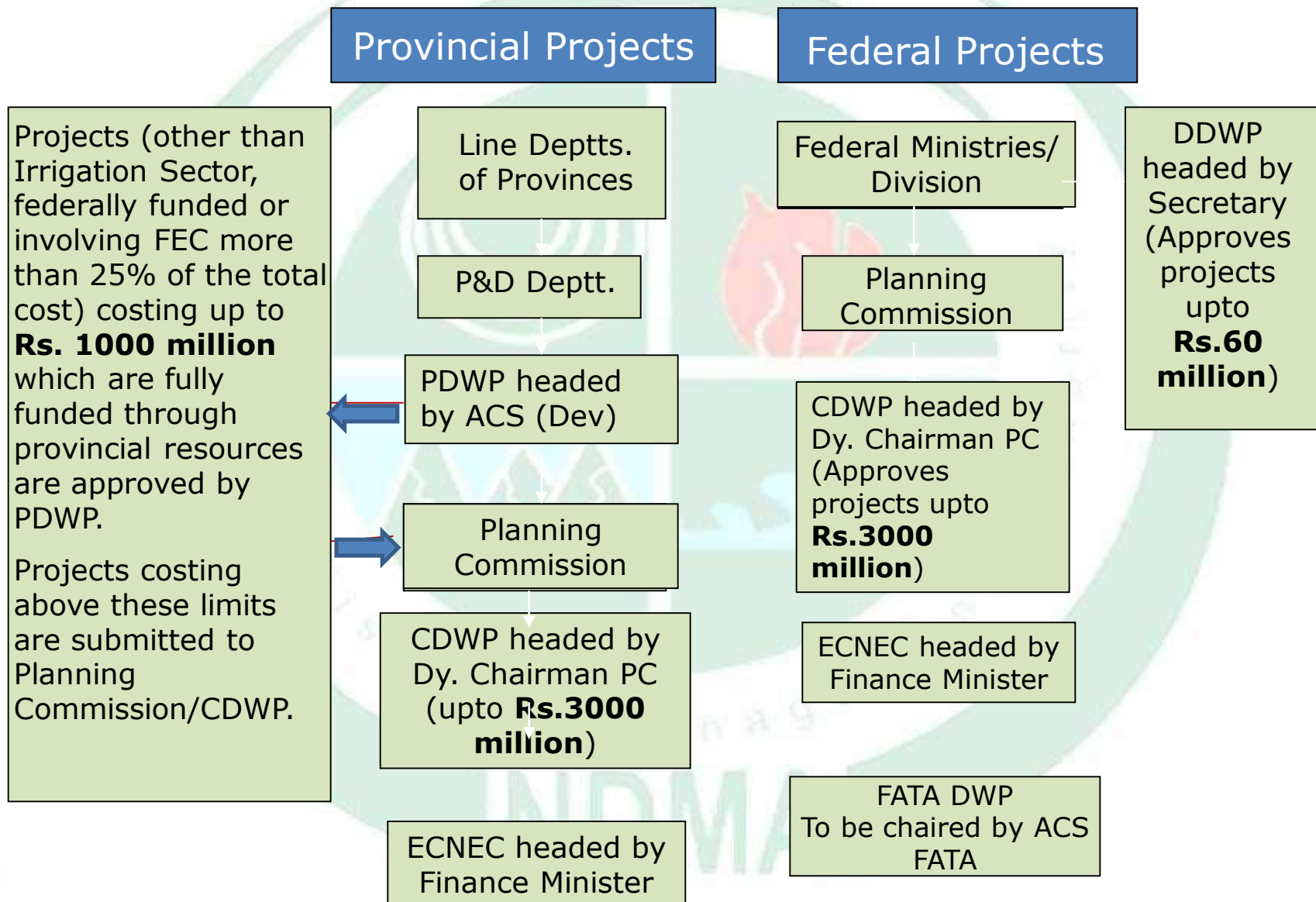




# Development Framework



# ADMINISTRATIVE STRUCTURE/MACHINERY FOR PREPARATION/ APPROVAL OF PROJECTS



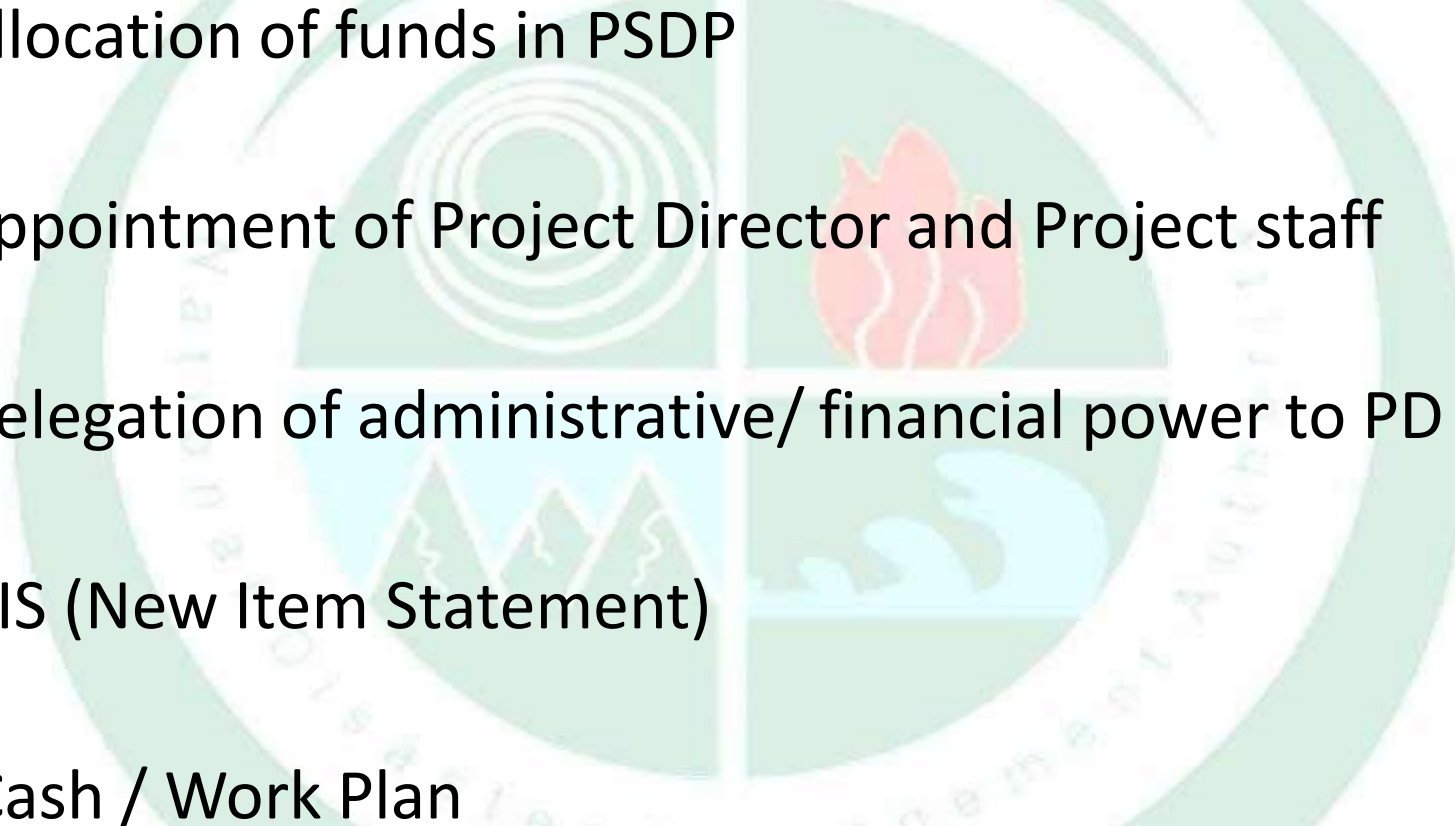


# Project Approval Process

- Submission of the PC-I/II to PIA Section Planning Commission
- Initial Scrutiny of PC-I/II by PIA Section
- Return to sponsors or Circulate to Members of CDWP and Technical Section concerned Planning Commission
- Technical/ Economic Appraisal of PC-I/II
- Pre-CDWP meeting
- Approval/ recommendation of CDWP
- Preparation of Summary & approval of ECNEC
- Authorization by PIA Section
- Administrative approval by the Ministry/ Division



# Project Implementation

- Allocation of funds in PSDP
  - Appointment of Project Director and Project staff
  - Delegation of administrative/ financial power to PD
  - NIS (New Item Statement)
  - Cash / Work Plan
- 
- The background features a large, faint watermark of the National Disaster Management Authority (NDMA) logo. The logo is circular and divided into four quadrants: top-left shows a sun, top-right shows a red flame, bottom-left shows green mountains, and bottom-right shows a blue river. The text 'National Disaster Management Authority' is written around the inner circle, and 'NDMA' is written in large letters at the bottom.



# Towards Mainstreaming DRR in Development in Pakistan

(Key Achievements)

- Development of DRR Mainstreaming Strategy
- National Working Group on MDRR formed
- DRR Strategies of six Ministries notified (Planning & Development, H&W, W&P, Defense, Industries & Production)
- Inclusion of Chapter on DRM in the 5-Year Development Plan
- Checklists/Guidelines on DRR for Project PCI & PCII for Infrastructure, Social and Production Sectors issued through Planning Commission
- Independent courses on DRM for higher education (Urban Planning, Architecture, Civil, Environment etc.) incorporated through HEC



# Towards Mainstreaming DRR in Development in Pakistan

(Key Achievements)

- Seismic concerns mainstreamed into the curricula of Civil Engineering Diploma
- Horizontal expansion of Provincial Mainstreaming (Formulation of Provincial Strategies & Working Groups on DRR (Punjab & KP))
- Engagement of DRR Consultants
- Identification of DRR pilot testing/ Demo projects
- Training Courses / Workshops on 'Mainstreaming DRR into Development'



# National Working Group on MDRR

1. NDMA (Chair)
2. All Provincial / Regional DMAs
3. Planning Commission
4. Water and Power
5. Housing and Works
6. Industries & Production
7. Defense
8. Communication
9. Climate Change
10. Information and Broadcasting
11. Petroleum & Natural Resources
12. Capital Administration & Development
13. Capital Development Authority
14. NESPAK
15. PMDC
16. Donors (JICA, UNDP, World Bank, ADB, USAID, DFID)





# **Analyzing Existing Policies, Institutional Mechanisms & Legislative Structure in Pakistan**



## Strengths

- Global commitment (SFDRR Target & Priorities)
- Legislation (NDM Act 2010)
- 10 years' Framework (National Disaster Management Plan & DRR Policy)
- Inter-Govt. Plans
- DRR Checklist
- Building Code & Fire Safety Provisions
- Environmental Impact Assessment



# Sendai Framework for DRR

## Global Target 4:

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

## Priority 3: Investing in disaster risk reduction for resilience

- To strengthen, as appropriate, disaster-resilient public and private investments, particularly through structural, non-structural and functional disaster risk prevention and reduction measures in **critical facilities**, in particular schools and hospitals and physical infrastructures; building better from the start to withstand hazards through proper design and construction, including the use of the principles of universal design and the standardization of building materials; retrofitting and rebuilding; nurturing a culture of maintenance; and taking into account economic, social, structural, technological and environmental impact assessments;



# Sendai Framework for DRR

## Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

- To promote the resilience of *new and existing critical infrastructure*, including water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide life-saving and essential services;



# National Disaster Management Plan (NDMP) 2012 - 2022

*“To manage the complete spectrum of disasters by development of DRR policies, strategies, measures and actions of all stakeholders, especially at the National level; and to enhance institutional capacities, and human and material resources for mitigation, prevention and preparedness, response and recovery in disasters”*

**Interventions : 10**

**Strategies : 41**

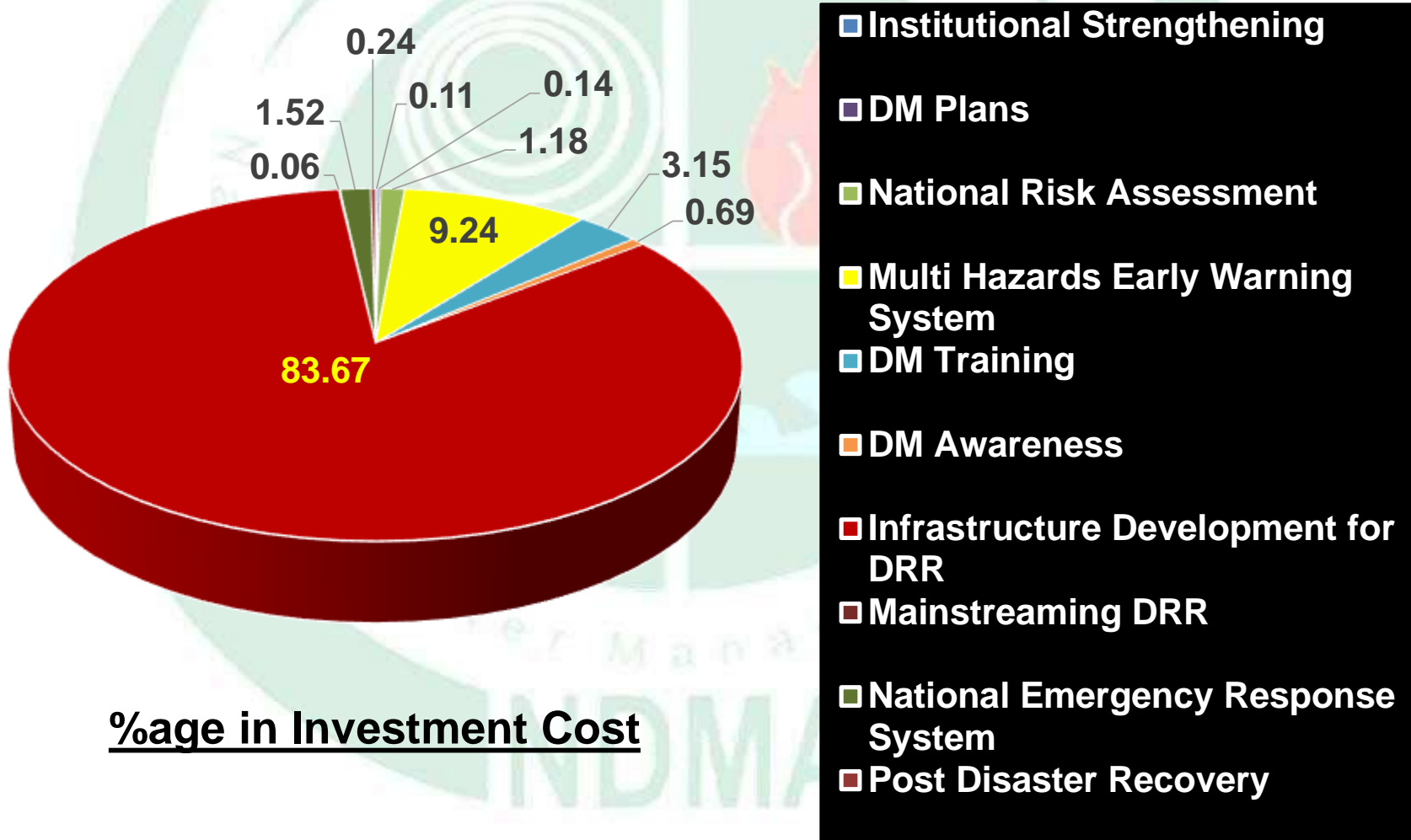
**Projects : 118**

**Revised Cost M : USD 2040.90**

**Timeframe (2012-22) : 10 Years**



# National Disaster Management Plan (NDMP) 2012 - 2022



**Overall Cost 2040.9 US \$ M**



# SFDRR & NDMP Interventions

## Priority 1: Understanding disaster risk.

**Intervention-3:** Establish national hazard and vulnerability assessment.

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

**Intervention-1:** Establish the institutional and legal system for disaster management.

**Intervention-2:** Prepare disaster management plans at various levels.

**Intervention-8:** Mainstreaming disaster risk reduction into development.

## Priority 3: Investing in disaster risk reduction for resilience.

**Intervention-4:** Establish multi-hazard early warning systems.

**Intervention-5:** Promotion of training, education and awareness in relation to disaster management.

**Intervention-6:** Strengthen the awareness program on disaster risk reduction at the local level.

**Intervention-7:** Infrastructure development for disaster risk reduction.

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

**Intervention-9:** Establish a national emergency response system.

**Intervention-10:** Capacity development for post-disaster recovery.



# National DRR Policy 2013

## Risk Knowledge

Risk Atlas

Risk Assessments

Database

Research

## Prevention & Mitigation

DRR – High Risk Areas

Resilient Development

Key Infrastructure

Risk Awareness

## Preparedness

Multi Hazard EWS

National Capacity

Financing Mechanisms





# National DRR Policy 2013

The Policy uses the term ‘key-infrastructure and life-line’ and defines it as “those facilities, structures and services whose disruption or destruction would seriously affect peoples’ lives and livelihoods including those whose functioning is crucial in a post disaster situation i.e:

- Educational and Health Facilities; Key Government Buildings
- Water Supply and Sanitation, Electricity, Transport and Communication
- Irrigation and Flood Protection

Policy recognizes that “strategies and plans need to define a program to promote and enforce appropriate construction norms and location requirements, and suggest eventual retrofitting activities and measures to mitigate non-structural damage as well as appropriate preparedness, operation and maintenance procedures”.





# National Flood Protection Plan IV 2015 - 2025

- Inventory of Flood Works, Benefit Monitoring, Evaluation of Flood Protection Works
- Flood Plain Mapping and Zoning
- Automation of Flood Situation Monitoring and Reporting

Financial Outlay	:	Rs 167,685 M
Structural Measures	:	Rs 147,260 M
Non-Structural Measures	:	Rs 19,425 M

# National Flood Protection Plan IV 2015 - 2025



## Structural Measures

- Strengthening of existing flood protection network
- Flood diversion/dispersion works across hill torrents
- Construction of mega dams
- Enhancement of flood passing capacity of barrages and bridges
- Construction of small dams in all provinces
- Model studies for major Railway bridges
- Measures for GLOFs and land sliding in hilly areas
- Coastal flood protection works

## Non Structural Measures

- Replacement / Expansion of existing weather radar network and river telemetry system
- Up-gradation of existing Flood Early Warning System
- Comprehensive studies for all existing breaching sections
- River Act
- Watershed management policy for re-forestation
- Revision of Mangla & Tarbela Dam SOPs
- Capacity building of relevant stakeholders
- Institutional reforms



# DRR Checklist

## Planning Commission

GOVERNMENT OF PAKISTAN  
PLANNING COMMISSION  
PLANNING AND DEVELOPMENT DIVISION  
(Public Investment Authorization Section)

IMMEDIATE

No. 5(7)Misc./PP&H/PD/10

Islamabad, the 23<sup>rd</sup> November, 2010

### CIRCULAR

Subject: **INTEGRATION OF DISASTER RISK REDUCTION INTO DEVELOPMENT PROCESS**

It has been decided that in future all development projects requiring approval of Government should give due consideration to vulnerability from natural and human induced disasters and incorporate measures of disaster risk reduction at the project design, planning and implementation stages. Accordingly Checklist (Infrastructure, Production and Social Sectors) are enclosed which may be made part of PC-I & PC-II for consideration of competent forum (i.e. DDWP, CDWP, PDWP, EDNEC).

2. This issues with the approval of the Deputy Chairman, Planning Commission.

Encl. Check List

*[Signature]*  
Research Officer  
Tel/9097621

All Federal Secretaries / Adnl. Secretaries (Incharge of Ministries / Divisions)  
All Chief Secretaries / Chairman P&D / ACS (Dev.) Provincial Governments /  
Departments, Govt. of AJK, Govt. of Gilgit Baltistan and ACS(FATA).

Copies to:-  
(1) Members, Planning Commission, Islamabad.  
(2) Additional Secretary (Admn.) P&D Division Islamabad  
(3) Chiefs/ Heads of Technical Sections, P&D Division, Islamabad.  
(4) Chief, PIA, P&D Division, Islamabad.  
(5) Project Director (MPFF), Projects Wing, Chughtai Plaza, Islamabad.  
(6) NPD (DERA)  
(8) All Project Directors, P&D Divisions, Islamabad.

C.C to:-  
(1) PS to Deputy Chairman, Planning Commission, Islamabad  
(2) PS to Secretary, Planning & Development Division, Islamabad.

**Planning Commission of Pakistan**  
CHECKLIST FOR DISASTER RISK REDUCTION  
Infrastructure Sectors  
(Issued vide No. 5(7) Misc./PP&H/PD/10, on 23 November 2010 as part of P&D PS)

1. Which types of hazards have been considered as unacceptable for the project and thus a condition for its planning and design?  
Indicate the relative order of importance of the hazards related to the project

<input type="checkbox"/> Earthquake	<input type="checkbox"/> Drought	<input type="checkbox"/> Tectonic Slips	<input type="checkbox"/> Fire
<input type="checkbox"/> Flooding	<input type="checkbox"/> Glacier Lake Outburst	<input type="checkbox"/> Miniblasts	<input type="checkbox"/> Technological
<input type="checkbox"/> Landslide	<input type="checkbox"/> Local	<input type="checkbox"/> Tsunami	<input type="checkbox"/> Internal Conflict
<input type="checkbox"/> Avalanche	<input type="checkbox"/> Cyclone		
<input type="checkbox"/> Others			

2. Has the brief history of the identified hazard(s) in the area included in the PC-I?  
 Yes  No  Partial  N/A

3. Is the project prepared keeping in view the Building Codes of Pakistan 2007?  
 Yes  No  Partial  N/A

4. Is the project prepared keeping in view the prevailing Building bye-laws?  
 Yes  No  Partial  N/A

5. Does the project incorporate the prevailing territorial planning regulations (e.g. hazard zoning, institutional provisions)?  
 Yes  No  Partial  N/A

6. Have the components and activities of the project been designed to resist the impact of hazards, prioritized in Q. No. 1 above, and to contribute to the reduction of its vulnerability, and that of its surroundings and beneficiaries?  
 Yes  No  Partial  N/A

Checklist for Disaster Risk Reduction-Infrastructure Sectors

1.  Yes  No  Partial  N/A

2.  Yes  No  Partial  N/A

3.  Yes  No  Partial  N/A

4.  Yes  No  Partial  N/A

5.  Yes  No  Partial  N/A

6.  Yes  No  Partial  N/A

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274.  Yes  No  Partial  N/A

275.  Yes  No  Partial

# Building Codes

- Pakistan Engineering Council Bye-laws notified in August, 1986
- Seismic Provisions 2007 incorporated in September, 2008
- NDMA had been pursuing legislation for Enforcement of Building Codes & its violation to be treated as a criminal offence since 2010
- After earthquake 26th October 2015, a motion was moved in the Senate regarding forceful implementation of Building Codes of Pakistan
- A Core Group for Development of Penalty Provisions against Violations & Implementation Mechanism of Building Codes of Pakistan was constituted
- The Committee has recommended a framework in November 2016 for the implementation of Building Codes of Pakistan with particular reference to provisions regarding earthquake and for providing penal provisions, measures and mechanism regarding violation of the said code
- Case is presently with the Committee for further deliberations & conversion into legislation



# Fire Safety Regulations

- NDMA took initiative to review Fire Safety Regulations in the Country. MOU was concluded with Pakistan Engineering Council on 15th October 2015 for Development of Building Code of Pakistan – Fire Safety Provisions (BCP-FSP).
- PEC constituted a Task Force which convened 10 meetings
- Final draft of Fire Safety Provisions was developed and subsequently approved by PEC Governing Body on 31st May 2016
- The final draft of Fire Safety Provisions was approved by M/o Science & Technology and M/o Law & Justice
- Launching Ceremony of the code was organized in February 2017 which was attended by the President of Pakistan



# Climate/Disaster Risk Management Mechanism in Pakistan

National level Contingency Planning	NDMA
Flood Control Planning & Execution	FFC
CC Adaptation & Mitigation	Ministry of Climate Change
Forecast generation	PMD, FFD
Cross Border data management	PCIW
Environment Protection	EPA/Provincial EPAs
Regulation of Dams	WAPDA
Canal water regulation	IRSA
Operation of Barrages & flood infrastructure	PIDs
Flood fighting	PIDs and Army
Management of resulting disasters	DDMAs/PDMAs/NDMA



# Issues/Concerns/Challenges

- Absence of macro / micro level risk assessment
- Development not “risk conscious”
- Low level of risk awareness and knowledge
- Insufficient DRR capacity at all levels of Society
- Coordination with provinces and federal institutions
- Implementation of policy, plans and decisions by provinces
- Capacity/resource constraints of NDMA/ PDMA/ DDMA
- Financial constraints
- Frequency of disasters since 2010



