

MHVRA

INFORMED DISASTER MANAGEMENT PLAN

2023-2032

DISTRICT MIRPURKHAS



DEVELOPED BY
PDMA SINDH



THROUGH
SUPARCO



WITH THE SUPPORT OF



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PREFACE

Multi-Hazard Vulnerability Risk Assessment (MHVRA) and resultant database are the foundation for evidence-based disaster management plan. Such databases are also an integral part of the implementation of disaster risk reduction and disaster risk management strategies. The MHVRA study of the Mirpurkhas district has been conducted successfully using high-resolution satellite imagery and its products like digital elevation models, historical disaster datasets, hydro-meteorological data, pertinent socio-economic data, and various other essential datasets. The hazard, vulnerability, and risk maps at Union Council (UC) level have been prepared and compiled as atlases. Using disaster risk information obtained through MHVRA, the disaster management plan of district Mirpurkhas is prepared and being presented to disaster management practitioners, executors, and prominent stakeholders. Before the MHVRA study, the district-level disaster and contingency plans were prepared using conventional methods and human knowledge. In contrast, the MHVRA based disaster management plans are realistic, based on modern techniques and multiple data sources, therefore, are more authentic and reliable for planning and management of disasters in the district.

The disaster management plans are based on MHVRA study carried out to understand the hazard vulnerability and risk at UC levels. The multi-criteria approach used in this disaster management plan offers comprehensive understanding of vulnerable communities at UC levels, while offering concerned authorities with viable and best practices to minimize the hazard impacts to the communities. Also, cost-benefit analysis for recommended mitigation efforts provides clear actionable insights for relevant authorities to take necessary measures.

District-wise disaster management plans will be revised after 10 years on updation of the MHVRA study. The disaster management plan of Mirpurkhas is comprehensive and covers guidelines on the complete spectrum of disaster management and standard operating procedures to efficiently cope with disasters and emergencies in the district.

The disaster management plan is duly approved by Provincial Disaster Management Board and demands its proactive implementation in true letter and spirit. The proactive implementation of the plan will ensure reduced disaster losses and damages in the district.

ACKNOWLEDGEMENTS

Multi-Hazard Vulnerability Risk Assessment (MHVRA) based Informed Disaster Management Plan (IDMP) for Sindh Province will help to strengthen the institutional and community level capacity to plan and implement natural hazard risk preparedness, recovery, and reduction in the province through capacity building, public education, and awareness by undertaking steps to reinforce physical, environmental and economic elements, as well as psychosocial wellbeing of communities.

SUPARCO appreciates and acknowledges the efforts of the project officials and professionals' team in preparing this comprehensive IDMP. We would also like to extend special thanks to the Project Director and Project Coordinator, Sindh Resilience Project (SRP), for their valuable inputs and necessary support required during the execution of different project activities.

- - Disclaimer - -

The Informed Disaster Management Plan (IDMP), the product of “Multi-Hazard Vulnerability Risk Assessment (MHVRA) Study” developed for Provincial Disaster Management Authority (PDMA) Sindh under Sindh Resilience Project (PDMA Component) by Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) is based on results of MHVRA 2022 study, satellite imagery, data and information obtained from concerned departments and verifiable online sources. Every effort has been made to make this plan practical and free of errors, however, PDMA Sindh or SUPARCO are not liable for any discrepancy in data obtained from various departments. The Informed Disaster Management Plan or any part of it is not to be used for legal or litigation matters and commercial use. However, the information contained in the IDMP or any part of the IDMP can be used without prior permission of PDMA Sindh with proper citation and acknowledgements.

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INTRODUCTION TO DISASTER MANAGEMENT PLAN OF DISTRICT MIRPURKHAS

INTRODUCTION

As per the declaration of National Disaster Management Act 2010, the districts are required to develop disaster management plans to effectively cope with disasters and emergencies at district level. The objective of district wise disaster management plan is to adopt a proactive approach in managing disaster risk by building capacity and strengthening institutional mechanisms. The plan is aimed to provide direction and guidelines to district governments and other stakeholders, in a paradigm shift from reactive to a proactive approach, and to layout the standard operating procedures to be followed in the complete cycle of disaster management.

Multi-Hazard Vulnerability and Risk Assessment (MHVRA) is integral for proactive risk management, hence under Sindh Resilience Project (PDMA Component), MHVRA has been conducted at the Provincial level. MHVRA is a multi-disciplinary process involving the quantification of the frequency and intensity of possible hazard(s), the assessment of the elements that can be destroyed or damaged from possible disasters, and the degree of the damage each element can sustain when affected by certain disasters of various intensities. The assessment of hazard, exposure, vulnerability and capacity leads to the risk assessment, which indicates the anticipated damages in case of a possible disaster. Disaster risk assessment is normally the first step in planning for disaster management activities. It provides an evidence-based estimation of the risk so that effective risk reduction measures can be employed appropriately and cost-effectively.

The development of MHVRA informed disaster management plan is based on diversified information sources including satellite remote sensing, Digital Elevation Model (DEM), and pertinent information collected from concerned departments. The outcomes for MHVRA study are depicted in atlas including; landuse / landcover, critical infrastructure, hazard, exposure, vulnerability, and risk maps of cyclone and storm surge, drought, earthquake, flood, heatwave, and tsunami at UC level.

The MHVRA Informed Disaster Management Plan is a significant step towards disaster resilient Sindh because the foundation of disaster management plan is laid on realistic disaster risk identification and efficient need-based disaster preparedness and response measures. UC-level multi-disaster risk identification will not only enable active and effective disaster preparedness but also help in disaster risk reduction at the grass-root level. In addition, the plan is intended to strengthen the district disaster management system and provide guidance on pre-disaster preparedness, coordinated response and recovery through implementable agenda.

VISION

Vision of MHVRA Informed Disaster Management Plan is;

- To identify underlying UC level multi-disaster risks in administrative districts of Sindh province.
- To develop realistic Disaster Management Plan for proactive disaster management.
- To ensure prioritization of disaster risk reduction measures at UC level.
- To enforce better coordination for disaster response.
- To improve rehabilitation plans for restoration of livelihood, and organizational capacities of affected communities.

OBJECTIVES

The plan is intended to meet following objectives in 10 years;

1. Building disaster resilience capacity at UC level to minimize the loss of lives, livelihood, assets and environment.
2. Improved understanding of disaster risk, hazard and vulnerabilities to strengthen disaster governance from local level to provincial level.
3. Enhanced preparedness to improve disaster response at grass-root level.
4. Promote and facilitate Disaster Risk Reduction (DRR) in planning and implementation of development projects to increase resilience.
5. Provide clarity on roles and responsibilities of various departments and stakeholders involved in different aspects of disaster management.
6. Promote “Build Back Better” principle in recovery, rehabilitation and reconstruction.
7. Promote social inclusion and communities as partners to reduce and manage disaster risk.
8. Promote disaster prevention and mitigation culture at local level.

REVIEW OF MHVRA INFORMED DISASTER MANAGEMENT PLAN

The MHVRA Informed Disaster Management Plan is planned to be effective for 10 years starting from January 2023 to December 2032 and requires review before completion of 10 years. Periodic review is essential because of following reasons;

1. During 10 years, there will be likely chances of new development in the district hence, vulnerability, exposure, and risk assessment will require updation.

1. Planning is a dynamic process, therefore, disaster management plan must be reviewed periodically to incorporate changes according to the emergence of new eminent disasters and situations.
2. Climate is a dynamic driver of changing hazard risks, therefore, it is important to review disaster management plan in changing disaster scenarios.

Additionally, it is also recommended to review the plan after the occurrence of each disaster event to measure its effectiveness. Necessary adjustment may be carried out in the plan accordingly.

Foregoing in view, it is recommended to formulate a committee to review the disaster management plan. A review of the plan shall be carried out by the concerned DDMA under the supervisory role of PDMA Sindh. Recommended composition of the plan review committee is as follows;

Table 1: Recommended Committee for Reviewing Disaster Management Plan

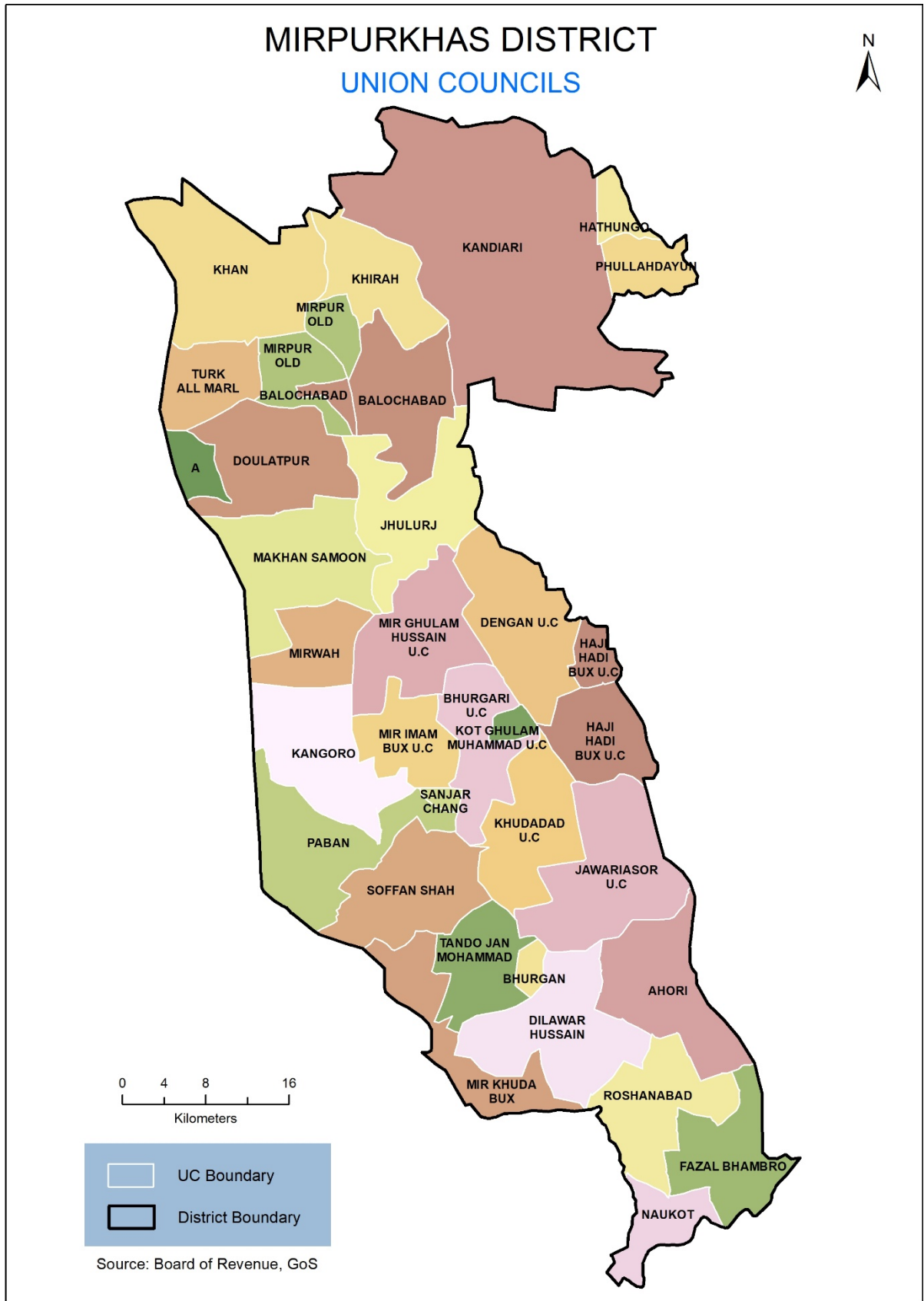
Committee Representative	Role
DG, PDMA Sindh / Dir Ops PDMA	Chairman
Concerned DC or representative officer	Member
Concerned officer from local government	Member
Elected representative of the concerned district	Member
Representatives from disaster affected communities	Member (s)
Representative from SUPARCO	Member
Representative from research / academia experienced in disaster management field	Member (s)
Representative from UN Organization on disaster related domains in Pakistan, especially in Sindh	Member
Representative from reputed NGO working on disaster related domains especially in Sindh	Member
Representatives from Business Committee	Member
Representatives from Chamber of Agriculture	Member
Any other member as deemed appropriate (need basis)	Member

MODES OF REVIEW

Preferred modes of review of plan are;

- a. For a post-disaster review of the plan, PDMA shall conduct a questionnaire-based survey covering pertinent questions to identify gaps or issues in the plan. A questionnaire-based survey can be conducted through online survey services or organizing online meetings. Once issues have been identified by the committee, necessary changes be incorporated in the plan and the revised plan be approved by review committee.
- b. For review before the expiry of the validity of the plan, necessary updation in baseline mapping i.e., hazard, exposure, vulnerability, and risk assessment be carried out to incorporate new developments and disaster situations. Once, baseline mapping is updated, plan is to be updated accordingly. The review committee shall vet the updation of the plan in the light of experience and recommendations. Upon approval from the review committee, the plan shall be effective for next 10-years.

DISASTER RISK PROFILE OF DISTRICT MIRPURKHAS



GEOGRAPHY

District area in Sq. Km	3,448	
Coordinates	Longitude 68° 59' 3" to 69° 16' 53" East Latitude 24° 48' 33" to 25° 48' 7" North	
Surrounding Districts	Umerkot in the East Sanghar in the North Tando Allahyar in the West Badin in South-West Tharparkar and Badin in the South	
Climate Conditions	Hot and Semi-Arid	
Coldest Month	January	
Hottest Month	May	
Seasonal Temperatures	Max Mean (°C)	Min Mean (°C)
Spring (March and April)	36.90	20.20
Dry Summer (May and June)	41.89	26.81
Wet Summer (July to September)	38.28	26.22
Autumn (October to November)	34.52	19.31
Winter (December to February)	26.67	11.67
Average Rainfall	165.69 mm/year	
Physiographic Features	Nil	

DEMOGRAPHY

	Year-1998	Year-2017
Population	1,006,329	1,504,440
Urban	300,175	434,081
Rural	706,154	1,070,359
No. of Household	-	286,547
Average Annual Growth Rate 1998-2017	2.13 %	

ECONOMY

Industries	Industries mainly based on agriculture
Agriculture	Production in M.tons as per (2016-17)
Major Crops	
Wheat	198,889
Sugarcane	1,111,698
Cotton	41,496
Minor Crops	
Bajra	482
Jowar	672
Maize	27
Barley	28
Rapeseed And Mustard	12,222
Sesame	252

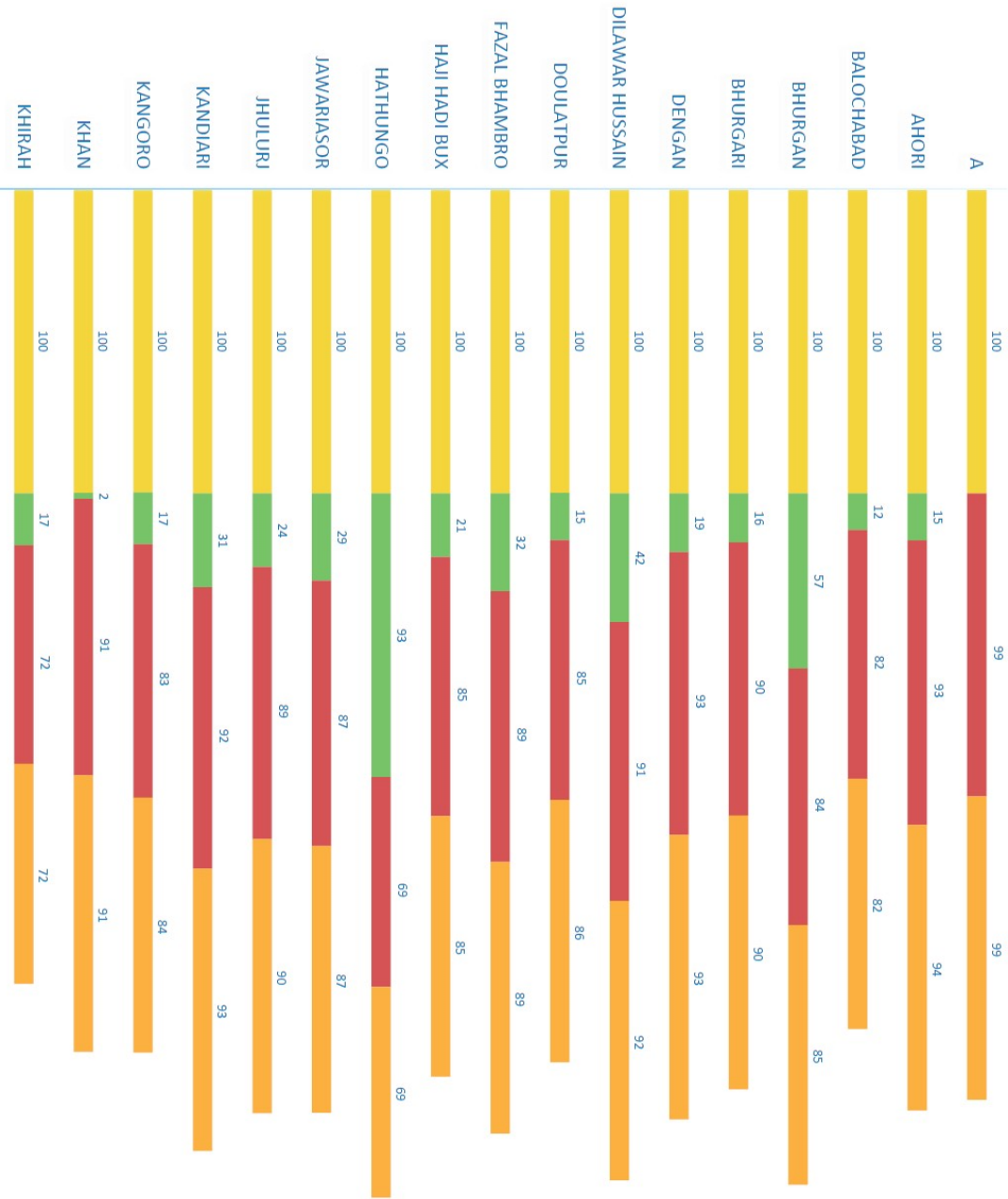
TALUKA NAMES	UC NAMES
<ol style="list-style-type: none"> 1. Digri Taluka 2. Hussain Bux Mari Taluka 3. Jhudo Taluka 4. Kot Ghulam Muhammad Taluka 5. Mirpur Khas Taluka 6. Shujaabad Taluka 7. Sindhri Taluka 	<ol style="list-style-type: none"> 1. A 2. Achori 3. Balochabad 4. Bhurgan 5. Bhurgari 6. Dengan 7. Dilawar Hussain 8. Doulatpur 9. Fazal Bhambro 10. Haji Hadi Bux 11. Hathungo 12. Jawariasor 13. Jhulurj 14. Kandiari 15. Kangoro 16. Khan 17. Khirah 18. Khudadad 19. Kot Ghulam Muhammad 20. Makhani Samoon 21. Mir Ghulam Hussain 22. Mir Imam Bux 23. Mir Khuda Bux 24. Mirpur Old 25. Mirwah 26. Naukot 27. Paban 28. Phullahdayun 29. Roshanabad 30. Sanjar Chang 31. Soffan Shah 32. Tando Jan Mohammad 33. Turk All Marl

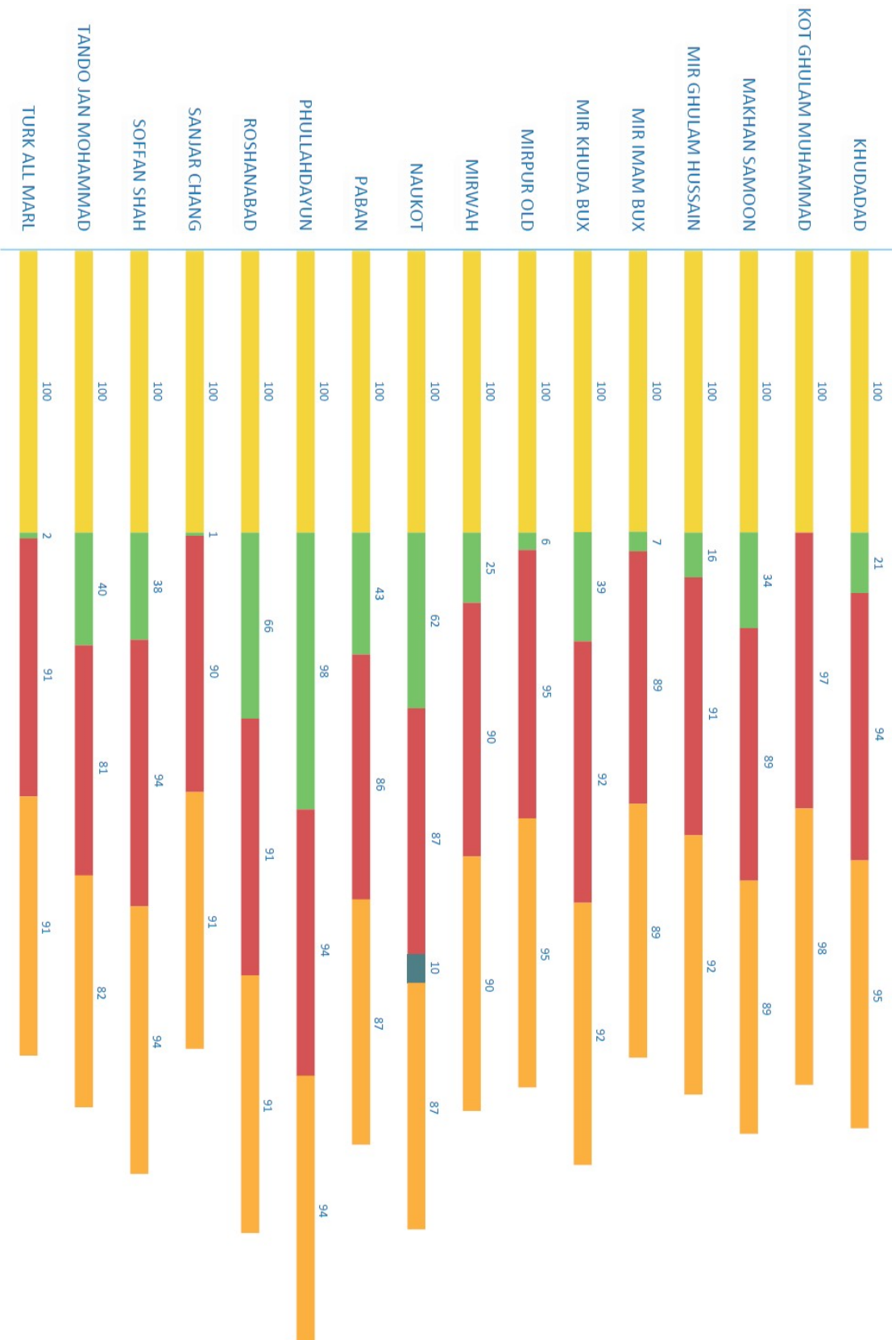
MIRPURKHASDISTRICT MULTI-HAZARD RISK PROFILES

LEGEND

PERCENTAGE OF AREA AT RISK

- FLOOD
- METEOROLOGICAL DROUGHT
- HEATWAVE
- CYCLONE
- STORM SURGE
- AGRICULTURE DROUGHT
- TSUNAMI
- EARTHQUAKE





UC WISE RISK PROFILE

A			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	24.464 sq km
		Pakka Unplanned Area	0.936 sq km
		Education Facilities	19
		Mobile Towers	1
		Petrol Pumps	6
		Settlements	50
		Irrigation and Drainage Network	6.6 km
		Railway Line	3.987 km
		Road Network	42.183 km
		Population	12512
		Household	2432
Meteorological Drought	Medium - Extreme	Settlements	50
		Agriculture Area	24.482 sq km
		Agriculture Area	24.482 sq km
		Water Body	0.027 sq km
		Population	10320
		Household	2003
Heatwave	Low - High	Settlements	50
		Population	10224
		Household	1985
		Agriculture Area	24.452 sq km
		Pakka Unplanned Area	0.939 sq km
Agriculture Drought	Nil	The UC falls out of vulnerable zone for Agriculture Drought	
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

AHORI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	111.355 sq km

		Forest Area	0.004 sq km
		Kachcha Area	0.937 sq km
		Pakka Planned Area	0.012 sq km
		Pakka Unplanned Area	1.827 sq km
		Range Land	0.029 sq km
		Bridges	1
		Education Facilities	57
		Health Facilities	1
		Settlements	89
		Irrigation and Drainage Network	52.443 km
		Road Network	183.519 km
		Population	37888
		Household	7493
Meteorological Drought	Medium - Extreme	Settlements	89
		Agriculture Area	111.572 sq km
		Forest Area	0.071 sq km
		Range Land	0.743 sq km
		Water Body	0.621 sq km
		Wet Area	6.148 sq km
		Population	31562
		Household	6234
Agricultural Drought	Low - Medium	Settlements	7
		Agriculture Area	19.272 sq km
		Forest Area	0.084 sq km
		Range Land	0.886 sq km
		Water Body	0.757 sq km
		Wet Area	1.421 sq km
		Population	6166
		Household	1217
Heatwave	Low - Extreme	Settlements	85
		Population	31267
		Household	6185
		Agriculture Area	111.274 sq km
		Kachcha Area	0.943 sq km
		Pakka Planned Area	0.012 sq km
		Pakka Unplanned Area	1.836 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone

BALOCHABAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	95.719 sq km
		Pakka Planned Area	0.014 sq km
		Pakka Unplanned Area	4.317 sq km
		Range Land	0.016 sq km
		Bridges	6
		Bus Stops	1
		Education Facilities	76
		Health Facilities	5
		Industries	1
		Mobile Towers	3
		Petrol Pumps	3
		Police Stations	1
		Settlements	180
		Irrigation and Drainage Network	25.784 km
		Railway Line	4.565 km
		Road Network	229.991 km
Population	62417		
Household	12270		
Meteorological Drought	Medium - Extreme	Settlements	180
		Agriculture Area	95.969 sq km
		Range Land	0.33 sq km
		Water Body	0.85 sq km
		Wet Area	20.882 sq km
		Population	51315
		Household	10082
Agricultural Drought	Low – Medium	Settlements	4
		Agriculture Area	6.883 sq km
		Water Body	0.007 sq km
		Wet Area	11.097 sq km
		Population	868
		Household	169
Heatwave	Low - High	Settlements	173
		Population	50905
		Household	10002

		Agriculture Area	95.627 sq km
		Pakka Planned Area	0.015 sq km
		Pakka Unplanned Area	4.325 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

BHURGAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	9.879 sq km
		Kachcha Area	0.033 sq km
		Pakka Unplanned Area	0.071 sq km
		Range Land	0.008 sq km
		Education Facilities	2
		Settlements	6
		Irrigation and Drainage Network	5.902 km
		Road Network	11.51 km
		Population	1080
		Household	205
Meteorological Drought	Medium - Extreme	Settlements	6
		Agriculture Area	9.901 sq km
		Range Land	0.249 sq km
		Wet Area	1.652 sq km
		Population	900
		Household	171
Agricultural Drought	Low - Medium	Settlements	3
		Agriculture Area	7.027 sq km
		Range Land	0.296 sq km
		Wet Area	0.923 sq km
		Population	636
		Household	120
Heatwave	Low - Extreme	Settlements	5
		Population	891
		Household	169
		Agriculture Area	9.867 sq km

		Kachcha Area	0.033 sq km
		Pakka Unplanned Area	0.071 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

BHURGARI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	72.679 sq km
		Kachcha Area	0.036 sq km
		Pakka Unplanned Area	2.707 sq km
		Range Land	0.159 sq km
		Bridges	5
		Bus Stops	1
		Education Facilities	42
		Mobile Towers	3
		Settlements	47
		Irrigation and Drainage Network	20.491 km
		Road Network	113.719 km
		Population	26020
		Household	5080
Meteorological Drought	Medium - Extreme	Settlements	47
		Agriculture Area	72.817 sq km
		Range Land	3.565 sq km
		Water Body	1.158 sq km
		Wet Area	3.87 sq km
		Population	21440
		Household	4186
Agricultural Drought	Low - Medium	Settlements	1
		Agriculture Area	12.961 sq km
		Range Land	1.797 sq km
		Water Body	0.991 sq km
		Wet Area	0.696 sq km
		Population	597
		Household	116

Heatwave	Low - Extreme	Settlements	47
		Population	21334
		Household	4161
		Agriculture Area	72.637 sq km
		Kachcha Area	0.036 sq km
		Pakka Unplanned Area	2.713 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

DENGAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	115.399 sq km
		Kachcha Area	0.093 sq km
		Pakka Planned Area	0.723 sq km
		Pakka Unplanned Area	4.615 sq km
		Range Land	0.428 sq km
		Bridges	3
		Bus Stops	2
		Education Facilities	67
		Health Facilities	10
		Mobile Towers	5
		Petrol Pumps	6
		Police Stations	1
		Post Offices	2
		Settlements	145
		Irrigation and Drainage Network	58.964 km
		Road Network	230.434 km
Population	59881		
Household	11574		
Meteorological Drought	Medium - Extreme	Settlements	145
		Agriculture Area	115.598 sq km
		Range Land	2.2 sq km
		Water Body	0.157 sq km
		Wet Area	6.52 sq km
		Population	49295
		Household	9524

Agricultural Drought	Low - Medium	Settlements	16
		Agriculture Area	28.344 sq km
		Range Land	0.86 sq km
		Water Body	0.139 sq km
		Wet Area	0.454 sq km
		Population	5111
		Household	995
Heatwave	Low - High	Settlements	143
		Population	49051
		Household	9482
		Agriculture Area	115.315 sq km
		Kachcha Area	0.095 sq km
		Pakka Planned Area	0.723 sq km
		Pakka Unplanned Area	4.63 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

DILAWAR HUSSAIN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	127.484 sq km
		Kachcha Area	0.394 sq km
		Natural Vegetation in Wet Areas	0.007 sq km
		Pakka Planned Area	1.166 sq km
		Pakka Unplanned Area	1.737 sq km
		Range Land	0.028 sq km
		Ambulance Services	1
		Bridges	5
		Education Facilities	65
		Health Facilities	8
		Mobile Towers	7
		Petrol Pumps	2
		Police Stations	1
		Post Offices	4
Settlements	79		
Irrigation and Drainage	37.964 km		

		Network	
		Road Network	162.315 km
		Population	54251
		Household	10220
Meteorological Drought	Medium - Extreme	Settlements	79
		Agriculture Area	127.762 sq km
		Natural Vegetation in Wet Areas	0.456 sq km
		Range Land	0.679 sq km
		Water Body	0.667 sq km
		Wet Area	9.316 sq km
		Population	44960
		Household	8470
Agricultural Drought	Low - High	Settlements	26
		Agriculture Area	62.282 sq km
		Natural Vegetation in Wet Areas	0.555 sq km
		Range Land	0.816 sq km
		Water Body	0.806 sq km
		Wet Area	6.707 sq km
		Population	23271
		Household	4337
Heatwave	Low - Extreme	Settlements	75
		Population	44668
		Household	8413
		Agriculture Area	127.377 sq km
		Kachcha Area	0.395 sq km
		Pakka Planned Area	1.166 sq km
		Pakka Unplanned Area	1.743 sq km
Tsunami	Low - Medium	Agriculture Area	0.005 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

DOULATPUR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	90.982 sq km
		Natural Vegetation in Wet Areas	0.001 sq km
		Pakka Planned Area	12.92 sq km
		Pakka Unplanned Area	4.54 sq km
		Range Land	0.085 sq km
		Ambulance Services	1
		Bridges	4
		Bus Stops	5
		Education Facilities	165
		Grain Mandi	1
		Grid Stations	1
		Health Facilities	24
		Industries	1
		Mobile Towers	20
		Petrol Pumps	46
		Police Stations	7
		Post Offices	3
		Power Plants	1
		Settlements	212
		Tourist Places	13
Irrigation and Drainage Network	53.877 km		
Railway Line	12.684 km		
Road Network	213.486 km		
Population	309162		
Household	55138		
Meteorological Drought	Medium - Extreme	Settlements	212
		Agriculture Area	91.349 sq km
		Natural Vegetation in Wet Areas	0.097 sq km
		Range Land	1.772 sq km
		Water Body	1.27 sq km
		Wet Area	5.246 sq km
		Population	253113
		Household	45144
Agricultural Drought	Low - High	Settlements	6
		Agriculture Area	20.387 sq km
		Natural Vegetation in Wet Areas	0.119 sq km
		Range Land	0.912 sq km
		Water Body	0.712 sq km

		Wet Area	2.144 sq km
		Population	1279
		Household	243
Heatwave	Low - High	Settlements	204
		Population	252068
		Household	44957
		Agriculture Area	90.837 sq km
		Pakka Planned Area	12.928 sq km
		Pakka Unplanned Area	4.547 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

FAZAL BHAMBRO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	81.729 sq km
		Forest Area	0.002 sq km
		Kachcha Area	0.283 sq km
		Pakka Unplanned Area	1.768 sq km
		Range Land	0.123 sq km
		Education Facilities	40
		Settlements	110
		Irrigation and Drainage Network	37.271 km
		Road Network	92.971 km
		Population	30275
		Household	6001
Meteorological Drought	Medium - Extreme	Settlements	110
		Agriculture Area	82 sq km
		Forest Area	0.077 sq km
		Range Land	1.876 sq km
		Water Body	0.16 sq km
		Wet Area	8.095 sq km
		Population	25314
Household	5021		
Agricultural Drought	Low - Medium	Settlements	33
		Agriculture Area	28.466 sq km

		Forest Area	0.053 sq km
		Range Land	2.243 sq km
		Water Body	0.19 sq km
		Wet Area	5.127 sq km
		Population	8585
		Household	1705
Heatwave	Low - Extreme	Settlements	108
		Population	25031
		Household	4967
		Agriculture Area	81.628 sq km
		Kachcha Area	0.284 sq km
		Pakka Unplanned Area	1.776 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

Haji Hadi Bux			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	78.337 sq km
		Forest Area	0.003 sq km
		Kachcha Area	0.028 sq km
		Pakka Planned Area	0.543 sq km
		Pakka Unplanned Area	3.274 sq km
		Range Land	0.015 sq km
		Bridges	1
		Education Facilities	52
		Mobile Towers	1
		Petrol Pumps	2
		Settlements	117
		Irrigation and Drainage Network	49.114 km
		Road Network	153.201 km
		Population	37095
Household	7232		
Meteorological Drought	Medium - Extreme	Settlements	117
		Agriculture Area	78.647 sq km
		Forest Area	0.021 sq km

		Range Land	0.175 sq km
		Water Body	0.144 sq km
		Wet Area	13.744 sq km
		Population	30584
		Household	5964
Agricultural Drought	Low - Medium	Settlements	16
		Agriculture Area	21.97 sq km
		Forest Area	0.024 sq km
		Range Land	0.195 sq km
		Water Body	0.173 sq km
		Wet Area	1.959 sq km
		Population	3024
		Household	586
Heatwave	Low - Extreme	Settlements	113
		Population	30364
		Household	5914
		Agriculture Area	78.259 sq km
		Kachcha Area	0.028 sq km
		Pakka Planned Area	0.543 sq km
		Pakka Unplanned Area	3.277 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

HATHUNGO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	14.578 sq km
		Kachcha Area	0.189 sq km
		Pakka Unplanned Area	0.043 sq km
		Range Land	0.029 sq km
		Education Facilities	8
		Settlements	11
		Irrigation and Drainage Network	0.798 km
		Road Network	19.053 km
		Population	3175
		Household	628

Meteorological Drought	Medium - Extreme	Settlements	11
		Agriculture Area	14.63 sq km
		Range Land	1.328 sq km
		Wet Area	5.277 sq km
		Population	2618
		Household	518
Agricultural Drought	Low - Extreme	Settlements	9
		Agriculture Area	16.236 sq km
		Range Land	1.634 sq km
		Wet Area	6.5 sq km
		Population	2037
		Household	403
Heatwave	Low - High	Settlements	11
		Population	2595
		Household	514
		Agriculture Area	14.56 sq km
		Kachcha Area	0.191 sq km
		Pakka Unplanned Area	0.043 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

JAWARIASOR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	134.05 sq km
		Forest Area	0.012 sq km
		Kachcha Area	1.757 sq km
		Natural Vegetation in Wet Areas	0.007 sq km
		Pakka Planned Area	0.015 sq km
		Pakka Unplanned Area	1.576 sq km
		Range Land	0.022 sq km
		Education Facilities	57
		Settlements	116
		Irrigation and Drainage Network	36.061 km

		Road Network	178.479 km
		Population	31773
		Household	6200
Meteorological Drought	Medium - Extreme	Settlements	116
		Agriculture Area	134.49 sq km
		Forest Area	0.272 sq km
		Natural Vegetation in Wet Areas	0.789 sq km
		Range Land	0.409 sq km
		Water Body	0.042 sq km
		Wet Area	18.446 sq km
		Population	26356
		Household	5149
Agricultural Drought	Low - Medium	Settlements	21
		Agriculture Area	42.4 sq km
		Forest Area	0.325 sq km
		Natural Vegetation in Wet Areas	0.963 sq km
		Range Land	0.495 sq km
		Water Body	0.051 sq km
		Wet Area	10.163 sq km
		Population	4815
		Household	944
Heatwave	Low - Extreme	Settlements	116
		Population	26141
		Household	5099
		Agriculture Area	133.914 sq km
		Kachcha Area	1.763 sq km
		Pakka Planned Area	0.015 sq km
		Pakka Unplanned Area	1.582 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

JHULURJ			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	108.935 sq km
		Kachcha Area	0.027 sq km
		Natural Vegetation in Wet Areas	0.009 sq km
		Pakka Planned Area	0.372 sq km
		Pakka Unplanned Area	4.537 sq km
		Range Land	0.069 sq km
		Bridges	4
		Education Facilities	71
		Health Facilities	1
		Industries	5
		Mobile Towers	3
		Petrol Pumps	2
		Settlements	155
		Irrigation and Drainage Network	39.725 km
		Railway Line	7.682 km
Road Network	195.66 km		
Population	56446		
Household	10994		
Meteorological Drought	Medium - Extreme	Settlements	155
		Agriculture Area	109.179 sq km
		Natural Vegetation in Wet Areas	1.044 sq km
		Range Land	1.559 sq km
		Water Body	0.509 sq km
		Wet Area	9.535 sq km
		Population	46474
		Household	9042
Agricultural Drought	Low - High	Settlements	24
		Agriculture Area	29.839 sq km
		Natural Vegetation in Wet Areas	1.28 sq km
		Range Land	0.132 sq km
		Water Body	0.454 sq km
		Wet Area	5.223 sq km
		Population	4754
		Household	921
Heatwave	Low - High	Settlements	152
		Population	46147
		Household	8975

		Agriculture Area	108.841 sq km
		Kachcha Area	0.027 sq km
		Pakka Planned Area	0.372 sq km
		Pakka Unplanned Area	4.55 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KANDIARI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	458.075 sq km
		Kachcha Area	2.317 sq km
		Natural Vegetation in Wet Areas	0.016 sq km
		Pakka Planned Area	0.076 sq km
		Pakka Unplanned Area	6.259 sq km
		Range Land	0.3 sq km
		Bridges	15
		Bus Stops	1
		Education Facilities	216
		Health Facilities	3
		Mobile Towers	8
		Petrol Pumps	6
		Police Stations	1
		Settlements	428
		Irrigation and Drainage Network	155.716 km
		Road Network	868.768 km
Population	129627		
Household	25699		
Meteorological Drought	Medium - Extreme	Settlements	428
		Agriculture Area	458.788 sq km
		Natural Vegetation in Wet Areas	1.021 sq km
		Range Land	5.343 sq km
		Water Body	1.568 sq km
		Wet Area	27.8 sq km
		Population	106490
		Household	21111

Agricultural Drought	Low - Extreme	Settlements	55
		Agriculture Area	161.437 sq km
		Natural Vegetation in Wet Areas	1.251 sq km
		Range Land	4.274 sq km
		Water Body	1.863 sq km
		Wet Area	20.277 sq km
		Population	15534
		Household	3065
Heatwave	Low - High	Settlements	414
		Population	105467
		Household	20897
		Agriculture Area	457.807 sq km
		Kachcha Area	2.322 sq km
		Pakka Planned Area	0.076 sq km
		Pakka Unplanned Area	6.269 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KANGORO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	100.09 sq km
		Pakka Planned Area	0.766 sq km
		Pakka Unplanned Area	3.483 sq km
		Range Land	0.038 sq km
		Bridges	2
		Bus Stops	1
		Education Facilities	68
		Health Facilities	7
		Industries	1
		Mobile Towers	7
		Petrol Pumps	2
		Police Stations	2
		Settlements	78
		Irrigation and Drainage Network	60.856 km

		Road Network	112.59 km
		Population	49575
		Household	9613
Meteorological Drought	Medium - Extreme	Settlements	78
		Agriculture Area	100.445 sq km
		Range Land	0.67 sq km
		Water Body	0.574 sq km
		Wet Area	18.528 sq km
		Population	40905
		Household	7933
Agricultural Drought	Low - High	Settlements	6
		Agriculture Area	22.894 sq km
		Water Body	0.327 sq km
		Wet Area	2.635 sq km
		Population	1440
		Household	268
Heatwave	Low - Extreme	Settlements	75
		Population	40640
		Household	7881
		Agriculture Area	99.977 sq km
		Pakka Planned Area	0.767 sq km
		Pakka Unplanned Area	3.494 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KHAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	163.475 sq km
		Pakka Unplanned Area	2.561 sq km
		Range Land	0.005 sq km
		Bridges	8
		Education Facilities	70
		Health Facilities	1
		Settlements	96
		Irrigation and Drainage	65.765 km

		Network	
		Road Network	322.796 km
		Population	42240
		Household	8243
Meteorological Drought	Medium - Extreme	Settlements	96
		Agriculture Area	163.652 sq km
		Range Land	0.126 sq km
		Water Body	0.545 sq km
		Wet Area	15.799 sq km
		Population	34708
		Household	6769
Agricultural Drought	Low	Agriculture Area	4.031 sq km
		Range Land	0.152 sq km
		Water Body	0.248 sq km
		Wet Area	0.006 sq km
		Population	74
		Household	14
Heatwave	Low - High	Settlements	94
		Population	34457
		Household	6721
		Agriculture Area	163.4 sq km
		Pakka Unplanned Area	2.57 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KHIRAH			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	60.922 sq km
		Pakka Unplanned Area	1.989 sq km
		Range Land	0.021 sq km
		Bridges	2
		Education Facilities	55
		Health Facilities	1
		Mobile Towers	2
		Petrol Pumps	1

		Settlements	65
		Irrigation and Drainage Network	19.46 km
		Road Network	117.74 km
		Population	27182
		Household	5369
Meteorological Drought	Medium - Extreme	Settlements	65
		Agriculture Area	61.095 sq km
		Range Land	0.557 sq km
		Water Body	0.151 sq km
		Wet Area	21.953 sq km
		Population	22306
		Household	4403
Agricultural Drought	Low	Settlements	1
		Agriculture Area	11.353 sq km
		Range Land	0.498 sq km
		Wet Area	4.89 sq km
		Population	409
		Household	80
Heatwave	Low - High	Settlements	62
		Population	22164
		Household	4371
		Agriculture Area	60.862 sq km
		Pakka Unplanned Area	1.995 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KHUDADAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	98.51 sq km
		Forest Area	0.037 sq km
		Kachcha Area	0.161 sq km
		Pakka Unplanned Area	3.296 sq km
		Range Land	0.21 sq km
		Bridges	1

		Education Facilities	47
		Settlements	74
		Irrigation and Drainage Network	35.383 km
		Road Network	98.674 km
		Population	32810
		Household	6402
Meteorological Drought	Medium - Extreme	Settlements	74
		Agriculture Area	98.672 sq km
		Forest Area	0.952 sq km
		Range Land	2.837 sq km
		Water Body	0.523 sq km
		Wet Area	1.58 sq km
		Population	27123
		Household	5294
Agricultural Drought	Low - Medium	Settlements	2
		Agriculture Area	23 sq km
		Forest Area	1.147 sq km
		Range Land	3.271 sq km
		Water Body	0.538 sq km
		Wet Area	0.008 sq km
		Population	1987
		Household	386
Heatwave	Low - Extreme	Settlements	73
		Population	26948
		Household	5258
		Agriculture Area	98.456 sq km
		Kachcha Area	0.162 sq km
		Pakka Unplanned Area	3.305 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

KOT GHULAM MUHAMMAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	10.11 sq km
		Pakka Planned Area	0.439 sq km
		Pakka Unplanned Area	0.551 sq km
		Education Facilities	11
		Health Facilities	3
		Mobile Towers	2
		Settlements	14
		Irrigation and Drainage Network	6.945 km
		Road Network	24.847 km
		Population	15373
		Household	2914
Meteorological Drought	Medium - Extreme	Settlements	14
		Agriculture Area	10.122 sq km
		Water Body	0.007 sq km
		Wet Area	0.108 sq km
		Population	12638
		Household	2397
Agricultural Drought	Low	Agriculture Area	0.04 sq km
		Population	69
		Household	12
Heatwave	Low - High	Settlements	13
		Population	12595
		Household	2388
		Agriculture Area	10.104 sq km
		Pakka Planned Area	0.44 sq km
		Pakka Unplanned Area	0.551 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

MAKHAN SAMOON			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	122.642 sq km

		Pakka Unplanned Area	4.638 sq km
		Range Land	0.079 sq km
		Bridges	4
		Education Facilities	65
		Health Facilities	4
		Mobile Towers	3
		Petrol Pumps	3
		Settlements	134
		Irrigation and Drainage Network	82.386 km
		Road Network	192.387 km
		Population	53381
		Household	10308
Meteorological Drought	Medium - Extreme	Settlements	134
		Agriculture Area	122.889 sq km
		Range Land	3.09 sq km
		Water Body	1.674 sq km
		Wet Area	9.585 sq km
		Population	43988
		Household	8491
Agricultural Drought	Low - High	Settlements	18
		Agriculture Area	43.752 sq km
		Range Land	3.758 sq km
		Water Body	2.041 sq km
		Wet Area	8.863 sq km
		Population	4829
		Household	932
Heatwave	Low - High	Settlements	132
		Population	43675
		Household	8430
		Agriculture Area	122.55 sq km
		Pakka Unplanned Area	4.65 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

MIR GHULAM HUSSAIN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	103.228 sq km
		Natural Vegetation in Wet Areas	0.11 sq km
		Pakka Planned Area	0.371 sq km
		Pakka Unplanned Area	4.258 sq km
		Range Land	0.146 sq km
		Bridges	4
		Bus Stops	2
		Education Facilities	67
		Health Facilities	5
		Mobile Towers	4
		Petrol Pumps	1
		Settlements	120
		Irrigation and Drainage Network	56.947 km
		Road Network	217.048 km
		Population	44626
Household	8698		
Meteorological Drought	Medium - Extreme	Settlements	120
		Agriculture Area	103.449 sq km
		Natural Vegetation in Wet Areas	0.982 sq km
		Range Land	1.426 sq km
		Water Body	0.153 sq km
		Wet Area	6.2 sq km
		Population	36801
		Household	7170
Agricultural Drought	Low - High	Settlements	6
		Agriculture Area	19.478 sq km
		Natural Vegetation in Wet Areas	1.187 sq km
		Range Land	0.365 sq km
		Water Body	0.183 sq km
		Wet Area	1.113 sq km
		Population	2619
		Household	508
Heatwave	Low - High	Settlements	119
		Population	36557
		Household	7121
		Agriculture Area	103.14 sq km
		Pakka Planned Area	0.371 sq km

		Pakka Unplanned Area	4.271 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

MIR IMAM BUX			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	58.008 sq km
		Pakka Unplanned Area	2.679 sq km
		Range Land	0.109 sq km
		Education Facilities	55
		Post Offices	1
		Settlements	50
		Irrigation and Drainage Network	29.164 km
		Road Network	109.722 km
		Population	25914
		Household	5024
Meteorological Drought	Medium - Extreme	Settlements	50
		Agriculture Area	58.141 sq km
		Range Land	2.673 sq km
		Water Body	0.095 sq km
		Wet Area	3.271 sq km
		Population	21361
		Household	4142
Agricultural Drought	Low	Settlements	1
		Agriculture Area	4.768 sq km
		Range Land	0.974 sq km
		Water Body	0.05 sq km
		Wet Area	0.017 sq km
		Population	196
		Household	37
Heatwave	Low - Extreme	Settlements	49
		Population	21263
		Household	4124
		Agriculture Area	57.948 sq km

		Pakka Unplanned Area	2.687 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

MIR KHUDA BUX			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	83.458 sq km
		Forest Area	0.008 sq km
		Kachcha Area	0.342 sq km
		Pakka Planned Area	0.043 sq km
		Pakka Unplanned Area	1.079 sq km
		Range Land	0.182 sq km
		Bridges	1
		Education Facilities	47
		Petrol Pumps	1
		Settlements	51
		Irrigation and Drainage Network	35.655 km
		Road Network	123.9 km
		Population	15702
Household	2956		
Meteorological Drought	Medium - Extreme	Settlements	51
		Agriculture Area	83.671 sq km
		Forest Area	0.063 sq km
		Range Land	2.276 sq km
		Wet Area	4.52 sq km
		Population	13048
		Household	2458
Agricultural Drought	Low - High	Settlements	19
		Agriculture Area	38.977 sq km
		Range Land	1.966 sq km
		Wet Area	1.755 sq km
		Population	4351
		Household	820
Heatwave	Low - Extreme	Settlements	51

		Population	12939
		Household	2435
		Agriculture Area	83.369 sq km
		Kachcha Area	0.343 sq km
		Pakka Planned Area	0.043 sq km
		Pakka Unplanned Area	1.082 sq km
Tsunami	Low - High	Agriculture Area	0.067 sq km
		Range Land	0.003 sq km
		Road Network	0.133sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

MIRPUR OLD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	70.257 sq km
		Forest Area	0.001 sq km
		Natural Vegetation in Wet Areas	0.004 sq km
		Pakka Planned Area	0.091 sq km
		Pakka Unplanned Area	1.383 sq km
		Education Facilities	45
		Health Facilities	1
		Industries	2
		Petrol Pumps	1
		Police Stations	1
		Settlements	71
		Irrigation and Drainage Network	25.273 km
		Road Network	143.976 km
		Population	23560
Household	4603		
Meteorological Drought	Medium - Extreme	Settlements	71
		Agriculture Area	70.335 sq km
		Forest Area	0.038 sq km
		Natural Vegetation in Wet Areas	0.105 sq km
		Water Body	0.523 sq km
		Wet Area	2.191 sq km
		Population	19351

		Household	3780
Agricultural Drought	Low - Medium	Agriculture Area	4.596 sq km
		Water Body	0.388 sq km
		Wet Area	0.633 sq km
		Population	122
		Household	22
Heatwave	Low - High	Settlements	69
		Population	19206
		Household	3752
		Agriculture Area	70.227 sq km
		Pakka Planned Area	0.091 sq km
		Pakka Unplanned Area	1.386 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

MIRWAH			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	56.155 sq km
		Pakka Planned Area	0.123 sq km
		Pakka Unplanned Area	2.5 sq km
		Range Land	0.008 sq km
		Bridges	2
		Education Facilities	40
		Health Facilities	2
		Mobile Towers	2
		Petrol Pumps	3
		Settlements	73
		Irrigation and Drainage Network	25.57 km
		Road Network	88.78 km
		Population	30196
		Household	5834
Meteorological Drought	Medium - Extreme	Settlements	73
		Agriculture Area	56.286 sq km
		Range Land	0.264 sq km

		Water Body	0.628 sq km
		Wet Area	5.615 sq km
		Population	24914
		Household	4811
Agricultural Drought	Low - Medium	Settlements	2
		Agriculture Area	18.826 sq km
		Range Land	0.316 sq km
		Water Body	0.663 sq km
		Wet Area	0.033 sq km
		Population	492
		Household	95
Heatwave	Low - High	Settlements	73
		Population	24751
		Household	4780
		Agriculture Area	56.104 sq km
		Pakka Planned Area	0.123 sq km
		Pakka Unplanned Area	2.508 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

NAUKOT			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	39.98 sq km
		Natural Vegetation in Wet Areas	0.008 sq km
		Pakka Planned Area	0.479 sq km
		Pakka Unplanned Area	1.734 sq km
		Range Land	0.109 sq km
		Bridges	2
		Education Facilities	28
		Grid Stations	1
		Health Facilities	6
		Mobile Towers	7
		Petrol Pumps	3
		Police Stations	1

		Post Offices	1
		Settlements	52
		Irrigation and Drainage Network	15.69 km
		Road Network	30.498 km
		Population	47292
		Household	8961
Meteorological Drought	Medium - Extreme	Settlements	52
		Agriculture Area	40.147 sq km
		Natural Vegetation in Wet Areas	0.589 sq km
		Range Land	2.406 sq km
		Wet Area	3.222 sq km
		Population	39342
		Household	7454
Agricultural Drought	Low - Medium	Settlements	16
		Agriculture Area	27.657 sq km
		Natural Vegetation in Wet Areas	0.714 sq km
		Range Land	2.908 sq km
		Wet Area	3.707 sq km
		Population	25819
		Household	4876
Heatwave	Low - Extreme	Settlements	52
		Population	39061
		Household	7400
		Agriculture Area	39.928 sq km
		Pakka Planned Area	0.479 sq km
		Pakka Unplanned Area	1.741 sq km
Cyclone	Low	Agriculture Area	4.905 sq km
		Natural Vegetation in Wet Areas	0.008 sq km
		Pakka Unplanned Area	0.024 sq km
		Range Land	0.02 sq km
		Settlements	2
		Irrigation and Drainage Network	2.302 km
		Road Network	5.125 km
		Population	347
		Household	68

Tsunami	Low - High	Agriculture Area	0.046 sq km
		Range Land	0.002 sq km
		Road Network	0.031 km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

PABAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	109.089 sq km
		Pakka Planned Area	0.236 sq km
		Pakka Unplanned Area	2.142 sq km
		Range Land	0.079 sq km
		Bridges	2
		Education Facilities	65
		Industries	1
		Mobile Towers	1
		Settlements	73
		Irrigation and Drainage Network	59.99 km
		Road Network	138.234 km
		Population	25516
Household	4808		
Meteorological Drought	Medium - Extreme	Settlements	73
		Agriculture Area	109.374 sq km
		Range Land	0.449 sq km
		Water Body	1.264 sq km
		Wet Area	15.335 sq km
		Population	21154
		Household	3983
Agricultural Drought	Low - High	Settlements	21
		Agriculture Area	53.565 sq km
		Range Land	0.263 sq km
		Water Body	1.53 sq km
		Wet Area	11.644 sq km
		Population	2982
		Household	563
Heatwave	Low - Extreme	Settlements	70
		Population	20979

		Household	3953
		Agriculture Area	108.995 sq km
		Pakka Planned Area	0.236 sq km
		Pakka Unplanned Area	2.15 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

PHULLAHDAYUN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	39.326 sq km
		Kachcha Area	0.322 sq km
		Pakka Unplanned Area	0.35 sq km
		Range Land	0.048 sq km
		Education Facilities	17
		Settlements	31
		Irrigation and Drainage Network	0.971 km
		Road Network	35.699 km
		Population	9204
		Household	1819
Meteorological Drought	Medium - Extreme	Settlements	31
		Agriculture Area	39.39 sq km
		Range Land	0.875 sq km
		Wet Area	1.258 sq km
		Population	7568
		Household	1496
Agricultural Drought	Low - High	Settlements	30
		Agriculture Area	47.264 sq km
		Range Land	1.076 sq km
		Wet Area	1.548 sq km
		Population	7516
		Household	1486
Heatwave	Low - High	Settlements	30
		Population	7504

		Household	1482
		Agriculture Area	39.309 sq km
		Kachcha Area	0.323 sq km
		Pakka Unplanned Area	0.352 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

ROSHANABAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	93.165 sq km
		Forest Area	0.003 sq km
		Kachcha Area	0.285 sq km
		Pakka Planned Area	0.163 sq km
		Pakka Unplanned Area	2.441 sq km
		Range Land	0.192 sq km
		Bridges	2
		Education Facilities	50
		Mobile Towers	1
		Petrol Pumps	2
		Settlements	142
		Irrigation and Drainage Network	23.784 km
		Road Network	150.577 km
		Population	42655
Household	8418		
Meteorological Drought	Medium - Extreme	Settlements	142
		Agriculture Area	93.435 sq km
		Forest Area	0.117 sq km
		Range Land	5.827 sq km
		Wet Area	2.572 sq km
		Population	35613
		Household	7025
Agricultural Drought	Low – Medium	Settlements	88
		Agriculture Area	71.526 sq km
		Forest Area	0.143 sq km

		Range Land	7.059 sq km
		Wet Area	2.584 sq km
		Population	21180
		Household	4194
Heatwave	Low - Extreme	Settlements	133
		Population	35182
		Household	6944
		Agriculture Area	93.077 sq km
		Kachcha Area	0.286 sq km
		Pakka Planned Area	0.162 sq km
		Pakka Unplanned Area	2.449 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

SANJAR CHANG			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	6.092 sq km
		Pakka Unplanned Area	0.191 sq km
		Range Land	0.014 sq km
		Education Facilities	3
		Settlements	3
		Irrigation and Drainage Network	6.253 km
		Road Network	9.303 km
		Population	2052
		Household	386
Meteorological Drought	Medium - Extreme	Settlements	3
		Agriculture Area	6.099 sq km
		Range Land	0.412 sq km
		Population	1705
		Household	321
Agricultural Drought	Low	Agriculture Area	0.095 sq km
		Population	19
		Household	3

Heatwave	Low - Extreme	Settlements	3
		Population	1688
		Household	318
		Agriculture Area	6.086 sq km
		Pakka Unplanned Area	0.192 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

SOFFAN SHAH			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	107.724 sq km
		Kachcha Area	0.006 sq km
		Pakka Planned Area	1.425 sq km
		Pakka Unplanned Area	3.23 sq km
		Range Land	0.251 sq km
		Bridges	4
		Bus Stops	1
		Education Facilities	90
		Grid Stations	1
		Health Facilities	9
		Mobile Towers	9
		Petrol Pumps	3
		Police Stations	1
		Settlements	95
		Irrigation and Drainage Network	46.982 km
		Road Network	112.474 km
		Population	67732
Household	12649		
Meteorological Drought	Medium - Extreme	Settlements	95
		Agriculture Area	107.881 sq km
		Range Land	2.882 sq km
		Water Body	0.275 sq km
		Wet Area	2.595 sq km
		Population	55973

		Household	10451
Agricultural Drought	Low - Medium	Settlements	15
		Agriculture Area	49.884 sq km
		Range Land	3.009 sq km
		Water Body	0.279 sq km
		Wet Area	1.291 sq km
		Population	5565
		Household	1040
Heatwave	Low - Extreme	Settlements	92
		Population	55586
		Household	10375
		Agriculture Area	107.645 sq km
		Kachcha Area	0.006 sq km
		Pakka Planned Area	1.423 sq km
		Pakka Unplanned Area	3.241 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

TANDO JAN MOHAMMAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	58.46 sq km
		Forest Area	0.152 sq km
		Kachcha Area	0.284 sq km
		Pakka Planned Area	0.498 sq km
		Pakka Unplanned Area	2.367 sq km
		Range Land	0.285 sq km
		Ambulance Services	1
		Bus Stops	2
		Education Facilities	43
		Grid Stations	1
		Health Facilities	3
		Mobile Towers	8
		Petrol Pumps	4
Police Stations	1		

		Post Offices	1
		Settlements	63
		Irrigation and Drainage Network	20.847 km
		Road Network	92.408 km
		Population	59770
		Household	10753
Meteorological Drought	Medium - Extreme	Settlements	63
		Agriculture Area	58.676 sq km
		Forest Area	3.831 sq km
		Range Land	5.508 sq km
		Water Body	0.021 sq km
		Wet Area	3.484 sq km
		Population	49453
		Household	8898
Agricultural Drought	Low - Medium	Settlements	20
		Agriculture Area	21.504 sq km
		Forest Area	4.663 sq km
		Range Land	6.682 sq km
		Water Body	0.024 sq km
		Wet Area	2.215 sq km
		Population	8914
		Household	1602
Heatwave	Low - Extreme	Settlements	60
		Population	49164
		Household	8845
		Agriculture Area	58.362 sq km
		Kachcha Area	0.285 sq km
		Pakka Planned Area	0.499 sq km
		Pakka Unplanned Area	2.373 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

TURK ALL MARL			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	57.312 sq km
		Pakka Unplanned Area	1.583 sq km
		Range Land	0.016 sq km
		Bridges	1
		Education Facilities	38
		Mobile Towers	1
		Settlements	57
		Irrigation and Drainage Network	27.776 km
		Road Network	111.116 km
		Population	26093
		Household	5089
Meteorological Drought	Medium - Extreme	Settlements	57
		Agriculture Area	57.419 sq km
		Range Land	0.108 sq km
		Water Body	0.376 sq km
		Wet Area	5.038 sq km
		Population	21423
		Household	4180
Agricultural Drought	Low - Medium	Agriculture Area	1.261 sq km
		Water Body	0.245 sq km
		Wet Area	0.085 sq km
		Population	15
		Household	3
Heatwave	Low - High	Settlements	57
		Population	21270
		Household	4147
		Agriculture Area	57.262 sq km
		Pakka Unplanned Area	1.585 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

ORGANIZATION STRUCTURE FOR DISASTER MANAGEMENT AT DISTRICT LEVEL

INTRODUCTION

Each year natural disasters kill thousands of people and inflict billions of dollars in economic losses. No nation or community is immune to the damage of disasters and certainly, the province of Sindh is no exception. Almost every year, a major or minor natural disaster disrupts the life and economy of people living in the province, especially those with high economic vulnerability or the poor strata of the population. Unless action is taken to reduce the toll of natural disasters, the damages and losses of disasters can only be expected to rise. The scientific and technological advances of today's world provide unprecedented opportunities for responding to the urgent need to mitigate the impacts of natural hazards.

It is a globally recognized fact that natural hazards do not kill but poor planning does. Better disaster management and disaster risk reduction can only be achieved through collective efforts in integrating hazard reduction policy and practice throughout the province. It is a need of the time and opportunity to reassess the approach to natural hazards and to develop strategies for reducing losses by prevention and preparedness.

Disaster management can be achieved through the collective effort of all segments of life. A central authority, like Provincial Disaster Management Authority, can oversee, plan, manage and coordinate for disaster management at the provincial scale, however, it is the responsibility of concerned departments and authorities to implement and execute disaster management measures at the grass-root level. For effective disaster management, it is also imperative to take onboard and empower communities at high disaster risk as first responders. The disaster management plan will be effective once the roles and responsibilities of each individual and department are well understood and disaster management measures are implemented.

Keeping in view the importance of disaster management at all levels i.e., from the Provincial level to UC or village level, different disaster management committees have been recommended to be constituted. These committees are District Disaster Management Authority (DDMA), Taluka Disaster Management Committee (TDMC), and Union Council Disaster Management Committee (UCDMC). The recommended composition of each committee is given in Table-2 to 4.

Table 2: District Disaster Management Authority

Sr.#	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 Chairman Zakat	Member
14.	Executive Engineer (Works and Services)	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	Members
20.	Two Representatives of NGOs/Civil Society	Members
21.	Two Representatives of Business Community	Members
22.	Representative of Agriculture and Livestock Department	Member
23.	Representative of NHA	Member
24.	Representative of Electric Supply Corporation	Member
25.	Representative of SSGC	Member
26.	Representative of Red Crescent	Member
27.	Representative of Sindh Scouts	Member
28.	Representation of Volunteers from Communities at Risk	Member(s)

Table 3: TDMC Taluka Disaster Management Committee

Sr.#	Committee Representative	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
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

Table 4: UCDCM Union Council Disaster Management Committee

Sr.#	Committee Representative	Role
1.	UC 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

RESPONSIBILITY OF DISTRICT DISASTER MANAGEMENT AUTHORITY

- The DDMA shall work as a coordinating body of all government agencies and non-government organizations operating in the district and act as a focal authority in the conduction and implementation of plan and actions on disaster management
- Additional Deputy Commissioner who is proposed as Disaster Management Officer shall also work as Secretary DDMA and will provide administrative support to DDMA
- The DDMA shall ensure to take all possible disaster management measures in the district in accordance with the guidelines laid down by PDMA or NDMA
- The DDMA shall provide leadership by taking initiative to achieve MHVRA Informed Disaster Management Plan goals and objectives
- The DDMA shall coordinate with PDMA Sindh in disaster preparedness, response and recovery
- The DDMA shall provide guidance and support for the implementation of district response plans including management of the District Emergency Operation Centre

FUNCTION OF DDMA

- To review district disaster management plan, including district response plan in-line with Provincial and National disaster management plans and policies
- To ensure that risk maps are developed and updated and disaster-prone areas have been identified and prioritized in the district
- To coordinate the efforts for prevention and mitigation measures that are undertaken by the government and local authorities in the identified vulnerable areas of the district
- To organize and coordinate specialized disaster management training programs for different levels of officers, employees, and volunteer rescue workers in the district
- To facilitate community training and awareness programs with the support of local authorities, government and non-government organizations

- To set up, maintain, review and upgrade the mechanism for early warning and dissemination of accurate information to concerned authorities and the general public
- To review development plans prepared by the government departments, statutory or local authorities with a view that disaster management plan has been integrated into the development activities and projects of the plan
- To coordinate with, and give guidelines to, local authorities in the district to ensure that pre-disaster and post-disaster management activities in the district are carried out promptly and effectively
- To prepare, review and update district level response and contingency plans.
- To identify buildings and places which could, in the event of disaster situation be, used as relief centers and camps and make arrangements for water supply and sanitation in such buildings or places
- To distribute relief and facilitate rescue or ensure disaster preparedness and response
- To ensure operationalization of District Emergency Operation Centre (DEOC) equipped with all necessary gadgets
- To activate the District Emergency Operations Centre (DEOC) and ensure its uninterrupted operation during and after disaster events
- To carry out rapid damage and needs assessment and develop a report for assisting PDMA and other relevant stakeholders
- To coordinate and monitor early recovery and rehabilitation activities with the support of PDMA or relevant local and international stakeholders
- To prepare and continuously update databases of external agency projects, future priority areas, funding framework, available resources, areas of operations/expertise etc.
- To perform other functions as deemed necessary by the provincial government or provincial authority for disaster management in the district

RESPONSIBILITY OF TALUKA DISASTER MANAGEMENT COMMITTEE

- 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

- The TDMC shall interface directly with communities at risk in disaster preparedness, disaster risk reduction and response
- The TDMC shall bridge between government and communities in disaster response
- The TDMC shall coordinate between DDMA, PDMA and all stakeholders working at grass-root level in pre, during and post disaster events

FUNCTION OF TALUKA DISASTER MANAGEMENT COMMITTEE

- Identification and updation of all hazards in their respective locations and conduct of risk and vulnerability analysis and communicate with DDMA and subsequently with PDMA
- Ensure that the officers and employees are trained in disaster management
- Ensure that resources relating to disaster management are maintained and readily available for use in the event of any threatening disaster situation or disaster
- To coordinate and monitor disaster management plan mainstreaming operations in the district and over all disaster management initiatives
- Land use planning and zoning within the municipality by preparing master plans while keeping the multi hazard of the municipality and Taluka in context
- To ensure the implementation of bylaws related to encroachment at hazardous places, building codes, land use planning and zonation etc.
- To identify evacuation/shelter places to face any disaster/emergency
- To monitor the disaster management activities of NGOs, UCDMCs and private sectors
- To share initial damage and needs assessment reports to DDMA and subsequently to PDMA
- To carry out relief, rehabilitation and reconstruction activities in the affected areas in accordance with the DDMA and PDMA

RESPONSIBILITY OF UNION COUNCIL DISASTER MANAGEMENT COMMITTEE

1. UCDMC shall work as front-line, first responder body at village, mohalla and ward level.
2. Shall assist TDMC, DDMA and PDMA especially in disaster response.
3. Shall encourage and keep record of volunteers in Union Council.

4. Shall formulate different groups to respond disaster and emergency events such as evacuation group, camp management group etc. and share this record with TDMC, DDMA and PDMA.
5. Shall 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.

FUNCTION OF UCDMC

1. Identification and updation of all hazards in their respective locations and conduct of risk and vulnerability analysis and communicate with TDMC, DDMA and subsequently with PDMA.
2. To prepare/update UC level disaster management plan for emergent hazards or new hazards caused by any disaster event.
3. To make an analysis of disaster risk and to prepare a list of vulnerable villages and areas of the concerned union councils.
4. To mobilize community for maintaining public ways, public streets, culverts, bridges and public buildings, and other development activities.
5. To coordinate with the village and neighborhood UCs in case of emergency in order to get quick information about the severity and extent of a disaster impact and report it to the TDMC and DDMA.
6. To report cases of handicapped, destitute and socially excluded groups to TDMC, DDMA and PDMA in order to streamline their special needs in relief and response operation.
7. Mobilizing and coordinating work of volunteers and ensuring community participation.
8. Conduct of search and rescue operations in coordination with the rescue teams and Police.
9. To provide assistance to other agencies for mobility/transport of staff, including rescue parties, relief personnel and relief materials. To communicate with the TDMC, DDMA or PDMA for required additional resources.
10. To monitor NGO activities and provide necessary support to ensure community participation by establishing coordination mechanisms among NGOs and local communities.

PROVINCIAL EMERGENCY OPERATION CENTER (PEOC)

As envisioned by PDMA Sindh, PEOC is established at HQ of PDMA Sindh. The center is equipped with modern tools and techniques for management and operation activities in pre, during and post disaster events. The center works under the management of PDMA with 24/7 operation.

The functions of PEOC are summarized below;

- Coordinating node for planning, management and operations of disaster management activities
- Inventory management and goods distribution.
- Assets and vehicles management and monitoring
- Monitoring of extreme weather and disasters
- Issuance of early warnings
- Disposal and monitoring of man and material resources during disaster events
- Coordination with community based associations, volunteers, NGOs and other relevant institutions involved in disaster management
- Assessment of disaster risk and elements at risk and dissemination of information to concerned departments
- Coordination for evacuation, medical, search, rescue and relief
- Preparation and collection of damage assessment reports
- Coordination with all management tiers
- Daily briefings on disaster events, search and rescue operations, damages and losses, recovery and rehabilitation
- Hosting of online meetings
- Damage data collection through imaging drones

DISTRICT EMERGENCY OPERATION CENTER (DEOC)

The PEOC established at PDMA HQ is connected with districts through DEOC. The DEOC is supposed to work as field arm of PEOC for execution and implementation of instructions passed on by PEOC. The center is equipped with modern tools and techniques for management and operation activities in pre, during and post disaster events. The center works under the management of DDMA with 24/7 operation during disasters.

FUNCTION OF DEOC

The functions of DEOC are appended below;

- Receive information and instructions from PEOC regarding implementation and execution of action plans
- Monitor the situation and put everything ready and functional in the DEOC
- Dissemination of early warnings issued from PEOC to stakeholders and communities
- To coordinate with PEOC, PDMA, concerned departments and other stakeholders
- To monitor emergency operations and make efforts for preventing secondary hazards
- To conduct rapid assessment of the relief needs by collecting information from affected areas and circulate to PDMA and other concerned departments and stakeholders
- To deploy evacuation, medical, search and rescue teams in the affected areas
- To provide relief assistance in terms of relief camps, medical and sanitation facilities and temporary shelter to the affected population in the district
- To establish a liaison with concerned departments and stakeholders engaged in emergency response by anticipating resource inventory
- To collect information for daily briefings on disaster situation for PEOC, media, general public and other stakeholders
- Record keeping and preparation of consolidated reports and response plans and projects.
- Coordination and mobilization of community based associations, volunteers, NGOs and other relevant institutions involved in disaster management

SECTOR WISE ROLES AND RESPONSIBILITIES OF GOVERNMENT FUNCTIONARIES

AGRICULTURE AND LIVESTOCK DEPARTMENT

Pre-Disaster

- Capacity building of department regarding disaster management and risk reduction and implementation of sector specific disaster risk reduction measures
- Provide recommendation on changing/rescheduling of cropping patterns with respect to changing climate and weather scenarios
- Create Community Seed Bank at Union Council level
- Provide livestock vaccination and de-worming
- Assessment of high prone areas and estimation of possible damage and needs for recovery regarding livestock, crops, in case of any disaster
- Mass awareness regarding epidemics and diseases to livestock and crops
- Close coordination with PDMA and DDMA

During-Disaster

- Close and regular coordination with DDMA and PDMA
- Immediate transfer of current situation to DDMA and PDMA
- Vaccination of livestock

Post-Disaster

- Facilitation to institutions / NGOs/ INGOs which focus on rehabilitation activities as per guidelines provided by DDMA and PDMA
- Submit report on damages and needs to DDMA and PDMA
- Mass awareness regarding epidemics and diseases to livestock and crops
- Vaccination of livestock
- Upgrade Community Seed Bank (CSB)
- Timely compensation to affected farmers

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

PROVINCIAL DISASTER MANAGEMENT AUTHORITY (PDMA)

Pre-Disaster

- Close coordination with national and international institutions engaged in disaster forecasting.
- Coordinate meeting and engage DDMA for preparation of anticipated disasters
- Ensure readiness of equipment and inventory
- Disseminate disaster alerts to concerned DDMA with action plans for forecastable disasters
- Ensure availability of relief goods and other relevant stuff before anticipated disaster
- Advise concerned departments on removal of congestion from water ways before monsoon period
- Aware and sensitize public and private departments on main streaming disaster risk reduction in developing planning
- Ensure availability and functioning of provincial emergency operation center
- Provide and report high risk population and infrastructure in anticipated hazard areas.
- Capacity building of line and stakeholder department on disaster risk reduction and management.

During-Disaster

- Coordination and mobilization of man and material resources
- For rescue and evacuation of people, provide and manage temporary shelter and life restoration equipment in disaster affected regions
- Coordinate with line departments for health and veterinary services in the affected regions and ensure to control outbreak of any communicable diseases
- Coordinate with DDMA and line departments

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

Post-Disaster

- Coordination with DDMA and line departments for need and damage assessment
- Need and damage assessment reporting to higher management, NGOs, INGOs and other agencies for rehabilitation
- Ensure rehabilitation on build back better principle

DISTRICT DISASTER MANAGEMENT AUTHORITY (DDMA)

Pre-Disaster

- Close coordination with PDMA and other relevant stakeholders
- Risk assessment and identification of disaster-prone areas
- Aware and sensitize public and private departments on main streaming disaster risk reduction in developing planning
- Coordinate meeting and engage TDMC for preparation of anticipated disasters.
- Ensure readiness of equipment and inventory
- Disseminate disaster alerts to concerned TDMC with action plans for forecastable disasters
- Ensure availability of relevant staff before anticipated disaster
- Advise concerned departments on removal of congestion from water ways before monsoon period
- Ensure availability and functioning of district emergency operation center
- Arrange emergency response exercises and drills along with volunteer groups, social welfare and civil defense on various disaster scenarios

During-Disaster

- Mobilization of man and material resources
- For rescue and evacuation of people, provide and manage temporary shelter and life restoration equipment in disaster affected regions
- Coordinate with TDMC and line departments
- 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
- Only authorized officials of DDMA shall brief media on disaster situation and the response activities.

Post-Disaster

- Coordination with TDMC and line departments for need and damage assessment
- Need and damage assessment reporting to PDMA
- Ensure rehabilitation on Build Back Better principle

CIVIL DEFENSE

Pre-Disaster

- Assign representatives for DDMA to participate in meetings
- Information sharing regarding capacities and needs of Civil Defense department regarding disaster risk management
- Capacity building of Civil Defense department regarding disaster risk management
- Information sharing regarding technical and personnel expertise with DDMA
- Conduct trainings for Volunteers regarding Rescue and other relevant expertise in collaboration with Health department and PDMA
- Create awareness regarding rescue, evacuation and first aid
- Effectively establish, train and systemize volunteers' initiatives in collaboration with education department / institutions

During-Disaster

- Fire fighting
- Rescue and evacuation
- Assign volunteers in coordination with PDMA and DDMA
- Communicate to DEOC about details of all activities
- Communicate to DEOC any additional resources required for performing the above tasks
- Facilitate line departments as per demand in disaster response

Post-Disaster

- Assist in rehabilitation process if required

EDUCATION DEPARTMENT

Pre-Disaster

- Assign representatives for DDMA and participate in meetings
- Information sharing regarding capacities and needs of Education department regarding disaster risk management
- Teachers and students are informed about the disaster prone areas of the district
- Teachers and students are informed of their responsibilities to take care of materials and documents to safe places during disaster
- Facilitate and collaborate with PDMA in preparation of disaster management curriculum
- Collaborate with PDMA and DDMA in synergizing volunteers

During-Disaster

- Mobilize human resources for intervention during disaster
- Inform schools situated in high risk areas about hazard and hazard forecast
- Assist in arrangement of relief and shelter camps in educational institutes for the disaster affectees

- Facilitate Health department and other relevant entities in arranging medical camps, blood donations and provision of medical aid during disaster and emergencies
- Coordinate with PDMA and DDMA in assigning volunteers for emergency response

Post-Disaster

- Assessment of damages occurred to educational institutes
- Provide assistance to teachers, students and other staff who are victimized by disasters (lack of food, shelter, etc.)
- Rehabilitation and reconstruction of affected educational facilities
- Facilitate institutions / NGOs / INGOs which focus on rehabilitation of educational facilities
- Prepare overall report of the department regarding intervention and disseminate to PDMA and DDMA

FINANCE DEPARTMENT

Pre-Disaster

- Regular coordination with PDMA
- Allocate budget on contingency basis, to handle any emergency situations
- Facilitate other departments in planning and meeting their financial needs

During-Disaster

- Provide funds to PDMA and other line departments for procurement of material and equipment required for emergency response
- Provide funds to PDMA and other line departments for rescue and relief activities

Post-Disaster

- Get statistical data regarding actual damage and recovery needs from all line departments
- Provide funds for execution of rehabilitation process

HEALTH DEPARTMENT

Pre-Disaster

- Assign representatives for DDMA, and participate in meetings
- Information sharing regarding capacities and needs of Health department regarding disaster risk management
- Build capacity of health department regarding disaster risk management and preventive health care especially in disaster prone areas
- Monitor the general health situation, e.g. monitor outbreak of diseases
- Provide specific information required regarding precautions for epidemics
- Establish a health mobile team in district and taluka headquarter hospital
- Set-up an information Centre to organize sharing of information for public information purposes
- Prepare first aid kits, medicines, water test kits, chloramines and anti-snake venom serum.
- Collaboration with relevant organizations / partner NGOs for participation and support through technical resources
- Up-gradation and smooth functioning of hospitals, BHUs, equipped with required staff, medicines and equipment
- Database and linkages with ambulance services/blood banks
- Health and hygiene awareness and education
- Ensure proper disposal of hospital waste

During-Disaster

- Provide emergency treatment for the seriously injured
- Ensure emergency supplies of medicines and first-aid
- Supervise food, water supplies, sanitation and disposal of waste

- Assess and co-ordinate provision of ambulances and hospitals where they could be sent (public and private);
- Provide special information required regarding precautions for epidemics
- Set-up an information Centre to organize sharing of information for public information purposes
- Conduct disaster impact assessment on health
- Intervene in case of disease outbreak
- Medical camps and vaccination
- Ongoing surveillance with regard to health issues and disease outbreaks

Post-Disaster

- Conduct disaster impact assessment on health situation
- Prepare plan for the following year along with reports and submit to PDMA and concerned department.
- Medical camps and vaccination
- Rehabilitation of health infrastructure affected during disaster
- 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

INFORMATION DEPARTMENT

Pre-Disaster

- Close coordination and liaison with PDMA and DDMA
- During monsoon season and forecastable hazards issuance of press releases regarding hazards and preparedness plans of the government
- Issue and publish disaster alerts on appropriate media forums
- Coverage and publication of government initiatives on disaster risk reduction and management

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

During-Disaster

- Coordination with PDMA and DDMA for announcement of warnings and updates on disasters
- Publication of bulletins on government actions, facilities, relief and rescue efforts
- Publication of camp management and relief distribution announcements
- Publication of safety measures during disasters to minimize disaster domino effects
- Communicate voice of affectees to concerned departments

Post-Disaster

- Focus on problems being faced by the people of the affected area
- Publish, broadcast /telecast programs highlighting strengths, weaknesses and scams in disaster response activities
- Publish, broadcast /telecast programs highlighting government initiatives and collective response of NGOs, INGOs and other departments for relief and rehabilitation

PAKISTAN METEOROLOGICAL DEPARTMENT (PMD)

Pre-Disaster

- Update and upgrade forecast equipment
- Timely and authentic forecast of rains, windstorms and other forecastable hazards
- Timely transfer of information regarding abnormal weather conditions to PDMA

During-Disaster

- Forecasting for any confluencing disaster
- Issuance of precautionary measures to avoid domino effects of disaster

Post-Disaster

- Technical assistance in rescue and rehabilitation process

POLICE DEPARTMENT

Pre-Disaster

- Coordinate with the DDMA in the pre-disaster planning
- Participate in DDMA meetings
- Capacity building of Police department regarding disaster risk management
- Information dissemination through 15 helpline service to local residents
- Prepare team for emergency intervention
- Prepare plan for shifting to safer places and early warning system

During-Disaster

- Co-ordinate with DEOC
- Assistance in shifting of rescued/affected people to relief camps and hospitals
- Provide protection and easy access to rescue and relief personnel/vehicles
- Maintain law and order
- Provide warning / instruction to travelers
- Divert traffic on alternate routes as and when necessary
- Ensure security to workers of NGOs and INGOs who perform duties for disaster response
- Ensure safety and security of relief goods and maintain discipline during relief distribution process
- Provide security in Relief Camps

Post-Disaster

- Assist in relief and rehabilitation process

REVENUE DEPARTMENT

Pre-Disaster

- Assign representatives for DDMA, and participate in meetings
- Information sharing regarding capacities and needs of Revenue department regarding disaster risk management
- Capacity building of Revenue department regarding disaster risk management
- Assessment of high prone areas and estimation of possible damage and needs for recovery in case of emergency
- Arrangement of financial resources
- Facilitate getting tax exemptions to institutions/NGOs/INGOs focus on disaster risk management
- Collect and update population data at village level

During-Disaster

- Coordination with the DEOC
- Establish relief distribution centers
- Accept relief donations and relief support
- Timely release of funds

Post-Disaster

- Allocation of funds for recovery and rehabilitation process
- Assessment of damage of crops and livestock and settlement of applicable taxes accordingly in coordination with relevant departments

ARMED FORCES

Pre-Disaster

- Coordinate with the DDMA in the pre-disaster planning

- Prepare necessary equipment, labor, transportation and other materials for emergency interventions
- Assist in evacuation of people to safe places

During-Disaster

- Maintain liaison with the DEOC for vital inputs during response
- Collect information and warn appropriate Army units for engagement in safety, rescue and evacuation activities
- Establish communication infrastructure and supplement the civil communication set-up if required
- Coordinate all military activity required by the civil administration
- Provision of medical care with the help of the medical teams, including treatment at the nearest armed forces hospital
- Transportation of relief material
- Provision of logistic back-up (aircrafts, helicopters, boats)
- Assist in establishment of Relief Camps
- Assist in evacuation of people to safe places during the disaster

Post-Disaster

- Cooperate and coordinate with district authorities
- Assist in rehabilitation process if required

SOCIAL WELFARE AND COMMUNITY DEVELOPMENT

Pre-Disaster

- Coordination with NGOs and civil society organizations working for disaster risk management
- Empower the extremely vulnerable people emphasizing women and children through public awareness involving respective departments for various fields such as Education, Health etc.
- Capacity building of community based groups and volunteers engaged in disaster management activities

During-Disaster

- Provide information on the situation of the disaster to the DEOC
- Coordinate all NGOs / INGOs and civil society organizations working during the emergency response
- Monitor progress of relief operations in the affected areas
- 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
- Assist and facilitate Damage and Needs Assessment teams from NGOs
- Share human resources with DDMA

Post-Disaster

- Monitor and follow up the status of the extremely vulnerable people
- Assist and facilitate Damage and Needs Assessment teams from NGOs
- Conduct impact assessment studies and analysis of strengths and weaknesses of stakeholders and disseminate learning to PDMA, DDMA and other concerned institutions
- Facilitate institutions / NGOs/ INGOs which focus on rehabilitation activities

NGOs / INGOs

Pre-Disaster

- Facilitate PDMA and DDMA for capacity building regarding disaster risk management
- Capacity building of community groups regarding disaster risk management
- Linkages with concerned departments and institutions for providing technical and financial resources regarding diverse sectors related to disaster management
- Resource mobilization at local and international level

During-Disaster

- Collaborate and facilitate in relief operations

- Incorporate local and international expertise in disaster response
- Facilitate establishment of temporary shelters and camps
- Facilitate in overall disaster response in collaboration with concerned departments
- Regular updates and alerts to local and international partners
- Utilization of existing resources and further mobilization at local and international level
- Assessment of losses using sphere standards

Post-Disaster

- Collaborate and facilitate in rehabilitation activities
- Incorporate local and international expertise in rehabilitation activities
- Facilitate overall rehabilitation in collaboration with concerned departments
- Impact assessment studies and sharing findings with PDMA, DDMA, local and international partners
- Linkages with partners for sustainable resources mobilization

DISASTER MANAGEMENT GUIDELINES

INTRODUCTION

Multi-hazard vulnerability Risk Assessment of Mirpurkhas district reveals that the district is prone to multiple natural disasters. The pertinent hazards to district are meteorological hazards including drought and Heatwave. The risk of geophysical hazards is low in the district. In modern technological era, meteorological hazards can be precisely forecasted and action can be taken well in time to minimize damages and losses. In other words, the vulnerabilities and risks are manageable and losses and damages can be minimized through adoption of best management practices and mobilization of resources.

These guidelines introduce best practices which can be adopted to manage risk of natural disasters in the district.

Riverine Flood	According to MHVRA Study 2022, there is no Riverine Flood Hazard in Mirpurkhas district.
Earthquake	<ol style="list-style-type: none">1. The geology of Sindh is divisible in three main regions, the mountain ranges of Kirthar, Pab containing a chain of minor hills in the west and in east it is covered by the Thar Desert and part of Indian Platform where the main exposure is of Karoonjhar Mountains, which is famous for Nagar Parkar Granite.2. Some of prominent faults situated in Sindh are (a) Karachi-Jati, (b) Surjan-Jhampir, (c) Pab Fault (d) Hub Fault and (e) Allah Bund-Rann of Kutch faults.3. Though risk of geophysical hazards in Mirpurkhas district is low but still some actions must be taken to avoid losses in case of minor jolts. Urban settings are most likely to be affected by jolts. It is highly recommended to identify old and weak buildings in the cities and other urban settings of the district. Local concerned authorities may decide evacuation or retrofitting of such buildings / structures.4. It is also recommended that, new housing schemes, societies and infrastructure be built with proper town planning and following Building Codes recommended for the zone in which Mirpurkhas district is situated.5. Local government departments must be strengthened to manage situation arisen from earthquake jolts. Strengthening must include capacity building to act as first responder in any likely situation.

<p>Heatwave</p>	<ol style="list-style-type: none"> 1. Historically, Mirpurkhas district has a Hot and Semi-Arid climate and is prone to severe heatwave seasons. However, most of the district is sparsely populated, which significantly lowers the chances of severe heatwave impacts. 2. Heatwaves are forecastable hazards and actions can be taken well before occurrence of heatwaves. The most suitable action is issuance of warnings and alerts in public for precautions and safety. Suitable media for the purpose is social media and SMS. 3. Scientific studies suggest that, frequency and intensity of heatwaves is increased due to climate change. Though climate change is global phenomena, however, its impacts can be minimized through local interventions. The most effective and cost-effective solution is tree plantation. Tree plantation must be encouraged at levels including government functionaries, NGOs, community and individual levels. 4. Additionally, introduction of reduced Urban Heat Islands (UHI) through policies and implementation in infrastructure development will significantly reduce impacts of heatwaves.
<p>Drought</p>	<ol style="list-style-type: none"> 1. Geographically, district Mirpurkhas has Hot and Semi-Arid climate. Average annual rainfall across the district is 165.69 mm. 2. Drought is also forecastable hazard and can be predicted well in advance. Though drought does not bring any prominent or famine like conditions in the district, however, it causes reduction in agricultural production and some extent disturb food supply for the animals and livestock. The best practice to manage drought related impacts is storage of food supplies for both humans and animals. 3. The situation of drought may vary in future due to climate change effects, therefore, introduction of drought resilient crops is need of the time. Additionally, efficient use of available water resources and introduction of efficient agricultural systems is also required. 4. Further, farmers may be encouraged for alternative crops during expected drought seasons. Also policies for compensation of farmers must also be introduced to assist and encourage drought hit farmers.

<p>Cyclone</p>	<ol style="list-style-type: none"> 1. The cyclone hazard threat to district Mirpurkhas is Tropical Storm to Cat-1 TC. However, the frequency and intensity of cyclone formation in Arabian Sea may further increase due to climate change and global warming. Fortunately, cyclone is forecastable hazard, its intensity, possible landfall, timings etc. can be precisely predicted before landfall. If population to be affected is well aware and already prepared for likely event, then major losses and damages can be minimized. Such example can be seen in regional countries like India, Bangladesh and Philippines etc. 2. It is utmost important to strengthen cyclone detection and warning systems in the coastal belt along entire coast in Sindh. Community based disaster risk management, capacity development of prone communities, establishment of permanent shelters and provision of life support facilities will increase the trust and confidence of communities on government functionaries in early evacuation process.
<p>Tsunami</p>	<ol style="list-style-type: none"> 1. The only known Tsunami which hit some parts of Sindh coast happened to major earthquake in Makran coast in Balochistan which triggered tsunami in the region. This event happened in November 1945. No authentic record is available on damage and losses caused by Tsunami in coastal belt of Sindh. The effects of the Tsunami of December, 2004 caused by earthquake in Indonesia were along the coastline of Pakistan in the form of abnormal changes in tide gauge stations placed at Keti Bunder. 2. As Tsunami is consequence of major earthquake, hence not forecastable hazard in true sense but once the earthquake is occurred in sea or near coast, special sensors can detect the occurrence of tsunami. Once tsunami is detected little time is left for evacuation. However, installation of tsunami early warning system along the coast may greatly impact losses. The best approaches to tsunami response are; <ul style="list-style-type: none"> ○ Installation of tsunami early warning and dissemination system in coastal settlements ○ Awareness of communities at risk on tsunami precautions and response

STANDARD OPERATING PROCEDURES

INTRODUCTION

Overall, disaster risk reduction is collective responsibility of concerned departments, associated line departments, private sector and communities. Synergized and coherent efforts are required at each cycle of disaster in order to minimize and avoid disaster losses and damages. The implementation of this disaster management plan would only be possible until roles and responsibilities of every department are defined and well understood.

ACTION PLAN FOR FORECASTABLE DISASTERS

Heatwave, drought and cyclone are only forecastable hazards in the district. For such hazards following action plan is recommended:

Table 5: Action Plan for Heatwave Hazard Management

Action	Timelines	Responsibility
Interaction with PMD for forecasting and monitoring of heatwave	Based on forecast	PDMA
Dissemination of forecast to concerned DDMA and local community	Based on forecast	PDMA
Mobilization of NGOs, INGOs and individuals for arrangement of heat stroke and medical camps within affected areas	During disturbance period	PDMA and DDMA

Table 6: Action Plan for Drought Hazard Management

Action	Timelines	Responsibility
Interaction with PMD for forecasting and monitoring of drought	Based on forecast	PDMA
Dissemination of forecast to concerned DDMA and local community	Based on forecast	PDMA

Mobilization of NGOs, INGOs and individuals for stocking of food and life support items to prevent and mitigate famine conditions depending upon severity and spell of drought	During disturbance period	PDMA and DDMA
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Table 7: Action Plan for Cyclone Hazard Management

Action	Timelines	Responsibility
Interaction with PMD for forecasting and monitoring of cyclone and likely landfall	Based on forecast	PDMA
Dissemination of forecast to concerned DDMA and local community	Based on forecast	PDMA
Evacuation of population likely to be affected to safe places	Before forecasted landfall	PDMA and DDMA
Temporary shelter and camp management for affected population and livestock	Before forecasted landfall	PDMA and DDMA
Arrangement of initial relief for affectees	During disturbance period	PDMA and DDMA
Recovery and resettlement of population to native places	Post disaster	PDMA and DDMA

ACTION PLAN FOR UNFORECASTABLE HAZARDS

Earthquake/Tsunami

The earthquake and tsunami are unforecastable hazards and do not provide reaction time to prevent damages. The recommended post disaster action plan are as follows

Table 8: Action Plan for Earthquake Hazard Management

Action	Timelines	Responsibility
Mobilization of man and material resources for rescue and recovery	Post disaster	PDMA and DDMA
Mobilization of NGO, INGO, volunteer groups, scouts and armed services for rescue and recovery	Post disaster	PDMA and DDMA
Coordination and establishment of relief camps, mobile medical camps, life support facilities and provision of relief to affectees	Post disaster	PDMA and DDMA
Coordination and mobilization of rescue teams to search and rescue life in collapsed structures	Post disaster	PDMA and DDMA
Coordination with National Disaster Management Authority (NDMA) for seeking assistance from international agencies (depending on severity of events and damages/losses)	Post disaster	PDMA
Coordination and mobilization of resources on Build Back Better principles	Post disaster	PDMA

SOP FOR PEOC AND DEOCs

- For the smooth operation of the emergency activities the PEOC and District Emergency Response Centre (DEOC) will work under defined Standard Operating Procedures (SOPs). These SOPs are broadly categorized in three sections

- a. Action on receipt of early warning, safe evacuation, search and rescue, initial assessment, relief distribution, recovery and deactivation of response.
 - b. Coordination and information dissemination
 - c. Contingency planning and response actions
- For localized emergencies, the situation shall be dealt within the regular operating mode of the emergency management services in the district.
- DDMA shall activate the DEOC and take the operational lead for the district government response.
- The DEOC will serve as the center for receiving early warning and issuing information to public at village level, taking measures to evacuate people, updating relevant departments, response agencies, and media etc.
- The DEOC will lead the coordination and management of relief operations in affected areas in the district with the assistance of PEOC.
- DEOC will coordinate with all concerned departments and humanitarian agencies at district level.
- DEOC will coordinate for early recovery with the assistance of PDMA and other concerned departments.
- In standby position, PEOC and DEOC shall be alert and ready to start emergency operations. The PEOC shall coordinate with concerned departments like NDMA, PMD, etc. for regular updates on likely disaster events. Once the threat is established, the PDMA shall approve the alert and activate response mechanism of PEOC and DEOC.
- Once PEOC and DEOC activation is approved or issued, both centers will remain fully operational on 24/7 basis and coordination shall be established with all concerned departments.
- PEOC and DEOC will collect regular updates on disaster situation and after normalization of situation and with mutual consultation shall inform PDMA to issue stand down or disaster deactivation call and final report on emergency operations will be circulated to stakeholders.
- The operationalization of PEOC and DEOC means complete activation of centers during disaster situation. Management of PDMA shall ensure full functionalities of PEOC including stock for emergency food, office supplies, communication system with backup support, electricity generators, computers, screens, multimedia projectors and other necessary equipment. While Deputy Commissioner Mirpurkhas shall ensure availability of all necessary equipment and supplies at DEOC for 24/7 operations. The deputy commissioner or chairperson DDMA will also ensure

availability and presence of representatives of DDMA in DEOC during emergency operations for liaison and close coordination and smooth emergency response.

- A contact information of relevant government officials, influential personnel, political figures, volunteer groups, social welfare organizations and communities of high disaster risk prone areas shall be collected and maintained by PEOC and DEOC. For establishing quick liaison and coordination this contact information shall be used by both PEOC and DEOC. In addition to these contacts, PEOC will arrange random SMS alerts, robo calls etc. through commercial cellular services.
- The PEOC will establish the direct contact/coordination with district disaster management officer for disaster alerts and warnings and onward dissemination and other immediate actions.
- All warnings and alerts shall be carefully scrutinized by the central body i.e. PDMA and disaster warning alerts shall only be issued through single nodal agency to avoid any circulation of misinformation etc.
- During the disaster, all instructions, guidelines, action plans and advisories on disaster events, evacuation, relief operations etc. shall be issued by PEOC or DEOC in consultation with PEOC.

DISASTER MANAGEMENT PLAN

INTRODUCTION

Following disaster management measures are recommended for effective preparation, response and rehabilitation of communities. PDMA may identify suitable partners/agencies to carry out each of the below-mentioned measures to maximize the effectiveness of disaster management plan and minimize losses in case of any disaster.

Riverine Flood	
UCs At Risk	Nil
General Description	According to MHVRA Study 2022, there is no risk of riverine flood in Mirpurkhas district.

Earthquake	
UCs At Risk	All UCs
General Description	<ol style="list-style-type: none"> 1. An earthquake is a sudden shaking of the ground caused by two chunks of earth's crust sliding past one another. 2. Although earthquakes are short-lived, usually not lasting more than a minute, they can leave behind incredible damage. 3. Identifying potential hazards ahead of time and advance planning can reduce the dangers of serious injury or loss of life from an earthquake. 4. The earthquake hazard intensity for district Mirpurkhas is "Low" 5. The earthquake risk intensity for district Mirpurkhas is "Low".
Disaster Management Measures	
Preparedness	
<ol style="list-style-type: none"> 1. Identifying and inventorying weak buildings and structures especially in urban settings of the district and situation demanding action by concerned departments. 2. Preparation of landuse plans, town plans and implementation of building codes in new residential schemes, schools, public and private offices. 3. Implementation of disaster risk reduction measures in public infrastructure development schemes. 4. Establishment of search and rescue infrastructure and services which can be mobilized as first responder in post-earthquake situation. 5. Mobilize NGOs, INGOs, community development organizations and volunteers, and conduct earthquake safety awareness campaigns and drills especially in main urban settings. 6. Availability of necessary material and equipment required for establishing temporary shelters with life support facilities i.e. mobile medical camps, schools, power supply, water and sanitation etc. 	

7. Availability of alternative communication system in case if usual communication means are disturbed by earthquake.
8. Preparation of medical emergency plan to manage mass casualties in face of any major earthquake event.
Response
1. Obtain firsthand information on intensity of earthquake and damages; prioritize areas for search and rescue operation.
2. Mobilize community-based volunteers, scouts and other trained personnel to hard hit areas to assess situation and help victims.
3. Establish emergency camps / shelters with necessary life support facilities.
4. Establish medical camps for provision of first aid and possible medical assistance to injured.
5. Evacuate people from damaged houses to safe places and shelters.
6. Provide security in affected areas and maintain law and order situation to prevent incidents of thefts and stampede.
7. Arrangement and conduct of aerial / drone survey of the affected areas.
8. Establish information and help desks for facilitation of affectees.
9. Restore essential services like power, water supply, and telecommunication of critical infrastructure like hospitals, control Rooms, etc. on priority basis.
Recovery and Rehabilitation
1. Detailed damage and need assessment for recovery and rehabilitation.
2. Rehabilitation on built back better principal.

Heatwave	
UCs At Risk	All UCs
General Description	<ol style="list-style-type: none"> Heatwave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. Climatic condition of the district can be categorized as Hot and Semi-Arid (Climate Classification of Pakistan (Khan et al., 2010)). The climate of the district is extreme, both in winters and summers. The summer heats are considerably neutralized by constant sea breeze from the south-west. The months of May and June are very hot during the day with average maximum and minimum temperatures being 43 °C and 27.5 °C respectively. December and January are the coldest months with average maximum

	<p>and minimum temperature of 27.5 °C and 11 °C respectively.</p> <p>6. The extreme temperatures combined with high humidity and resultant atmospheric conditions adversely affect people living in district.</p> <p>7. According to MHVRA Study 2022, heatwave hazard intensity for district Mirpurkhas is “Severe to Extreme”</p> <p>8. According to MHVRA Study 2022, heatwave risk for district Mirpurkhas is “Low to Extreme”.</p>
Disaster Management Measures	
Preparedness	
<ol style="list-style-type: none"> 1. Consistent future development strategy: Tree plantation, restoration of natural ecosystem, construction of environment friendly and well planned residential societies, offices, infrastructure and human dwellings. 2. Monitoring for hot weather alerts through local and international sources and issuance of timely Hot Day Advisories, and Hot Day Warnings. 3. Upgradation of major public health care facilities with necessary equipment and medicines to treat heatstroke patients. 4. Heatstroke awareness campaigns and wide public coverage through media, social media, SMS, NGOs and social welfare organizations. 5. Arrangements for uninterrupted supply of electricity and water in vulnerable areas. 	
Response	
<ol style="list-style-type: none"> 1. Mobilization of NGOs, social welfare organization and volunteers for arranging heatstroke facilitation camps and distribution of fresh drinking water in affected areas. 2. Local radio FM broadcasts to disseminate heatstroke safety and precautions. 3. Mobilize mobile medical teams for first-aid and other medical emergency support in affected area. 4. Record keeping of heatwave patients and fatalities. 	
Recovery and Rehabilitation	
<ol style="list-style-type: none"> 1. Post event review of heatwave plan and modifications if required. 	

Cyclone	
UCs at Risk (1)	Naukot
UCs not at Risk (32)	A, Ahori, Balochabad, Bhurgan, Bhurgari, Dengan, Dilawar Hussain, Doulatpur, Fazal Bhambro, Haji Hadi Bux, Hathungo, Jawariator, Jhulurj, Kandiyari, Kangoro, Khan, Khirah, Khudadad, Kot Ghulam Muhammad, Makhan Samoon, Mir Ghulam Hussain, Mir Imam Bux, Mir Khuda Bux, Mirpur Old, Mirwah, Paban, Phullahdayun, Roshanabad, Sanjar Chang, Soffan Shah, Tando Jan Mohammad, Turk All Marl
General Description	<ol style="list-style-type: none"> 1. Cyclones in the Arabian sea form mostly from May till June and then from September till October, monsoon season plays a vital role for the

	<p>formation of cyclone in this basin.</p> <ol style="list-style-type: none"> 2. Tropical storms that hit Pakistan are mostly remnants by the time reach Pakistan or make landfall in south eastern Sindh which is not very much populated. 3. Some of the major tropical cyclones hit the coastal areas occurred during May 1902, June 1926, June 1964, November 1993, June 1998, May 1999, June 2007 and 2011 and June 2014. 4. Very hot and dry weather with gusty winds continued for two days in Karachi, Hyderabad, Shaeed Benazirabad, Badin, Mirpurkhas, Tando Muhammad Khan and Thatta districts due to tropical cyclone “TAUKTAE” in May-2021. 5. According to MHVRA study 2022, cyclone hazard in the district is of “Tropical Storm to Cat-1 TC” intensity. 6. According to MHVRA study 2022, risk of cyclone in the district is of “Low” intensity.
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Disaster Management Measures

Preparedness

<ol style="list-style-type: none"> 1. Community based disaster risk reduction measures and inclusion of disaster prone communities in disaster management cycle, specially preparedness, evacuation and resettlement. 2. Establishment of multipurpose permanent shelters with all life support facilities to facilitate safe evacuation of people and livestock. 3. Disaster Risk Reduction mainstreaming in development planning. 4. Strengthening of cyclone detection, forecasting and warning dissemination centres. 5. Launching a series of public awareness campaign in the district by various means including Radio, TV and other media. 6. Training of local administration in warning dissemination and evacuation techniques. 7. Mobilization of NGOs and community based organizations for awareness on construction of houses, billboards, roof tops, and boundary walls, keeping in view effects of high winds. 8. Review/Update emergency response plans and disaster recovery plans. 9. Stocking of key equipment and supplies to carry out immediate response activities including evacuation, shelters, medical camps, water and sanitation, power supply, alternate communication means etc. 10. Design, practice and implementation of evacuation plans with emphasis on self-reliance. 11. Cleaning of water channel, drainage and sewerage before cyclone season in Arabian Sea. 12. Readiness of de-watering machines before start of monsoon and cyclone season.
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Response	
	<ol style="list-style-type: none"> 1. Issue early reliable warning through siren or other relevant means to reduce the severity of the cyclone related disasters and save valuable human lives. 2. Identify, involve and mobilize local NGOs which can assist in community awareness and mobilisation for response. 3. Identify and mobilize volunteers' / volunteer organizations which can assist various facets of response like provision of emergency healthcare and relief items. 4. Initiate preliminary damage assessment and run search and rescue operations. 5. Provision of immediate relief including provision of food and potable water to affectees. 6. Deployment of emergency medical support. 7. Provide emergency health care to the affected population, in order to cover risk of spread of epidemic prone diseases like acute watery diarrhea, typhoid fever, malaria and measles, relapsing of fever and acute respiratory illness.
Recovery and Rehabilitation	
	<ol style="list-style-type: none"> 1. Assess damage to buildings across the impacted areas to gather information about the extent and severity of damage. 2. Monitor potential water quality issues. 3. Rehabilitation on built back better principal.

Drought	
UCs At Risk	All UCs
General Description	<ol style="list-style-type: none"> 1. Climatic condition of the district can be categorized as Hot and Semi-Arid (Climate Classification of Pakistan (Khan et al., 2010)) 2. Average annual rainfall received during a year across the district is 165.69 mm. 3. District has an efficient canal irrigation system, which ensures agricultural productivity. Tube-wells are also being used as a source of irrigation. 4. According to MHVRA Study 2022, <ul style="list-style-type: none"> • Meteorological drought hazard for district Mirpurkhas is “Extreme” • Meteorological drought risk for district Mirpurkhas is “Medium to Extreme” • Agricultural drought hazard for district Mirpurkhas is “Mild to Extreme” • Agricultural drought risk for district Mirpurkhas is “Low to Extreme”.
Disaster Management Measures	
Preparedness	
	<ol style="list-style-type: none"> 1. Implement Drought Early Warning System (EWS) at provincial/district level to get clear indications of the impending drought and its consequences, e.g. forecast of impending drought

<p>conditions related to changing weather conditions linked to El Nino or La Nina events.</p> <ol style="list-style-type: none"> Monitoring of temperature, precipitation, potential evapotranspiration, soil moisture, groundwater levels, and reservoirs. Building of small-scale reservoir for rainwater harvesting Implementation of water supply and demand management. Control ground water extraction from upper and lower aquifers to be within the sustainable yield limits.
Response
<ol style="list-style-type: none"> Assess data about the nature of drought conditions and their impact. Provision and installation of solar water pumps for availability of clean drinking water. Public information campaign for water management and saving.
Recovery and Rehabilitation
<ol style="list-style-type: none"> Awareness and encouragement of on best practices for water conservation.

Tsunami	
UCs At Risk (3)	Dilawar Hussain, Mir Khuda Bux, Naukot
UCs Not At Risk (30)	A, Achori, Balochabad, Bhurgan, Bhurgari, Dengan, Doulatpur, Fazal Bhambro, Haji Hadi Bux, Hathungo, Jawariasor, Jhulurj, Kandiari, Kangoro, Khan, Khirah, Khudadad, Kot Ghulam Muhammad, Makhan Samoon, Mir Ghulam Hussain, Mir Imam Bux, Mirpur Old, Mirwah, Paban, Phullahdayun, Roshanabad, Sanjar Chang, Soffan Shah, Tando Jan Mohammad, Turk All Marl
General Description	<ol style="list-style-type: none"> District Mirpurkhas can be affected by the tsunami disaster. According to MHVRA study 2022 the hazard of Tsunami in the district is “Medium to Very High”. According to MHVRA study 2022 the risk of Tsunami in the district is “Low to High”
Disaster Management Measures	
Preparedness	
<ol style="list-style-type: none"> Strengthening of tsunami detection, forecasting and warning dissemination centers. Launching a series of public awareness campaign through NGOs and community development organizations. Training of local administration in warning dissemination and evacuation techniques. Plantation of mangroves and coastal forests along the coast line Design, practice and implementation of evacuation plans and shelter sites with emphasis on self-reliance. Plan the timing of initial actions to be taken in the event of a Tsunami. Ensure all communities and response agencies are prepared and ready to respond to a tsunami 	

event.

8. Identify buildings and places that could, in the event of a Tsunami, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places.
9. Protect hazardous material storage facility located in tsunami prone area

Response

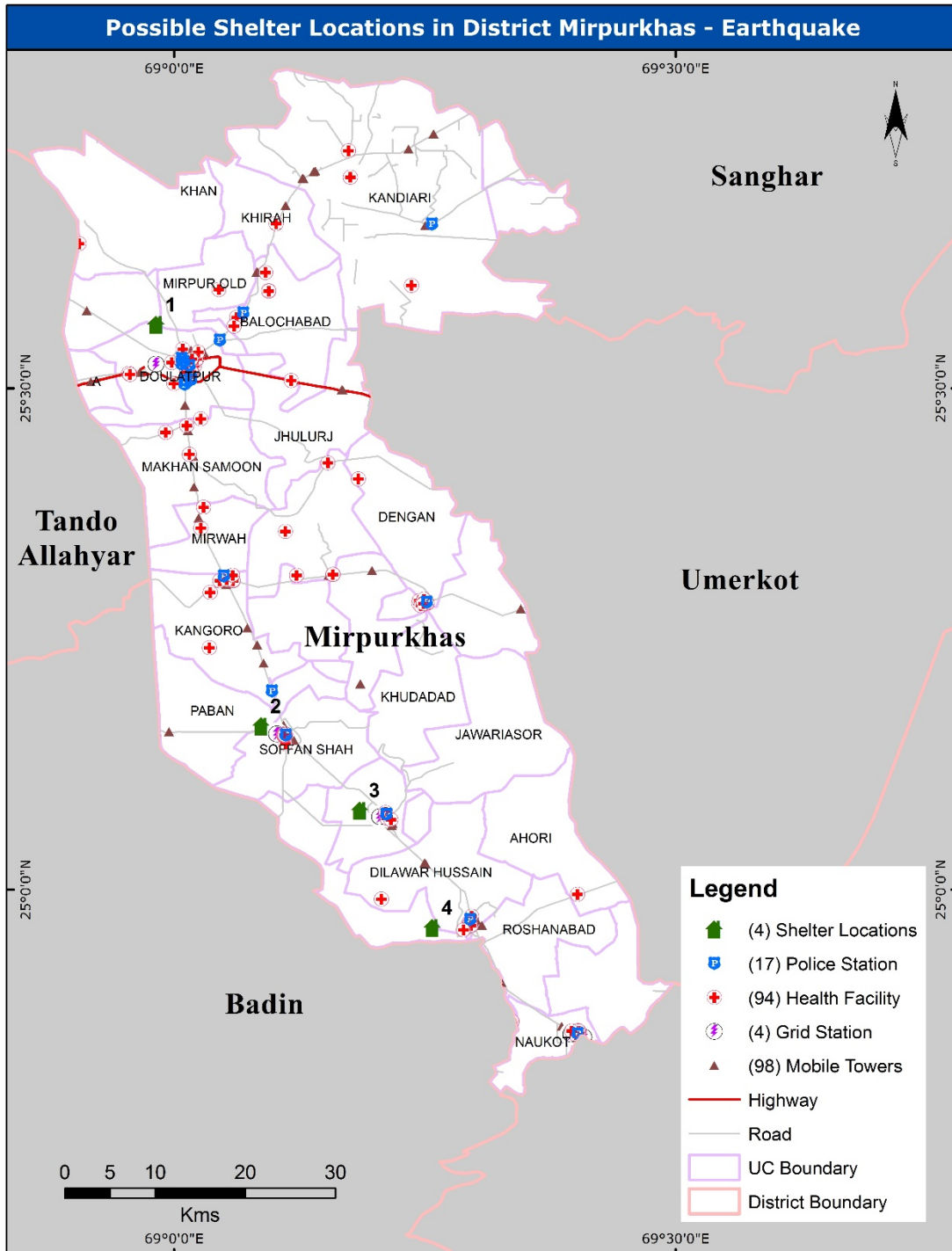
1. Coordination with Pakistan Meteorological Department as nodal agency for earthquake and tsunami detection service and dissemination of alerts and warnings through dedicated tsunami warning systems in coastal belt.
2. Immediate evacuation of nearest coastal belt population to safe sides emphasizing population living near coastal creeks.
3. Arrangement for alternate communication links like satellite phones, HF/ VHF communication, VSAT, etc.
4. Establishment of shelters with all necessary life support facilities
5. Mobilize and deploy resources e.g. search and rescue, medical teams in the Tsunami affected areas.
6. Supply food, drinking water, medical supplies to the affected population.
7. Assess hygiene of affected area and preventing the spread of disease.

Recovery and Rehabilitation

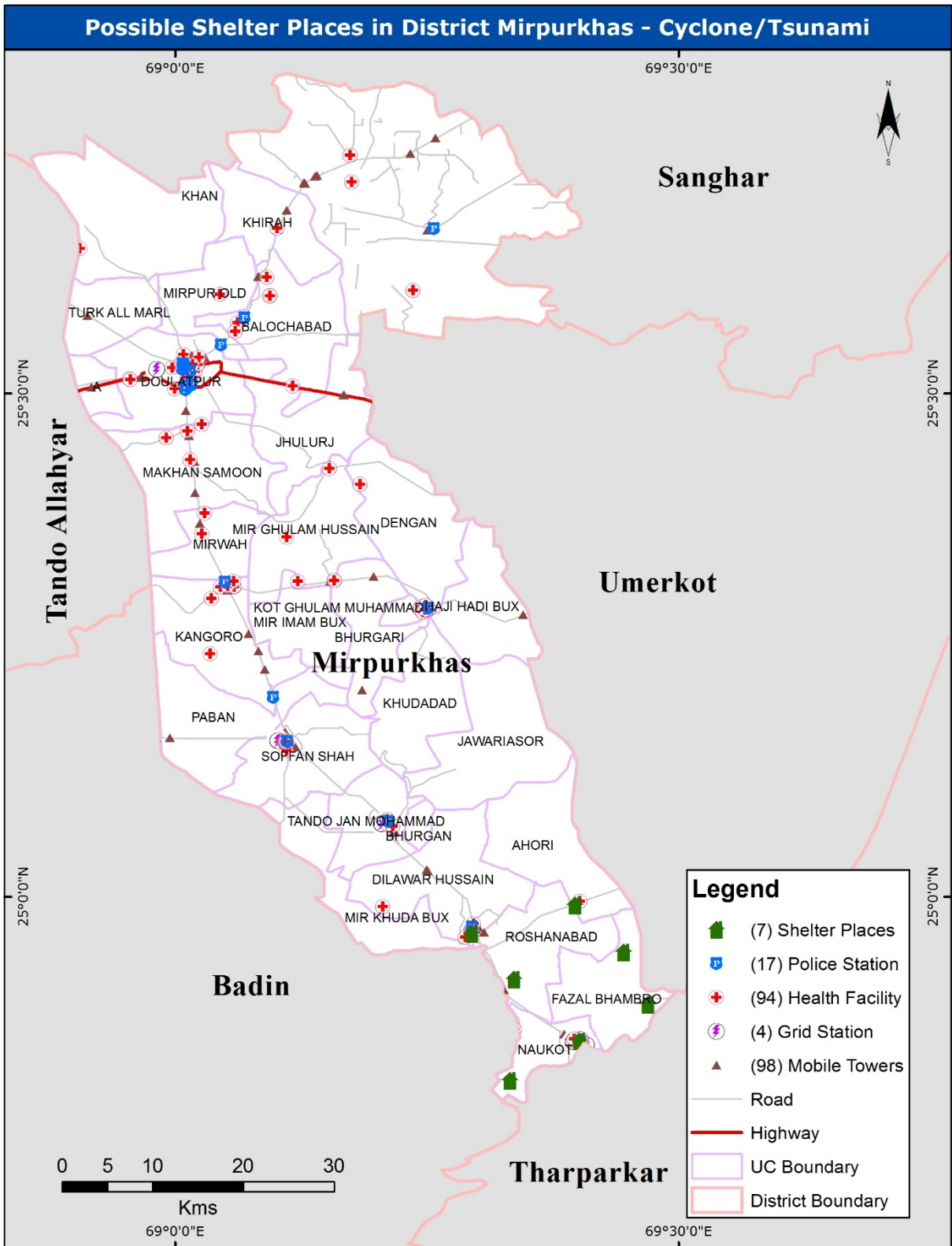
1. Reconstruction of essential infrastructure, such as access to roads, water supply and sanitation, waste water treatment and solid waste disposal.
2. Enhance the ability of the natural system to act as a bio-shield to protect people and their livelihoods by conserving, managing and restoring wetlands, mangroves, spawning areas, seagrass beds and coral reefs.
3. Conduct post-Tsunami damage assessment analysis to provide a clear, and concise picture of post disaster situation, to identify damage caused to different sectors and to develop strategies for rehabilitation, reconstruction and recovery on built back better principal.

SHELTER LOCATION MAP

As part of preparedness, response, and rehabilitation against hazards, shelter places are integral. These are necessary to relocate, evacuate, or replenish the population that may be affected from hazards. Proposed shelters are illustrated in the maps.



Annex-A details the list of earthquake shelter locations



PROPOSED PRIORITY DISASTER RISK MANAGEMENT PROJECTS

INTRODUCTION

Following are the recommended disaster risk management projects, which may be initiated to ensure effective disaster management in district Mirpurkhas. PDMA may identify suitable partnering agencies/ line departments to carry out and prioritize each proposed project.

Hazard wise list of Priority Disaster Risk Management Projects	
Disaster Risk Management Projects/ Studies	Brief
Earthquake	
1. Ensure implementation of building codes and standards.	Prepare policy and SOP to ensure new buildings in the district are constructed as per the seismic codes and standard of the area.
2. Identification and retrofitting of weak existing structures and unsafe buildings (schools, hospitals and government offices).	Coordinate with local community regarding unsafe buildings and regularly conduct building safety surveys to check structural integrity of buildings against the seismic risk of the district and take necessary retrofitting measures to strengthen weak structures. Create database of vulnerable and unsafe buildings and retrofitting measures taken to strengthen the structure of such buildings.
3. Preparation of rescue and rehabilitation plan	Coordinate with line departments to create a comprehensive plan with clearly defined roles and responsibilities of first responding departments, as well as, correspond with rescue agencies/NGOs for their role in an event of earthquake. The plan should also details the rescue equipment available with concerned departments.
Drought	
1. Conduct feasibility study for identification of suitable sites for rainwater harvesting and aquifer recharge in the district.	The rainwater harvesting sites should be identified by using geospatial technologies and ancillary data, which can be used as clean water aquifers by communities, which in turn can use it for drinking, and irrigation purposes. Potential rainwater harvesting sites may be identified by using Analytical Hierarchy Process (AHP) and spatial analyst tool, with multiple thematic layers (rain data, population, digital elevation model, soil type, etc.)
Cyclone/Tsunami	
1. Establishment of tsunami/cyclone early warning detection and dissemination system using Common Alert Protocol (CAP).	A single emergency alert using Common Alert Protocol (CAP) can trigger a variety of public warning systems, increasing the likelihood that people receive the alert by one or more communication pathways. The CAP is capable to disseminate rich multimedia such as photographs, maps, streaming video and audio. An early warning system based on CAP may be established at suitable location.
2. Preparation of cyclone/Tsunami response and evacuation plan	Collaborate with community leaders to create community evacuation plans, including evacuation zones and routes. Identify and prepare shelter locations above sea level and conduct emergency evacuation trainings to ensure readiness of communities.
3. Conduct of District Level Mock Exercise (DLME).	Develop a calendar for mock exercises to assess the preparedness, review the District Disaster Management Plans, Standard Operating Procedures and to evaluate the readiness of various departments to any disaster or emergency.
4. Development of insurance policy for financial risk management	Collaborate with Provincial Govt. and Private Partners to devise a disaster insurance policy for vulnerable communities. Disaster insurance provides a means of covering losses incurred through disasters and catastrophic events and reducing disasters' severe financial impact on individuals and communities. Financial liquidity provided by insurance helps mitigate disasters' effects on food security, health and livelihood assets.

COST BENEFIT ANALYSIS

INTRODUCTION

1. Cost Benefit Analysis (CBA) is a key analytical tool that can provide quantitative information regarding the prioritization of risk reduction based on comparing benefits of an actual or planned intervention with its costs.
2. Cost Benefit Analysis (CBA) can play a pivotal role in advocacy and decision-making on disaster risk reduction (DRR) by demonstrating the financial and economic value of incorporating DRR initiatives into planning.
3. In an age of austerity, cost–benefit analysis continues to be an important tool for prioritizing efficient DRM measures but with a shifting emphasis from infrastructure-based options (hard resilience) to preparedness and systemic interventions (soft resilience), other tools such as cost-effectiveness analysis, multi-criteria analysis and robust decision-making approaches deserve more attention.
4. Studies categorize interventions into hard and soft type of measures. Hard resilience refers to the strengthening of structures and physical components of systems in order to brace against shocks imposed by extremes such as earthquakes, storms and floods. In contrast, soft resilience (Behavioural DRR) refers to less tangible and process-oriented measures as well as policy in order to robustly cope with events as they occur and minimize the adverse outcomes.
5. The studies find that many of the highest economic returns exist for behavioural DRR strategies
6. The benefits of hazard mitigation are the avoided losses, i.e., those losses that would have occurred in a probabilistic sense if the mitigation activity had not been implemented.

COST BENEFIT ANALYSIS – MIRPURKHAS DISTRICT

The existing nature of disaster in Mirpurkhas district can be categorized as low to extreme. The prominent hazard in the district is drought, heatwave and to a certain extent, tsunami. The bigger threat here is posed by meteorological drought with risk ranging from medium to extreme, while agricultural drought with risk ranging from low to extreme in the district. Low flow in irrigation channels and low rainfall are likely to adversely affect agricultural output in the event of drought. Settlements in the district are having low to extreme risk of heatwave. The risk of cyclone in the district is determined to be low. The risk of tsunami in the district ranges from low to high. Mirpurkhas district has low risk of earthquake. There is no risk of riverine flood in the district. Based on the results of the MHVRA study the hazards of the district can be managed through soft and enhanced management measures. In this scenario, cost benefit analysis of proposed interventions is appended in table below:

Table 9: Cost Benefit Analysis of Disaster Risk Measures in District Mirpurkhas

S. no.	Soft resilience (Behavioral DRR)	Cost	Benefit
1.	Identification and management of shelters	Identification and management of shelter spaces is a cost-effective way to ensure rapid, and effective management of population at times of crisis. Government schools can serve as ideal cost-effective shelter spaces in district Mirpurkhas, as these can accommodate large number of people. Gradually, permanent shelters can be established in future to avoid use of education facilities.	Shelter places are highly beneficial at times of disaster as it offers a unified accommodation place for affected people. Shelter place also helps administration in effective management of affectees and provide them with required relief. Shelter serve as centralized facilities where government can concentrate relief efforts including disbursement of relief goods and essential food supplies to affected people. Additionally, hydration stations at these shelters will improve accessibility to drinking water during times of heatwave. Reduction in cases of emergencies due to drought and heatwave can help in reducing burden on the health care facilities and reduce fatalities.
2.	Early warning system for drought	Dissemination of information by meteorological department regarding delays in rainfall season using radio announcements, print and digital media. Warnings to be issued prior to commencing maintenance on headworks and for low flow in channels.	Equipping farmers with knowledge of impending low flow in irrigation channels will enable for better crop water management and reduce loss of crops as much as possible. This shall lead to an overall reduction in cases of malnutrition, dehydration, save medical expenses and possible save lives.
3.	Early warning system for heatwave	Dissemination of forecast of heatwaves from the meteorological department through public radio announcements, print and digital media. This shall increase the preparedness of local populace against the impending hot climate and save precious lives. Early warning systems for periods of drought can help in minimizing the impact of disaster for concerned communities.	Early warnings give people time to prepare in advance and postpone activities after daytime. Local authorities would get ample time to establish relief centers with provisions of shade and hydration. Hospitals could be prepared to receive more patients and check their inventory for necessary medicine / supplements in advance. An overall reduction in emergency cases would reflect in less mortality and more savings in medical expenditure.
4.	Awareness campaigns	Public private partnership and use of electronic/print media for raising public awareness is a cost-	Public awareness and public education for disaster reduction helps to reduce disaster risks. It mobilizes people through clear messages,

		effective approach to build society resilience and improved disaster risk management capabilities of vulnerable communities.	supported with detailed information. People who know how to react in case of a disaster, community leaders who have learned to warn their people in time, and whole social layers who have been taught how to prepare themselves for natural hazards can contribute to better mitigation strategies and dissemination of information on the consequences of hazards. Education and knowledge can provide people with tools for vulnerability reduction and life-improving self-help strategies.
5.	Enhancement of municipal water system	Maintenance of existing distribution system shall help in reducing water losses and contamination.	Consumption of unclean water leads to many health problems including gastric issues, infections and other long term health issues. Ensuring adequate supply of clean water will reduce medical expenditure and prevent loss of life specially among the vulnerable groups like children and elderly.
6.	Strengthening of mobile health care facilities	Setup of temporary health facilities reduce difficulty in patients' transportation to permanent hospital facilities. Mobile health care units are already available with government of Sindh, their mobilization to disaster management will ensure lifesaving.	Mobile health facilities play a very significant role in the mitigation of disaster because of their particular function in providing essential first aid. Ease of access to basic health facilities will reduce burden on hospitals. The systematic organization and easy mobilization of the staff, equipment and medical supplies in a safe environment are crucial if disaster response is to be prompt and effective.

ANNEX – A – SHELTER LOCATIONS DESCRIPTION – EARTHQUAKE

The given shelter locations for earthquake are proposed on the findings of the MHVRA 2022 study and information obtained through satellite technology and online verifiable sources. It is recommended to conduct on ground physical surveys to evaluate their suitability.

Shelter location	Co-ordinates	Area (acres)	Estimated Tents (numbers)	Avg. elevation (ft)
1	Upper right corner: 25°34'33.99"N 68°59'5.44"E Upper left corner: 25°34'30.96"N 68°58'57.79"E Lower right corner: 25°33'40.29"N 68°59'34.00"E Lower left corner: 25°33'4.76"N 68°58'37.63"E	814	~36,600	47
2	Upper right corner: 25° 9'40.59"N 69° 5'55.75"E Upper left corner: 25°10'18.51"N 69° 5'11.09"E Lower right corner: 25° 9'27.60"N 69° 5'42.39"E Lower left corner: 25° 9'28.27"N 69° 4'28.94"E	571	~25,600	41
3	Upper right corner: 25° 4'26.17"N 69°12'17.20"E Upper left corner: 25° 5'47.97"N 69°10'47.37"E Lower right corner: 25° 3'54.31"N 69°11'49.72"E Lower left corner: 25° 3'53.24"N 69°10'48.57"E	1,909	~85,000	36
4	Upper right corner: 24°57'59.54"N 69°15'52.92"E Upper left corner: 24°57'57.02"N 69°15'8.68"E Lower right corner: 24°57'26.17"N 69°15'48.85"E Lower left corner: 24°57'37.86"N 69°14'49.17"E	330	~14,000	27

A total of 4 shelter locations have been selected as Earthquake shelter places across the district. The shelter locations are selected based on their proximity to the population vulnerable to earthquake, and accessibility to roads and other basic facilities (healthcare, education, police station, etc.) A total of 161,200 tents approximately (tent with size of 45 sq. m each) can be set up within the demarcated shelter places.

ANNEX – B – LIST OF EQUIPMENT AVAILABLE IN DISTRICT MIRPURKHAS

Equipment	Quantity
De-watering Machine	40
Fire Brigade / Engine / Tender	7
Tractor / Trolley / Blade	16
Electric Motors	17

Source: Provincial Monsoon contingency plan 2020 – PDMA, Government of Sindh