

MHVRA

INFORMED DISASTER MANAGEMENT PLAN

2023-2032

DISTRICT KAMBAR SHAHDADKOT



DEVELOPED BY
PDMA SINDH



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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 Kambar Shahdadkot 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 Kambar Shahdadkot 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 Kambar Shahdadkot 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 KAMBAR SHAHDADKOT

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

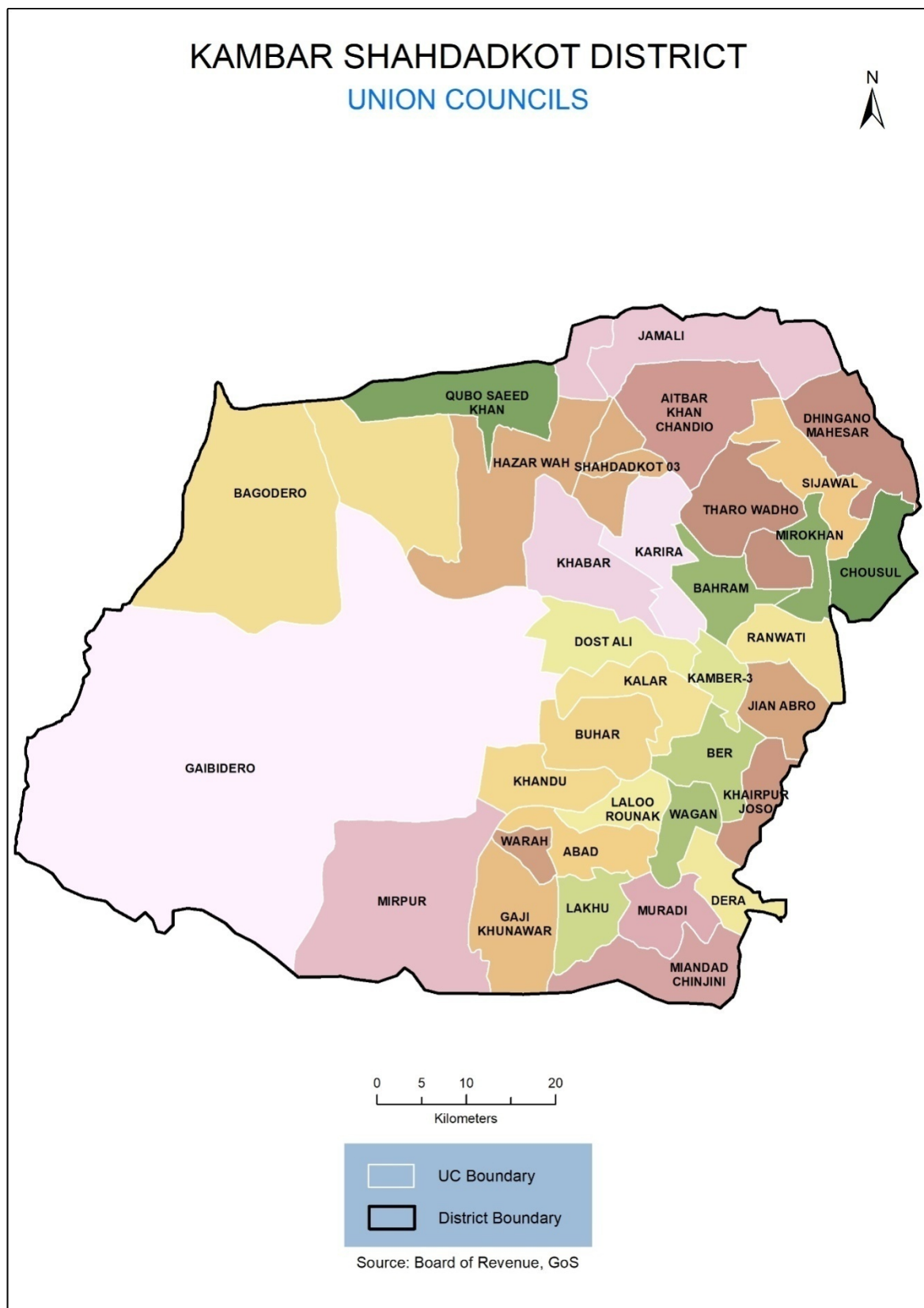
Committee Representative	Role
DG, PDMA Sindh / Dir Ops PDMA	Chairman
Concerned DC or representative officer	Member
Concerned officer from local government	Member
Elected representative of the concerned district	Member
Representatives from disaster affected communities	Member (s)
Representative from SUPARCO	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

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 KAMBAR SHAH DADKOT



GEOGRAPHY

District area in Sq. Km	5,528	
Coordinates	Longitude 67° 10' 52" to 68° 12' 19" East Latitude 27° 18' 14" to 28° 3' 55" North	
Surrounding Districts	Balochistan Province In North-West Shikarpur and Jacobabad in North-East Dadu in South Larkana in East	
Climate Conditions	Hot and Arid	
Coldest Month	January	
Hottest Month	June	
Seasonal Temperatures	Max Mean (°C)	Min Mean (°C)
Spring (March and April)	36.25	19.63
Dry Summer (May and June)	44.49	28.98
Wet Summer (July to September)	41.68	28.78
Autumn (October to November)	34.02	18.33
Winter (December to February)	25.26	10.06
Average Rainfall	86.23 mm/year	
Physiographic Features	Hamal Lake, Drigh Lake, Langh Lake	

DEMOGRAPHY

	Year-1998	Year-2017
Population	924,294	1,338,035
Urban	166,949	396,803
Rural	757,345	941,232
No. of Household	-	223,154
Average Annual Growth Rate 1998-2017	1.96 %	

ECONOMY

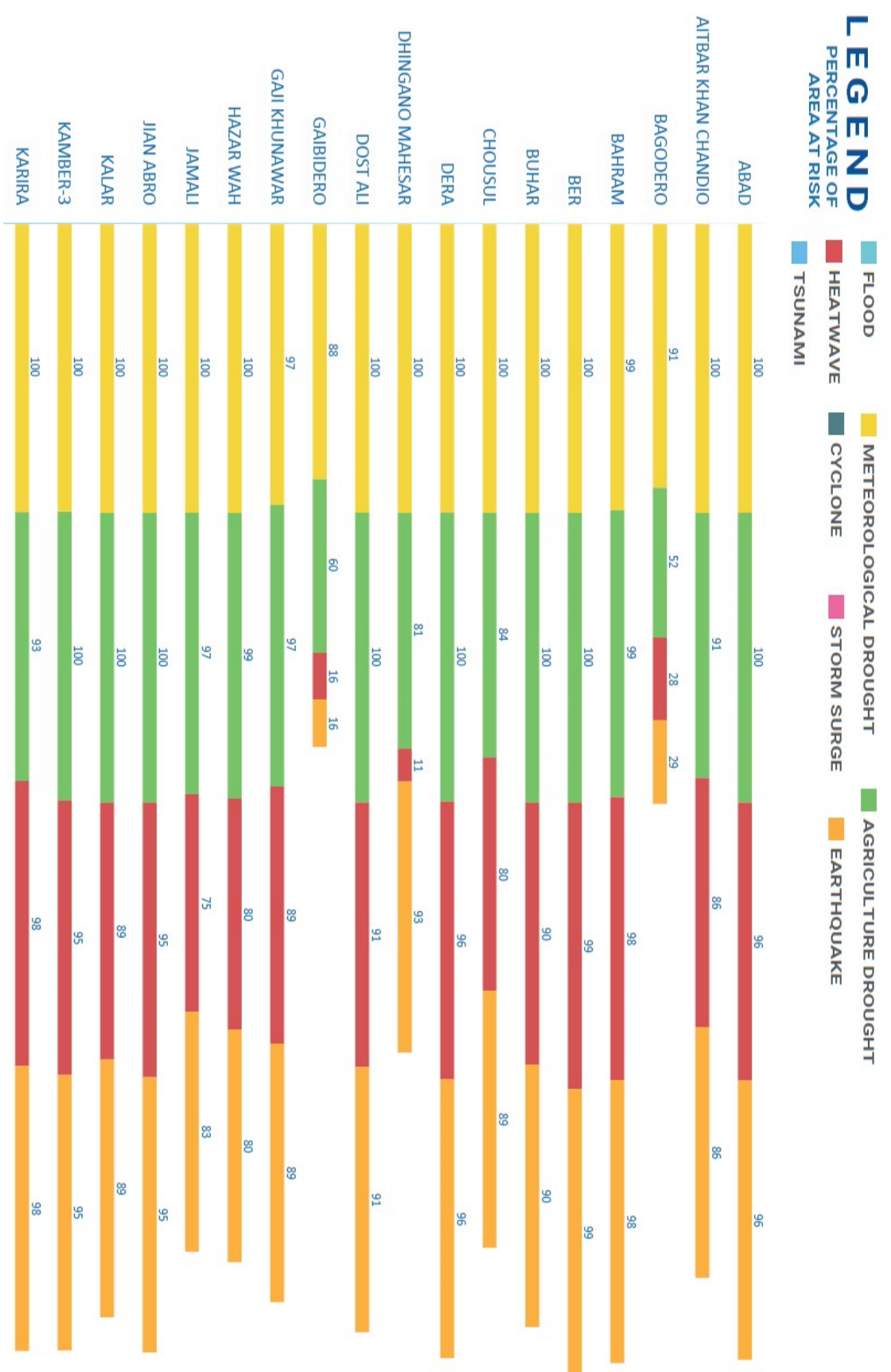
Industries	Manufacture of Textiles, Wood and wood products, Chemical and Chemical Products, Oil and Gas
Agriculture	Production in M.tons as per (2016-17)
Major Crops	
Rice	335,530
Wheat	158,242
Minor Crops	
Barley	300
Jowar	1235
Rapeseed and Mustard	1361
Gram	543

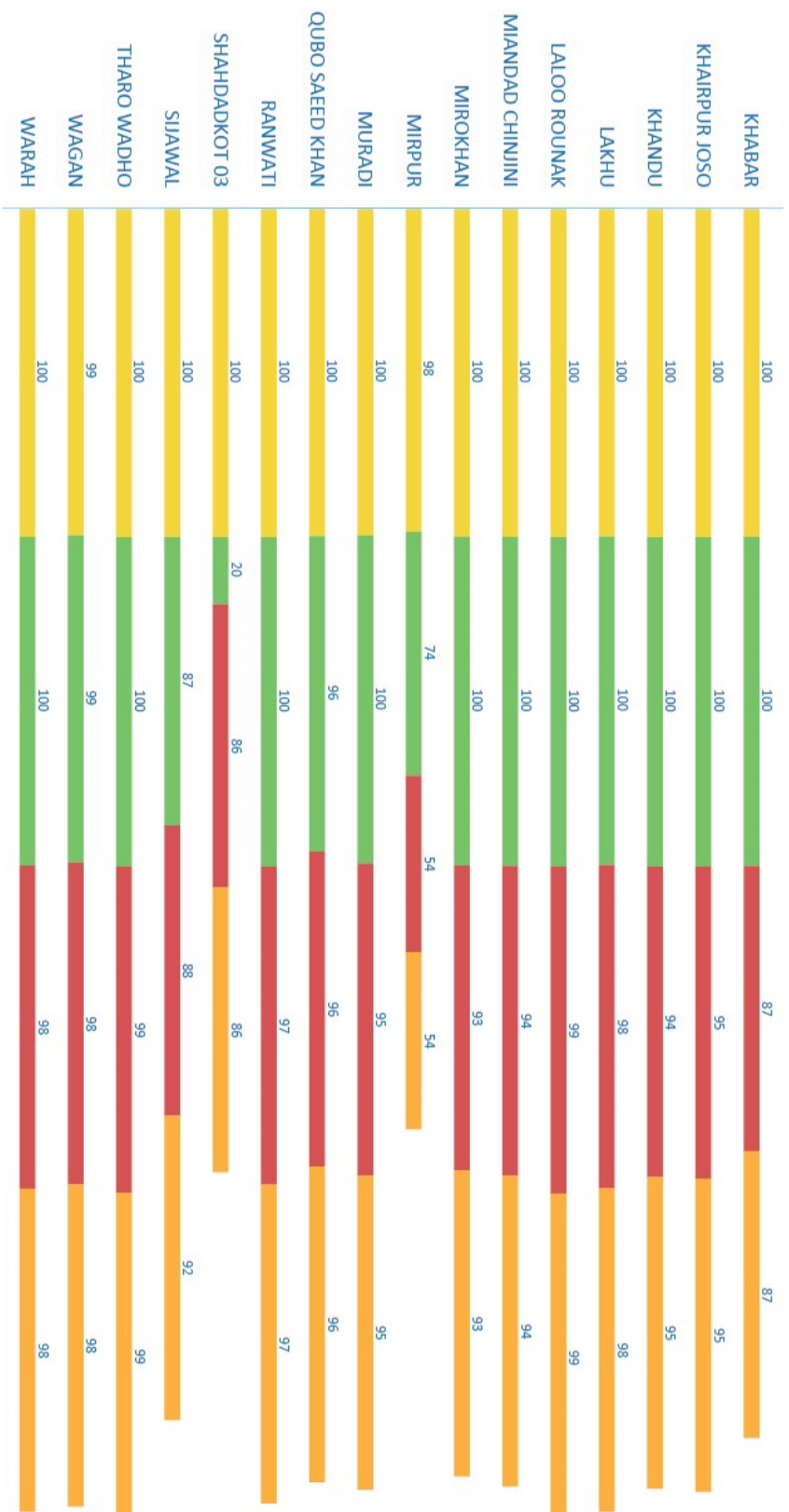
ADMINISTRATIVE SYSTEM

TALUKA NAMES	UC NAMES
<ol style="list-style-type: none">1. Kambar Ali Khan Taluka2. Miro Khan Taluka3. Nasirabad Taluka4. Qubo Saeed Khan Taluka5. Shahdadkot Taluka6. Sujawal Junejo Taluka7. Warah Taluka	<ol style="list-style-type: none">1. Abad2. Aitbar Khan Chandio3. Bagodero4. Bahram5. Ber6. Buhar7. Chousul8. Dera9. Dhingano Mahesar10. Dost Ali11. Gaibidero12. Gaji Khunawar13. Hazar Wah14. Jamali15. Jian Abro16. Kalar17. Kamber-318. Karira19. Khabar20. Khairpur Joso21. Khandu22. Lakh23. Laloo Rounak24. Miandad Chinjini25. Mirokhan26. Mirpur27. Muradi28. Qubo Saeed Khan

	29. Ranwati 30. Shahdadt 03 31. Sijawal 32. Tharo Wadho 33. Wagan 34. Warah
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KAMBAR SHAHDADKOTDISTRICT MULTI-HAZARD RISK PROFILES





UC WISE RISK PROFILE

ABAD			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	68.702 sq km
		Forest Area	0.002 sq km
		Pakka Unplanned Area	3.689 sq km
		Bridges	1
		Bus Stops	1
		Education Facilities	43
		Health Facilities	9
		Mobile Towers	8
		Petrol Pumps	4
		Police Stations	2
		Post Offices	2
		Settlements	48
		Irrigation and Drainage Network	49.786 km
		Road Network	142.456 km
		Population	57920
		Household	10375
Meteorological Drought	Medium - Extreme	Settlements	48
		Agriculture Area	68.787 sq km
		Forest Area	0.051 sq km
		Water Body	0.022 sq km
		Wet Area	2.416 sq km
		Population	58243
		Household	10431
Agricultural Drought	Low - High	Agriculture Area	87.273 sq km
		Forest Area	0.065 sq km
		Water Body	0.028 sq km
		Wet Area	3.065 sq km
		Settlements	48
		Population	73890
		Household	13233
Heatwave	Low - High	Agriculture Area	68.67 sq km
		Pakka Unplanned Area	3.692 sq km
		Population	57933
		Household	10374
		Settlements	47

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

AITBAR KHAN CHANDIO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	130.075 sq km
		Pakka Planned Area	1.903 sq km
		Pakka Unplanned Area	2.861 sq km
		Range Land	0.003 sq km
		Bridges	1
		Bus Stops	1
		Education Facilities	67
		Fire Stations	1
		Health Facilities	3
		Mobile Towers	4
		Petrol Pumps	3
		Police Stations	4
		Settlements	82
		Tourist Places	1
		Irrigation and Drainage Network	68.836 km
		Railway Line	11.276 km
		Road Network	214.521 km
		Population	95796
		Household	15788
Meteorological Drought	Medium - Extreme	Settlements	82
		Agriculture Area	130.335 sq km
		Range Land	0.034 sq km
		Water Body	0.195 sq km
		Wet Area	20.506 sq km
		Population	96530
		Household	15906
Agricultural Drought	Low - High	Agriculture Area	154.602 sq km
		Range Land	0.042 sq km
		Water Body	0.247 sq km
		Wet Area	25.25 sq km
		Settlements	58

		Population	57770
		Household	9444
Heatwave	Low - High	Agriculture Area	129.973 sq km
		Pakka Planned Area	1.904 sq km
		Pakka Unplanned Area	2.865 sq km
		Population	95899
		Household	15802
		Settlements	77
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

BAGODERO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	173.995 sq km
		Kachcha Area	0.148 sq km
		Natural Vegetation in Wet Areas	0.063 sq km
		Pakka Unplanned Area	0.791 sq km
		Range Land	0.157 sq km
		Education Facilities	26
		Mobile Towers	1
		Petrol Pumps	1
		Settlements	35
		Irrigation and Drainage Network	31.98 km
		Road Network	222.064 km
		Population	14562
		Household	2409
Meteorological Drought	Medium - Extreme	Settlements	35
		Agriculture Area	174.295 sq km
		Bare Area with sparse Natural Vegetation	231.789 sq km
		Forest Area	0.309 sq km
		Natural Vegetation in Wet Areas	3.058 sq km
		Range Land	145.249 sq km
		Water Body	0.089 sq km
		Wet Area	1.012 sq km

		Population	14676
		Household	2427
Agricultural Drought	Low - Extreme	Agriculture Area	217.669 sq km
		Bare Area with sparse Natural Vegetation	100.123 sq km
		Forest Area	0.393 sq km
		Natural Vegetation in Wet Areas	3.904 sq km
		Range Land	77.405 sq km
		Water Body	0.114 sq km
		Wet Area	1.292 sq km
		Settlements	35
		Population	18749
		Household	3100
Heatwave	Low - High	Agriculture Area	172.49 sq km
		Kachcha Area	0.149 sq km
		Pakka Unplanned Area	0.793 sq km
		Population	14618
		Household	2418
		Settlements	35
Riverine Flood	Nil	The UC is not prone to flood hazard due to Indus River; however, it can be affected by rainwater drainage channels that are flowing from Balochistan province during monsoon / heavy rains.	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

BAHRAM			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	67.594 sq km
		Pakka Unplanned Area	3.419 sq km
		Range Land	0.001 sq km
		Bridges	2
		Education Facilities	41
		Health Facilities	2
		Mobile Towers	4
		Petrol Pumps	1
		Post Offices	1
		Settlements	45

		Irrigation and Drainage Network	50.231 km
		Road Network	158.858 km
		Population	53874
		Household	9024
Meteorological Drought	Medium - Extreme	Settlements	45
		Agriculture Area	67.636 sq km
		Range Land	0.027 sq km
		Water Body	0.227 sq km
		Wet Area	0.715 sq km
		Population	54153
		Household	9071
Agricultural Drought	Low - Medium	Agriculture Area	86.225 sq km
		Range Land	0.034 sq km
		Water Body	0.29 sq km
		Wet Area	0.911 sq km
		Settlements	45
		Population	69015
		Household	11560
Heatwave	Low - High	Agriculture Area	67.57 sq km
		Pakka Unplanned Area	3.423 sq km
		Population	53916
		Household	9033
		Settlements	45
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

BER			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	72.684 sq km
		Pakka Unplanned Area	3.403 sq km
		Bridges	1
		Education Facilities	55
		Health Facilities	2
		Petrol Pumps	2

		Settlements	47
		Tourist Places	1
		Irrigation and Drainage Network	54.751 km
		Road Network	112.059 km
		Population	43620
		Household	6979
Meteorological Drought	Medium - Extreme	Settlements	47
		Agriculture Area	72.731 sq km
		Water Body	0.565 sq km
		Wet Area	0.247 sq km
		Population	43932
		Household	7025
Agricultural Drought	Low - High	Agriculture Area	92.425 sq km
		Water Body	0.718 sq km
		Wet Area	0.314 sq km
		Settlements	47
		Population	55833
		Household	8926
Heatwave	Low - High	Agriculture Area	72.656 sq km
		Pakka Unplanned Area	3.407 sq km
		Population	43670
		Household	6985
		Settlements	47
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

BUHAR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	87.386 sq km
		Natural Vegetation in Wet Areas	0.026 sq km
		Pakka Unplanned Area	3.638 sq km
		Range Land	0.003 sq km
		Education Facilities	34
		Health Facilities	1

		Police Stations	1
		Settlements	64
		Irrigation and Drainage Network	52.815 km
		Road Network	156.829 km
		Population	43431
		Household	6908
Meteorological Drought	Medium - Extreme	Settlements	64
		Agriculture Area	87.545 sq km
		Natural Vegetation in Wet Areas	1.614 sq km
		Range Land	0.007 sq km
		Water Body	0.866 sq km
		Wet Area	7.225 sq km
		Population	43825
		Household	6973
Agricultural Drought	Low - High	Agriculture Area	111.293 sq km
		Natural Vegetation in Wet Areas	2.052 sq km
		Range Land	0.009 sq km
		Water Body	1.101 sq km
		Wet Area	9.186 sq km
		Settlements	64
		Population	55707
		Household	8865
Heatwave	Low - High	Agriculture Area	87.324 sq km
		Pakka Unplanned Area	3.645 sq km
		Population	43521
		Household	6928
		Settlements	62
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

CHOUSUL			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	70.55 sq km

		Forest Area	0.006 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Unplanned Area	2.084 sq km
		Education Facilities	48
		Settlements	47
		Irrigation and Drainage Network	55.356 km
		Road Network	108.945 km
		Population	30511
		Household	4923
Meteorological Drought	Medium - Extreme	Settlements	47
		Agriculture Area	70.674 sq km
		Bare Area with sparse Natural Vegetation	2.267 sq km
		Forest Area	0.057 sq km
		Natural Vegetation in Wet Areas	0.395 sq km
		Water Body	1.131 sq km
		Wet Area	5.712 sq km
		Population	30878
		Household	4982
Agricultural Drought	Low - High	Agriculture Area	78.986 sq km
		Bare Area with sparse Natural Vegetation	0.186 sq km
		Forest Area	0.072 sq km
		Natural Vegetation in Wet Areas	0.495 sq km
		Water Body	1.435 sq km
		Wet Area	5.165 sq km
		Settlements	41
		Population	32945
		Household	5317
Heatwave	Low - High	Agriculture Area	64 sq km
		Pakka Unplanned Area	2.089 sq km
		Population	30585
		Household	4934
		Settlements	45
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
DERA			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	51.206 sq km
		Pakka Unplanned Area	1.903 sq km
		Education Facilities	31
		Health Facilities	2
		Settlements	34
		Irrigation and Drainage Network	49.818 km
		Road Network	85.441 km
		Population	21216
		Household	3536
Meteorological Drought	Medium - Extreme	Settlements	34
		Agriculture Area	51.267 sq km
		Water Body	0.516 sq km
		Wet Area	1.593 sq km
		Population	21399
		Household	3563
Agricultural Drought	Low - High	Agriculture Area	65.003 sq km
		Water Body	0.655 sq km
		Wet Area	2.02 sq km
		Settlements	34
		Population	27134
		Household	4519
Heatwave	Low - High	Agriculture Area	51.178 sq km
		Pakka Unplanned Area	1.906 sq km
		Population	21251
		Household	3537
		Settlements	34
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

DHINGANO MAHESAR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	112.057 sq km
		Natural Vegetation in Wet Areas	0.024 sq km
		Pakka Unplanned Area	3.133 sq km
		Bridges	4
		Education Facilities	68
		Health Facilities	7
		Mobile Towers	6
		Petrol Pumps	4
		Police Stations	1
		Settlements	52
		Irrigation and Drainage Network	68.284 km
		Road Network	194.093 km
		Population	46081
		Household	7428
Meteorological Drought	Medium - Extreme	Settlements	52
		Agriculture Area	112.169 sq km
		Bare Area with sparse Natural Vegetation	1.411 sq km
		Natural Vegetation in Wet Areas	1.081 sq km
		Water Body	0.827 sq km
		Wet Area	4.997 sq km
		Population	46456
		Household	7489
Agricultural Drought	Low - Medium	Agriculture Area	120.545 sq km
		Bare Area with sparse Natural Vegetation	0.004 sq km
		Natural Vegetation in Wet Areas	1.363 sq km
		Water Body	1.047 sq km
		Wet Area	2.647 sq km
		Settlements	36
		Population	43865
		Household	7073
Heatwave	Low - High	Agriculture Area	10.831 sq km
		Pakka Unplanned Area	3.107 sq km
		Population	45702
		Household	7368

		Settlements	43
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

DOST ALI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	85.954 sq km
		Natural Vegetation in Wet Areas	0.014 sq km
		Pakka Unplanned Area	3.094 sq km
		Education Facilities	35
		Police Stations	1
		Settlements	62
		Irrigation and Drainage Network	61.833 km
		Road Network	165.681 km
		Population	37352
		Household	5929
Meteorological Drought	Medium - Extreme	Settlements	62
		Agriculture Area	86.121 sq km
		Natural Vegetation in Wet Areas	0.308 sq km
		Water Body	0.112 sq km
		Wet Area	7.921 sq km
		Population	37692
		Household	5981
Agricultural Drought	Low - High	Agriculture Area	109.672 sq km
		Natural Vegetation in Wet Areas	0.393 sq km
		Water Body	0.143 sq km
		Wet Area	10.091 sq km
		Settlements	62
		Population	47995
		Household	7618
Heatwave	Low - High	Agriculture Area	85.902 sq km
		Pakka Unplanned Area	3.102 sq km
		Population	37446

		Household	5944
		Settlements	61
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

GAIBDERO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	265.944 sq km
		Forest Area	0.009 sq km
		Natural Vegetation in Wet Areas	1.379 sq km
		Pakka Planned Area	0.087 sq km
		Pakka Unplanned Area	1.305 sq km
		Range Land	0.328 sq km
		Education Facilities	15
		Settlements	41
		Irrigation and Drainage Network	83.143 km
		Road Network	210.315 km
		Population	15789
		Household	2497
Meteorological Drought	Medium - Extreme	Settlements	40
		Agriculture Area	266.839 sq km
		Bare Area with sparse Natural Vegetation	715.906 sq km
		Forest Area	2.788 sq km
		Natural Vegetation in Wet Areas	125.134 sq km
		Range Land	260.007 sq km
		Water Body	9.827 sq km
		Wet Area	83.981 sq km
		Population	15986
		Household	2528
Agricultural Drought	Low - Extreme	Agriculture Area	335.597 sq km
		Bare Area with sparse Natural Vegetation	451.304 sq km
		Forest Area	3.551 sq km
		Natural Vegetation in	157.867 sq km

		Wet Areas	
		Range Land	205.525 sq km
		Water Body	12.465 sq km
		Wet Area	93.482 sq km
		Settlements	39
		Population	20338
		Household	3218
Heatwave	Low - High	Agriculture Area	265.166 sq km
		Pakka Planned Area	0.087 sq km
		Pakka Unplanned Area	1.308 sq km
		Population	15835
		Household	2504
		Settlements	35
Riverine Flood	Nil	The UC is not prone to flood hazard due to Indus River; however, it can be affected by rainwater drainage channels that are flowing from Balochistan province during monsoon / heavy rains.	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

GAJI KHUNAWAR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	111.741 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Unplanned Area	2.128 sq km
		Range Land	0.029 sq km
		Education Facilities	28
		Health Facilities	3
		Settlements	33
		Irrigation and Drainage Network	73.804 km
		Road Network	180.328 km
		Population	20884
		Household	3591
Meteorological Drought	Medium - Extreme	Settlements	33
		Agriculture Area	111.892 sq km
		Natural Vegetation in	0.062 sq km

		Wet Areas	
		Range Land	0.506 sq km
		Water Body	1.12 sq km
		Wet Area	9.097 sq km
		Population	21043
		Household	3620
Agricultural Drought	Low - High	Agriculture Area	141.729 sq km
		Natural Vegetation in Wet Areas	0.079 sq km
		Range Land	0.641 sq km
		Water Body	1.418 sq km
		Wet Area	11.525 sq km
		Settlements	33
		Population	26645
		Household	4584
Heatwave	Low - High	Agriculture Area	111.692 sq km
		Pakka Unplanned Area	2.131 sq km
		Population	20909
		Household	3599
		Settlements	33
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

HAZAR WAH			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	223.902 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Unplanned Area	1.476 sq km
		Range Land	0 sq km
		Bridges	2
		Education Facilities	27
		Mobile Towers	1
		Petrol Pumps	4
		Settlements	57
		Irrigation and Drainage	109.927 km

		Network	
		Road Network	250.348 km
		Population	30525
		Household	5107
Meteorological Drought	Medium - Extreme	Settlements	57
		Agriculture Area	224.263 sq km
		Natural Vegetation in Wet Areas	0.095 sq km
		Range Land	0.004 sq km
		Water Body	0.237 sq km
		Wet Area	56.678 sq km
		Population	30735
		Household	5145
Agricultural Drought	Low - Extreme	Agriculture Area	282.438 sq km
		Natural Vegetation in Wet Areas	0.121 sq km
		Range Land	0.005 sq km
		Water Body	0.302 sq km
		Wet Area	70.984 sq km
		Settlements	55
		Population	38391
		Household	6428
Heatwave	Low - High	Agriculture Area	223.79 sq km
		Pakka Unplanned Area	1.48 sq km
		Population	30592
		Household	5125
		Settlements	53
Riverine Flood	Nil	The UC is not prone to flood hazard due to Indus River; however, it can be affected by rainwater drainage channels that are flowing from Balochistan province during monsoon / heavy rains.	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

JAMALI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	165.33 sq km
		Pakka Unplanned Area	1.239 sq km

		Range Land	0 sq km
		Education Facilities	54
		Health Facilities	2
		Mobile Towers	1
		Settlements	72
		Irrigation and Drainage Network	92.178 km
		Railway Line	5.372 km
		Road Network	204.684 km
		Population	24855
		Household	4066
Meteorological Drought	Medium - Extreme	Settlements	72
		Agriculture Area	165.49 sq km
		Bare Area with sparse Natural Vegetation	10.924 sq km
		Range Land	0.418 sq km
		Water Body	0.124 sq km
		Wet Area	23.909 sq km
		Population	25076
		Household	4101
Agricultural Drought	Low - High	Agriculture Area	206.614 sq km
		Bare Area with sparse Natural Vegetation	13.991 sq km
		Range Land	0.535 sq km
		Water Body	0.159 sq km
		Wet Area	28.772 sq km
		Settlements	72
		Population	32109
		Household	5251
Heatwave	Low - High	Agriculture Area	150.309 sq km
		Pakka Unplanned Area	1.236 sq km
		Population	24806
		Household	4055
		Settlements	67
Riverine Flood	Nil	The UC is not prone to flood hazard due to Indus River; however, it can be affected by rainwater drainage channels that are flowing from Balochistan province during monsoon / heavy rains.	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge
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JIAN ABRO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	61.952 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Planned Area	0.202 sq km
		Pakka Unplanned Area	3.912 sq km
		Range Land	0.011 sq km
		Bridges	4
		Bus Stops	1
		Education Facilities	65
		Health Facilities	4
		Mobile Towers	6
		Petrol Pumps	8
		Post Offices	2
		Settlements	88
		Irrigation and Drainage Network	45.724 km
		Road Network	105.48 km
		Population	70331
		Household	11526
Meteorological Drought	Medium - Extreme	Settlements	88
		Agriculture Area	62.131 sq km
		Natural Vegetation in Wet Areas	0.055 sq km
		Range Land	0.078 sq km
		Water Body	2.485 sq km
		Wet Area	0.208 sq km
		Population	70786
		Household	11600
Agricultural Drought	Low - Medium	Agriculture Area	79.037 sq km
		Natural Vegetation in Wet Areas	0.07 sq km
		Range Land	0.099 sq km
		Water Body	3.161 sq km
		Wet Area	0.265 sq km
		Settlements	88
		Population	90047
		Household	14763
Heatwave	Low - High	Agriculture Area	61.885 sq km
		Pakka Planned Area	0.201 sq km

		Pakka Unplanned Area	3.916 sq km
		Population	70331
		Household	11528
		Settlements	87
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KALAR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	73.506 sq km
		Natural Vegetation in Wet Areas	0.027 sq km
		Pakka Unplanned Area	2.115 sq km
		Range Land	0.001 sq km
		Education Facilities	22
		Health Facilities	1
		Settlements	41
		Irrigation and Drainage Network	42.741 km
		Road Network	108.415 km
		Population	25596
		Household	4053
Meteorological Drought	Medium - Extreme	Settlements	41
		Agriculture Area	73.659 sq km
		Natural Vegetation in Wet Areas	1.186 sq km
		Range Land	0.115 sq km
		Water Body	2.07 sq km
		Wet Area	6.354 sq km
		Population	25849
		Household	4090
Agricultural Drought	Low - High	Agriculture Area	93.715 sq km
		Natural Vegetation in Wet Areas	1.51 sq km
		Range Land	0.146 sq km
		Water Body	2.632 sq km
		Wet Area	8.083 sq km
		Settlements	41

		Population	32887
		Household	5204
Heatwave	Low - High	Agriculture Area	73.467 sq km
		Pakka Unplanned Area	2.118 sq km
		Population	25629
		Household	4055
		Settlements	40
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KAMBER-3			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	33.572 sq km
		Pakka Planned Area	0.211 sq km
		Pakka Unplanned Area	3.62 sq km
		Range Land	0.001 sq km
		Bridges	2
		Education Facilities	43
		Grid Stations	1
		Health Facilities	9
		Mobile Towers	5
		Petrol Pumps	7
		Police Stations	2
		Settlements	31
		Irrigation and Drainage Network	23.527 km
		Road Network	57.605 km
		Population	76524
		Household	12716
Meteorological Drought	Medium - Extreme	Settlements	31
		Agriculture Area	33.63 sq km
		Range Land	0.046 sq km
		Water Body	0.809 sq km
		Population	76979
		Household	12792

Agricultural Drought	Low - High	Agriculture Area	42.806 sq km
		Range Land	0.058 sq km
		Water Body	1.029 sq km
		Settlements	31
		Population	97930
		Household	16271
Heatwave	Low - High	Agriculture Area	33.545 sq km
		Pakka Planned Area	0.211 sq km
		Pakka Unplanned Area	3.622 sq km
		Population	76589
		Household	12724
		Settlements	31
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KARIRA			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	99.725 sq km
		Pakka Planned Area	0.184 sq km
		Pakka Unplanned Area	2.255 sq km
		Bridges	1
		Education Facilities	41
		Petrol Pumps	3
		Settlements	55
		Irrigation and Drainage Network	46.976 km
		Road Network	172.728 km
		Population	31044
		Household	5249
Meteorological Drought	Medium - Extreme	Settlements	55
		Agriculture Area	99.776 sq km
		Water Body	0.212 sq km
		Wet Area	1.06 sq km
		Population	31320
		Household	5294

Agricultural Drought	Low - Medium	Agriculture Area	118.983 sq km
		Water Body	0.269 sq km
		Wet Area	1.169 sq km
		Settlements	48
		Population	32155
		Household	5451
Heatwave	Low - High	Agriculture Area	99.7 sq km
		Pakka Planned Area	0.183 sq km
		Pakka Unplanned Area	2.261 sq km
		Population	31096
		Household	5258
		Settlements	55
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KHABAR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	112.389 sq km
		Pakka Unplanned Area	1.886 sq km
		Range Land	0.007 sq km
		Education Facilities	31
		Health Facilities	1
		Settlements	53
		Irrigation and Drainage Network	66.917 km
		Road Network	177.323 km
		Population	21160
		Household	3620
Meteorological Drought	Medium - Extreme	Settlements	53
		Agriculture Area	112.535 sq km
		Range Land	0.194 sq km
		Water Body	0.052 sq km
		Wet Area	17.124 sq km
		Population	21372
		Household	3657

Agricultural Drought	Low - High	Agriculture Area	143.508 sq km
		Range Land	0.247 sq km
		Water Body	0.067 sq km
		Wet Area	21.853 sq km
		Settlements	53
		Population	27249
		Household	4661
Heatwave	Low - High	Agriculture Area	112.336 sq km
		Pakka Unplanned Area	1.891 sq km
		Population	21218
		Household	3628
		Settlements	50
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KHAIRPUR JOSO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	50.116 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Unplanned Area	2.576 sq km
		Bridges	1
		Education Facilities	38
		Health Facilities	4
		Mobile Towers	3
		Police Stations	1
		Settlements	46
		Tourist Places	1
		Irrigation and Drainage Network	41.792 km
		Road Network	101.322 km
		Population	30866
		Household	4885
Meteorological Drought	Medium - Extreme	Settlements	46
		Agriculture Area	50.217 sq km
		Natural Vegetation in Wet Areas	0.038 sq km

		Water Body	1.253 sq km
		Wet Area	1.531 sq km
		Population	31212
		Household	4940
Agricultural Drought	Low - High	Agriculture Area	63.767 sq km
		Natural Vegetation in Wet Areas	0.049 sq km
		Water Body	1.592 sq km
		Wet Area	1.944 sq km
		Settlements	46
		Population	39637
		Household	6273
Heatwave	Low - High	Agriculture Area	50.071 sq km
		Pakka Unplanned Area	2.581 sq km
		Population	30931
		Household	4894
		Settlements	45
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

KHANDU			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	74.304 sq km
		Natural Vegetation in Wet Areas	0.029 sq km
		Pakka Unplanned Area	2.16 sq km
		Range Land	0.053 sq km
		Bridges	1
		Education Facilities	34
		Settlements	51
		Irrigation and Drainage Network	38.107 km
		Road Network	137.014 km
		Population	21376
		Household	3667
Meteorological	Medium - Extreme	Settlements	51

Drought		Agriculture Area	74.417 sq km
		Natural Vegetation in Wet Areas	0.29 sq km
		Range Land	1.511 sq km
		Water Body	0.058 sq km
		Wet Area	2.682 sq km
		Population	21589
		Household	3699
Agricultural Drought	Low - High	Agriculture Area	94.519 sq km
		Natural Vegetation in Wet Areas	0.369 sq km
		Range Land	1.919 sq km
		Water Body	0.074 sq km
		Wet Area	3.407 sq km
		Settlements	51
		Population	27424
Household	4697		
Heatwave	Low - High	Agriculture Area	74.268 sq km
		Pakka Unplanned Area	2.166 sq km
		Population	21433
		Household	3680
		Settlements	49
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

LAKHU			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	63.369 sq km
		Forest Area	0.002 sq km
		Natural Vegetation in Wet Areas	0.01 sq km
		Pakka Unplanned Area	3.135 sq km
		Bus Stops	1
		Education Facilities	52
		Health Facilities	5
		Mobile Towers	2
		Police Stations	1

		Settlements	41
		Irrigation and Drainage Network	34.071 km
		Road Network	114.578 km
		Population	45023
		Household	7887
Meteorological Drought	Medium - Extreme	Settlements	41
		Agriculture Area	63.413 sq km
		Forest Area	0.022 sq km
		Natural Vegetation in Wet Areas	0.018 sq km
		Water Body	0.162 sq km
		Wet Area	0.722 sq km
		Population	45359
		Household	7948
Agricultural Drought	Low - High	Agriculture Area	80.351 sq km
		Forest Area	0.027 sq km
		Natural Vegetation in Wet Areas	0.023 sq km
		Water Body	0.206 sq km
		Wet Area	0.914 sq km
		Settlements	41
		Population	57472
		Household	10071
Heatwave	Low - High	Agriculture Area	63.352 sq km
		Pakka Unplanned Area	3.138 sq km
		Population	45062
		Household	7893
		Settlements	40
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

LALOO ROUNAK			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	44.34 sq km
		Forest Area	0.006 sq km

		Pakka Unplanned Area	3.313 sq km
		Education Facilities	32
		Health Facilities	2
		Mobile Towers	2
		Settlements	28
		Irrigation and Drainage Network	24.454 km
		Road Network	74.201 km
		Population	32515
		Household	5591
Meteorological Drought	Medium - Extreme	Settlements	28
		Agriculture Area	44.377 sq km
		Forest Area	0.047 sq km
		Water Body	0.067 sq km
		Wet Area	0.132 sq km
		Population	32753
		Household	5633
Agricultural Drought	Low - High	Agriculture Area	56.344 sq km
		Forest Area	0.059 sq km
		Water Body	0.085 sq km
		Wet Area	0.168 sq km
		Settlements	28
		Population	41588
		Household	7153
Heatwave	Low - High	Agriculture Area	44.325 sq km
		Pakka Unplanned Area	3.321 sq km
		Population	32586
		Household	5603
		Settlements	28
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

MIANDAD CHINJINI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	103.504 sq km

		Pakka Unplanned Area	3.114 sq km
		Range Land	0.002 sq km
		Bridges	4
		Education Facilities	31
		Mobile Towers	1
		Police Stations	2
		Settlements	46
		Irrigation and Drainage Network	89.355 km
		Road Network	180.934 km
		Population	36956
		Household	6119
Meteorological Drought	Medium - Extreme	Settlements	46
		Agriculture Area	103.63 sq km
		Range Land	0.022 sq km
		Water Body	0.422 sq km
		Wet Area	5.785 sq km
		Population	37287
		Household	6178
Agricultural Drought	Low - High	Agriculture Area	131.126 sq km
		Range Land	0.028 sq km
		Water Body	0.534 sq km
		Wet Area	7.31 sq km
		Settlements	46
		Population	47199
		Household	7820
Heatwave	Low - High	Agriculture Area	103.455 sq km
		Pakka Unplanned Area	3.118 sq km
		Population	37008
		Household	6129
		Settlements	46
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

MIRO KHAN

Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	41.491 sq km
		Pakka Unplanned Area	3.358 sq km
		Education Facilities	38
		Health Facilities	9
		Settlements	22
		Irrigation and Drainage Network	34.395 km
		Road Network	98.543 km
		Population	43027
		Household	7399
Meteorological Drought	Medium - Extreme	Settlements	22
		Agriculture Area	41.552 sq km
		Water Body	0.299 sq km
		Wet Area	3.218 sq km
		Population	43313
		Household	7449
Agricultural Drought	Low - Medium	Agriculture Area	53.002 sq km
		Water Body	0.381 sq km
		Wet Area	4.102 sq km
		Settlements	22
		Population	55245
		Household	9502
Heatwave	Low - High	Agriculture Area	41.466 sq km
		Pakka Unplanned Area	3.362 sq km
		Population	43077
		Household	7409
		Settlements	21
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

MIRPUR			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	178.619 sq km
		Kachcha Area	0.027 sq km

		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Unplanned Area	2.38 sq km
		Range Land	0.154 sq km
		Education Facilities	22
		Police Stations	1
		Settlements	41
		Irrigation and Drainage Network	65.038 km
		Road Network	171.918 km
		Population	23694
		Household	4074
Meteorological Drought	Medium - Extreme	Settlements	41
		Agriculture Area	179.054 sq km
		Bare Area with sparse Natural Vegetation	27.718 sq km
		Natural Vegetation in Wet Areas	16.947 sq km
		Range Land	19.057 sq km
		Water Body	9.169 sq km
		Wet Area	78.913 sq km
		Population	23952
		Household	4115
Agricultural Drought	Low - Extreme	Agriculture Area	204.74 sq km
		Bare Area with sparse Natural Vegetation	35.112 sq km
		Natural Vegetation in Wet Areas	11.428 sq km
		Range Land	23.519 sq km
		Water Body	0.384 sq km
		Wet Area	39.653 sq km
		Settlements	37
		Population	28902
		Household	4966
Heatwave	Low - High	Agriculture Area	178.534 sq km
		Kachcha Area	0.027 sq km
		Pakka Unplanned Area	2.384 sq km
		Population	23733
		Household	4079
		Settlements	40
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

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

MURADI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	61.636 sq km
		Forest Area	0.006 sq km
		Pakka Unplanned Area	4.133 sq km
		Range Land	0.004 sq km
		Bridges	3
		Education Facilities	46
		Grid Stations	1
		Health Facilities	5
		Mobile Towers	7
		Petrol Pumps	3
		Police Stations	1
		Post Offices	1
		Settlements	44
		Irrigation and Drainage Network	69.561 km
		Road Network	109.723 km
		Population	68587
		Household	11577
Meteorological Drought	Medium - Extreme	Settlements	43
		Agriculture Area	61.73 sq km
		Forest Area	0.02 sq km
		Range Land	0.057 sq km
		Water Body	0.198 sq km
		Wet Area	2.34 sq km
		Population	69091
		Household	11664
Agricultural Drought	Low - High	Agriculture Area	78.225 sq km
		Forest Area	0.025 sq km
		Range Land	0.072 sq km
		Water Body	0.252 sq km
		Wet Area	2.965 sq km
		Settlements	43
		Population	87559
		Household	14777

Heatwave	Low - High	Agriculture Area	61.597 sq km
		Pakka Unplanned Area	4.136 sq km
		Population	68621
		Household	11584
		Settlements	41
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

QUBO SAEED KHAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	123.782 sq km
		Pakka Unplanned Area	1.849 sq km
		Range Land	0.005 sq km
		Bridges	7
		Education Facilities	35
		Health Facilities	1
		Mobile Towers	3
		Petrol Pumps	1
		Police Stations	1
		Settlements	59
		Irrigation and Drainage Network	49.693 km
		Road Network	202.882 km
		Population	41095
		Household	6910
Meteorological Drought	Medium - Extreme	Settlements	59
		Agriculture Area	123.651 sq km
		Range Land	0.038 sq km
		Water Body	0.898 sq km
		Wet Area	4.492 sq km
		Population	41417
		Household	6966
Agricultural Drought	Low - Extreme	Agriculture Area	151.471 sq km
		Range Land	0.047 sq km
		Water Body	1.148 sq km
		Wet Area	5.689 sq km

		Settlements	59
		Population	52975
		Household	8908
Heatwave	Low - High	Agriculture Area	123.737 sq km
		Pakka Unplanned Area	1.854 sq km
		Population	41181
		Household	6930
		Settlements	59
Riverine Flood	Nil	The UC is not prone to flood hazard due to Indus River; however, it can be affected by rainwater drainage channels that are flowing from Balochistan province during monsoon / heavy rains.	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

RANWATI			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	71.144 sq km
		Pakka Unplanned Area	4.008 sq km
		Education Facilities	47
		Health Facilities	3
		Settlements	99
		Irrigation and Drainage Network	52.359 km
		Road Network	118.001 km
		Population	47712
		Household	7560
Meteorological Drought	Medium - Extreme	Settlements	99
		Agriculture Area	71.257 sq km
		Water Body	0.695 sq km
		Wet Area	1.688 sq km
		Population	48149
		Household	7628
Agricultural Drought	Low - Medium	Agriculture Area	90.743 sq km
		Water Body	0.885 sq km
		Wet Area	2.151 sq km
		Settlements	99

		Population	61312
		Household	9711
Heatwave	Low - High	Agriculture Area	71.099 sq km
		Pakka Unplanned Area	4.015 sq km
		Population	47807
		Household	7577
		Settlements	97
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

SHAHDADKOT-3			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	13.044 sq km
		Pakka Planned Area	1.947 sq km
		Pakka Unplanned Area	1.496 sq km
		Bridges	1
		Bus Stops	1
		Education Facilities	27
		Grid Stations	1
		Health Facilities	6
		Mobile Towers	3
		Petrol Pumps	4
		Police Stations	2
		Post Offices	2
		Settlements	11
		Irrigation and Drainage Network	7.694 km
		Railway Line	1.011 km
		Road Network	43.391 km
		Population	67628
		Household	11223
Meteorological Drought	Medium - Extreme	Settlements	11
		Agriculture Area	13.082 sq km
		Water Body	0.149 sq km
		Wet Area	1.531 sq km
		Population	67945

		Household	11276
Agricultural Drought	Low - Medium	Agriculture Area	4.056 sq km
		Water Body	0.184 sq km
		Wet Area	0.383 sq km
		Settlements	1
		Population	4471
		Household	743
Heatwave	Low - High	Agriculture Area	13.029 sq km
		Pakka Planned Area	1.944 sq km
		Pakka Unplanned Area	1.498 sq km
		Population	67609
		Household	11221
		Settlements	11
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

SIJAWAL			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	86.332 sq km
		Natural Vegetation in Wet Areas	0.003 sq km
		Pakka Unplanned Area	1.482 sq km
		Bridges	2
		Education Facilities	38
		Health Facilities	1
		Mobile Towers	2
		Settlements	40
		Irrigation and Drainage Network	49.638 km
		Road Network	177.816 km
		Population	21457
		Household	3484
Meteorological Drought	Medium - Extreme	Settlements	40
		Agriculture Area	86.405 sq km
		Bare Area with sparse Natural Vegetation	0.146 sq km

		Natural Vegetation in Wet Areas	0.502 sq km
		Water Body	0.222 sq km
		Wet Area	6.613 sq km
		Population	21598
		Household	3506
Agricultural Drought	Low - Medium	Agriculture Area	99.391 sq km
		Bare Area with sparse Natural Vegetation	0.181 sq km
		Natural Vegetation in Wet Areas	0.627 sq km
		Water Body	0.282 sq km
		Wet Area	4.373 sq km
		Settlements	33
		Population	25122
		Household	4078
Heatwave	Low - High	Agriculture Area	82.514 sq km
		Pakka Unplanned Area	1.485 sq km
		Population	21493
		Household	3489
		Settlements	38
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

THARO WADHO			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	139.068 sq km
		Pakka Unplanned Area	2.99 sq km
		Bridges	2
		Education Facilities	52
		Health Facilities	3
		Mobile Towers	2
		Petrol Pumps	1
		Settlements	55
		Irrigation and Drainage Network	92.775 km
		Road Network	287.917 km
		Population	40356

		Household	6672
Meteorological Drought	Medium - Extreme	Settlements	55
		Agriculture Area	139.119 sq km
		Water Body	0.257 sq km
		Wet Area	0.999 sq km
		Population	40664
		Household	6721
Agricultural Drought	Low - Medium	Agriculture Area	177.587 sq km
		Water Body	0.328 sq km
		Wet Area	1.275 sq km
		Settlements	55
		Population	51891
		Household	8577
Heatwave	Low - High	Agriculture Area	139.047 sq km
		Pakka Unplanned Area	2.996 sq km
		Population	40433
		Household	6685
		Settlements	55
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

WAGAN			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	47.706 sq km
		Pakka Unplanned Area	2.887 sq km
		Range Land	0.001 sq km
		Bus Stops	1
		Education Facilities	30
		Health Facilities	3
		Mobile Towers	4
		Petrol Pumps	1
		Post Offices	1
		Settlements	28
		Irrigation and Drainage Network	36.276 km

		Road Network	83.201 km
		Population	35925
		Household	6293
Meteorological Drought	Medium - Extreme	Settlements	28
		Agriculture Area	47.75 sq km
		Range Land	0.011 sq km
		Water Body	0.307 sq km
		Wet Area	0.566 sq km
		Population	36176
		Household	6336
Agricultural Drought	Low - High	Agriculture Area	60.604 sq km
		Range Land	0.014 sq km
		Water Body	0.39 sq km
		Wet Area	0.718 sq km
		Settlements	28
		Population	45921
		Household	8043
Heatwave	Low - High	Agriculture Area	47.684 sq km
		Pakka Unplanned Area	2.89 sq km
		Population	35969
		Household	6298
		Settlements	28
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

WARAH			
Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	25.209 sq km
		Pakka Unplanned Area	0.766 sq km
		Education Facilities	16
		Grid Stations	1
		Settlements	21
		Irrigation and Drainage Network	8.152 km
		Road Network	40.115 km

		Population	12231
		Household	2199
Meteorological Drought	Medium – Extreme	Settlements	21
		Agriculture Area	25.228 sq km
		Water Body	0.035 sq km
		Wet Area	0.294 sq km
		Population	12306
		Household	2211
Agricultural Drought	Low - Medium	Agriculture Area	32.002 sq km
		Water Body	0.045 sq km
		Wet Area	0.373 sq km
		Settlements	21
		Population	15612
		Household	2804
Heatwave	Low - High	Agriculture Area	25.199 sq km
		Pakka Unplanned Area	0.767 sq km
		Population	12253
		Household	2203
		Settlements	20
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

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: UCDMC 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 interact 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, de-silting of canals 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.

ESTABLISHMENT OF EMERGENCY OPERATION CENTERS

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

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, irrigation facilities 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
- 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
- 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

IRRIGATION DEPARTMENT

Pre-Disaster

- Introduce and ensure water harvesting and modern water management interventions in likely drought affected areas
- Ensure safety and compactness of irrigation channels, canals, branches, etc. before start of monsoon season to avoid breaches in irrigation system during heavy rains
- Ensure removal of congestion from storm water and draining channels before monsoon

During-Disaster

- Coordinate with PDMA and DDMA during entire disaster event for execution of on-demand action plans

Post-Disaster

- Conduct assessment of damages and needs and report to PDMA through DEOC
- Restore and repair damaged irrigation systems
- Prepare overall report of the department regarding intervention and disseminate to PDMA and DDMA

INFORMATION DEPARTMENT

Pre-Disaster

- Close coordination and liaison with PDMA and DDMA
- Issuance of press releases during monsoon and forecastable hazards 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 industry/business, crops and livestock and settlement of applicable taxes accordingly in coordination with Industry, Agriculture and Irrigation 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
- Provide training to soldiers and determine the role of soldiers who are stationed in disaster prone areas
- 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 Kambar Shahdadkot district reveals that the district is relatively safe in terms of 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 actions 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 Floods	According to MHVRA Study 2022, there is no riverine flood hazard in district Kambar Shahdadkot
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. The risk of geophysical hazards in Kambar Shahdadkot district is low, still some actions must be taken to avoid losses in case of minor jolts. 3. It is recommended that, new housing and infrastructure be built with proper town planning and following Building Codes recommended for the zone in which Kambar Shahdadkot district is situated. 4. 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.
Heatwave	<ol style="list-style-type: none"> 1. Historically, Kambar Shahdadkot district is not prone to severe heatwave spells. 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

	<p>for the purpose is social media and SMS.</p> <ol style="list-style-type: none"> 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.
Cyclone	<p>According to MHVRA Study 2022, there is no cyclone hazard in district Kambar Shahdadkot</p>
Drought	<ol style="list-style-type: none"> 1. Climatic condition of the district can be categorized as Hot and Arid (Climate Classification of Pakistan (Khan et al., 2010). Rainfall is very insufficient, average annual rainfall received during a year across the district is only 86.23 mm. 44.3% of the total district area is covered with irrigated crop fields. Western part of the district comprises bare areas with sparse natural vegetation, complete bare areas and Range lands with natural herbs and shrubs. 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 districts, 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 irrigation systems in agriculture sector 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.
Tsunami	According to MHVRA Study 2022, there is no tsunami hazard in district Kambar Shahdadkot

STANDARD OPERATING PROCEDURES

INTRODUCTION

Overall, disaster risk reduction is collective responsibility of concerned departments, associated line departments, private sector and communities. Synergized and coherence 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

In addition to heavy rains and severe weather, heatwave and drought are only forecastable hazards. 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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ACTION PLAN FOR UNFORECASTABLE HAZARDS

Earthquake

The earthquake is an unforecastable hazard and does not provide reaction time to prevent damages. The recommended post-disaster action plan is as follows

Table 7: 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)	Post disaster	PDMA

and damages/losses)		
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 Kambar Shahdaskot 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 Kambar Shahdadkot 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 Kambar Shahdadkot is Low. 5. The earthquake risk intensity for district Kambar Shahdadkot 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 DRR 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 case of any major earthquake event. 	
Response	
<ol style="list-style-type: none"> 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 build back better principle.

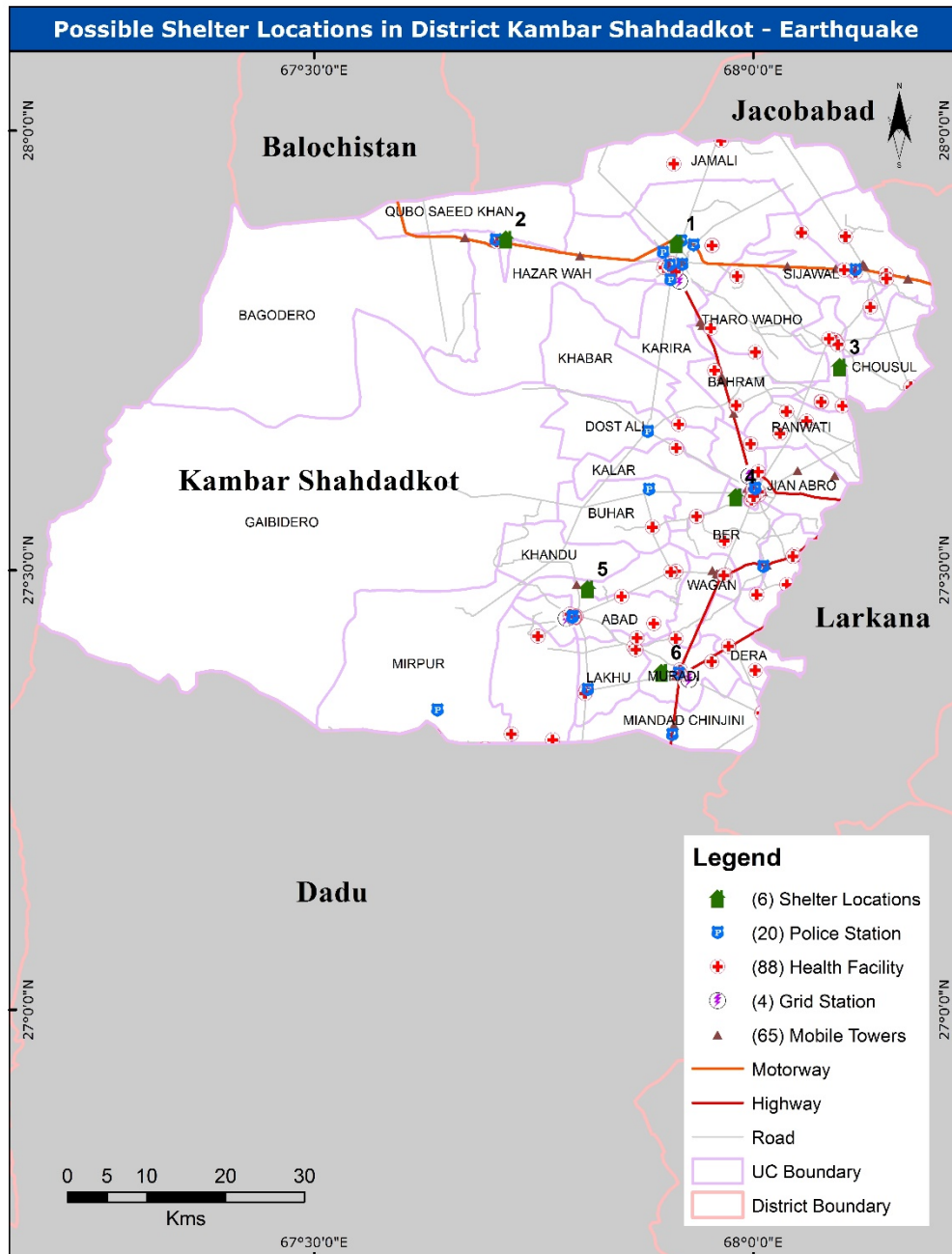
Heatwave	
UCs at Risk	All UCs
General Description	<ol style="list-style-type: none"> Heatwave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. The climate of Kambar Shahdadkot district is mainly Hot and Arid, with average annual rain-fall is 86.23 mm. Kambar Shahdadkot is one of the hottest areas of Sindh province. The reported maximum temperature is 51.6°C in July 2002. May, June and July are the hottest months of the district. January is the coldest month of the year. Daytime average maximum temperature of the district is 23°C, whilst the average night-time maximum temperature in the district is 8°C. Higher daily peak temperatures of longer duration and more intense heatwaves are becoming increasingly frequent globally due to climate change. Sindh too is feeling the impact of climate change in terms of increased instances of heat wave with each passing year. Very high temperature not only affects vegetation but also creates problem for the individuals like heat stroke, skin burn etc. A severe heatwave, in 2010, engulfed parts of Sindh, including Kambar Shahdadkot. A severe heatwave with temperatures as high as 49°C struck southern Pakistan in June 2015. It caused the deaths of about 2,000 people from dehydration and heat stroke, mostly in Sindh province. According to MHVRA Study 2022, heatwave hazard intensity for district Kambar Shahdadkot is “Severe” According to MHVRA Study 2022, heatwave risk for district Kambar Shahdadkot is “Low to High”.
Disaster Management Measures	
Preparedness	
<ol style="list-style-type: none"> Consistent future development strategy: Tree plantation, restoration of natural ecosystem, construction of environment friendly and well planned residential societies, offices, infrastructure and human dwellings. Monitoring for hot weather alerts through local and international sources and issuance of timely Hot Day Advisories, and Hot Day Warnings. Upgradation of major public health care facilities with necessary equipment and medicines to treat heatstroke patients. Heatstroke awareness campaigns and wide public coverage through media, social media, SMS, NGOs and social welfare organizations. Arrangements for uninterrupted supply of electricity and water in vulnerable areas. 	
Response	
<ol style="list-style-type: none"> Mobilization of NGOs, social welfare organization and volunteers for arranging heatstroke facilitation camps and distribution of fresh drinking water in affected areas. Local radio FM broadcasts to disseminate heatstroke safety and precautions. Mobilize mobile medical teams for first-aid and other medical emergency support in affected area. Record keeping of heatwave patients and fatalities. 	
Recovery and Rehabilitation	
<ol style="list-style-type: none"> Post event review of heatwave plan and modifications if required. 	
Cyclone / Tsunami	
UCs at Risk	Nil

General Description	According to MHVRA Study 2022, there is no risk of Cyclone / Tsunami in Kambar Shahdadkot district.
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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 Arid (Climate Classification of Pakistan (Khan et al., 2010). 2. Agriculture is mainly dependent on canal irrigation and tube-wells in the district. 44.3% of the total district area is covered with Irrigated crop fields only. 3. Crop fields that are dependent on rainfall water are situated at western side, comprising bare areas with sparse natural vegetation, complete bare areas and Range lands with natural herbs and shrubs. 4. Most of the water bodies are situated at the eastern side, whereas, natural vegetation is mostly found in the central areas of the district. 5. Rainfall is very insufficient, average annual rainfall received during a year across the district is only 86.23 mm. 6. According to MHVRA Study 2022, <ol style="list-style-type: none"> a. Meteorological drought hazard found across the district is mostly of “Extreme” intensity. b. Meteorological drought risk is mostly of “Medium to Extreme” intensity. c. Agricultural drought hazard is mostly of “Mild to Extreme” intensity. d. Agricultural drought risk is of “low to Extreme” intensity across the district.
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 conditions related to changing weather conditions linked to El Nino or La Nina events. 2. Implementation of water supply and demand management and encouragement of efficient irrigation systems in agriculture. 3. Research and promote drought resistant agriculture crops. 4. Resilience and improvement of adaptive capacity of farmers. 5. Monitoring of temperature, precipitation, potential evapotranspiration, soil moisture, stream flow, groundwater levels, lakes, and reservoirs for drought forecasting. 6. Control ground water extraction from upper and lower aquifers to be within the sustainable yield limits. 	
Response	
<ol style="list-style-type: none"> 1. Assess data about the nature of drought conditions and their impact. 2. Provision and installation of solar water pumps for availability of clean drinking water. 3. Public information campaign for water management and saving. 	
Recovery and Rehabilitation	
<ol style="list-style-type: none"> 1. Cash and in-kind support to farmers for next cropping. 2. Awareness and encouragement of farmers on best irrigation practices and water saving. 	

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 Kambar Shahdadt. 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).	<p>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.</p> <p>Create database of vulnerable and unsafe buildings and retrofitting measures taken to strengthen the structure of such buildings.</p>
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.	<p>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.</p> <p>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.)</p>

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 – KAMBAR SHAHDADKOT DISTRICT

The existing nature of disaster in Kambar Shahdadtakot district can be categorized as low to extreme. The prominent hazard in the district is drought with risk ranging from Low to Extreme. 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 high risk of heatwave. The district is far away from the coastline and is not susceptible to storm surge, tsunami and cyclone. As far as riverine flood is concerned the settled areas in the district are unlikely to be affected. Kambar Shahdadtakot district has low risk of earthquake. 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:

Table8: Cost Benefit Analysis of Disaster Risk Measures in District Kambar Shahdadtakot

S. no.	Soft resilience (Behavioral DRR)	Cost	Benefit
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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 Kambar Shahdadt, 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 drought 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 management and reduce loss to the crops by as much as possible. This shall lead to an overall reduction in financial loss of farmers and loss of livestock.
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. Authorities will be able to procure emergency food and water supplies for distribution and take action against hoarders / profiteers. 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-effective approach to build society resilience and improved disaster risk management	Public awareness and public education for disaster reduction helps to reduce disaster risks. It mobilizes people through clear messages, supported with detailed information. People who know how to react in case of a disaster, community leaders who have learned to warn

		capabilities of vulnerable communities.	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 dangers of hazards. Education and knowledge can provide people with tools for vulnerability reduction and life-improving self-help strategies.
5.	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: 27°52'27.91"N 67°55'3.58"E Upper left corner: 27°52'25.19"N 67°54'18.59"E Lower right corner: 27°52'5.41"N 67°54'55.69"E Lower left corner: 27°52'4.85"N 67°54'40.11"E	169	~7,600	152
2	Upper right corner: 27°52'45.01"N 67°43'24.88"E Upper left corner: 27°52'45.23"N 67°42'48.69"E Lower right corner: 27°52'24.75"N 67°43'24.89"E Lower left corner: 27°52'24.34"N 67°42'49.07"E	154	~6,900	154
3	Upper right corner: 27°43'56.76"N 68° 6'17.71"E Upper left corner: 27°44'5.05"N 68° 5'40.53"E Lower right corner: 27°43'42.79"N 68° 6'18.53"E Lower left corner: 27°43'42.79"N 68° 5'25.55"E	183	~8,200	161
4	Upper right corner: 27°35'15.44"N 67°59'19.67"E Upper left corner: 27°35'14.41"N 67°58'25.78"E Lower right corner: 27°35'2.64"N 67°59'29.24"E Lower left corner: 27°34'30.64"N 67°58'19.74"E	345	~15,500	158
5	Upper right corner: 27°28'57.19"N 67°48'51.59"E Upper left corner: 27°28'56.78"N 67°48'26.83"E Lower right corner: 27°28'32.08"N 67°48'57.06"E Lower left corner: 27°28'27.23"N 67°48'31.85"E	147	~6,600	145

6	Upper right corner:	27°23'21.50"N	67°54'36.72"E	591	~26,500	147
	Upper left corner:	27°23'14.43"N	67°53'6.98"E			
	Lower right corner:	27°22'51.31"N	67°54'20.79"E			
	Lower left corner:	27°22'36.40"N	67°52'58.81"E			

A total of 6 shelter locations have been selected as Earthquake shelter places across district Kambar Shahdadkot. 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 71,300 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 KAMBAR SHAHDADKOT

Equipment	Quantity
De-watering Machine	26
Buildozers / Dozers	6
Fire Brigade / Engine / Tender	20
Tractor / Trolley / Blade	18
Loader	5
Tralor	8
Ambulances	15
Refuge Van	7
Power Generators	11

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