MHVRA

INFORMED DISASTER MANAGEMENT PLAN 2023-2032

DISTRICT JACOBABAD

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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 Jacobabad 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 Jacobabad 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 Jacobabad is comprehensive and covers guidelines on the complete spectrum of disaster management and standard operating procedures to efficiently cope with disasters and emergencies in the district.

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

ACKNOWLEDGEMENTS

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

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

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- - 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.

INTRODUCTION TO DISASTER MANAGEMENT PLAN OF DISTRICT JACOBABAD

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

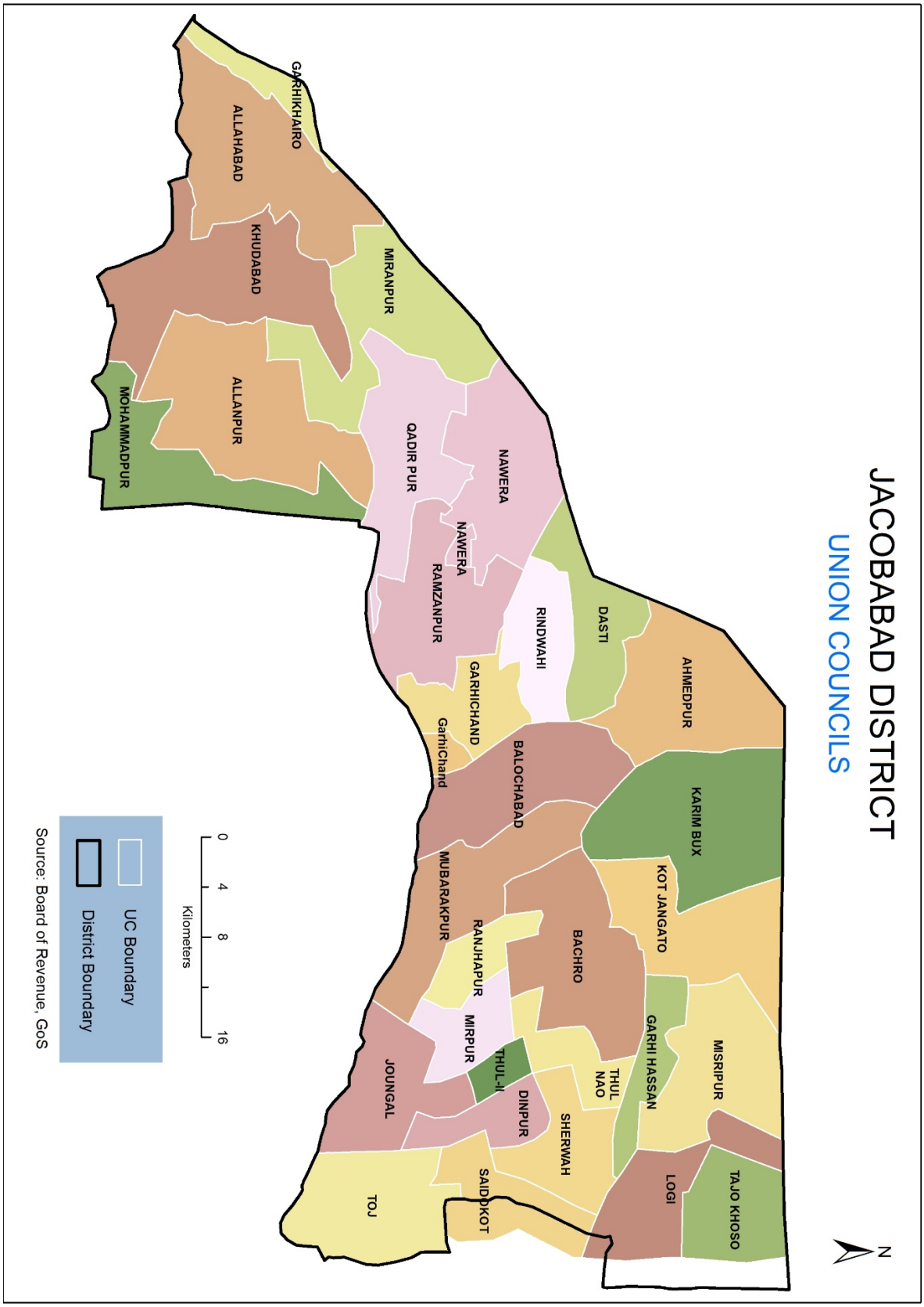
MODES OF REVIEW

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 JACOBABAD

DISTRICT JACOBABAD AT A GLANCE



District area in Sq. Km	2,683	
Coordinates	Longitude 67^0 54' 57" to 68^0 55' 34" East Latitude 27^0 59' 55" to 28^0 6' 34" North	
Surrounding Districts	Kashmore in the East Balochistan Province in the North Shikarpur and Larkana in the South Kambar Shahdadkot in the West	
Climate Conditions	Hot and Arid	
Coldest Month **Hottest Month**	January June	
Seasonal Temperatures	**Max Mean (◦C)**	**Min Mean (◦C)**
Spring (March and April)	37.59	20.43
Dry Summer (May and June)	45.53	29.72
Wet Summer (July to September)	42.65	29.54
Autumn (October to November)	35.12	18.94
Winter (December to February)	26.08	10.33
Average Rainfall	83.34 mm/year	
Physiographic Features	Nil	

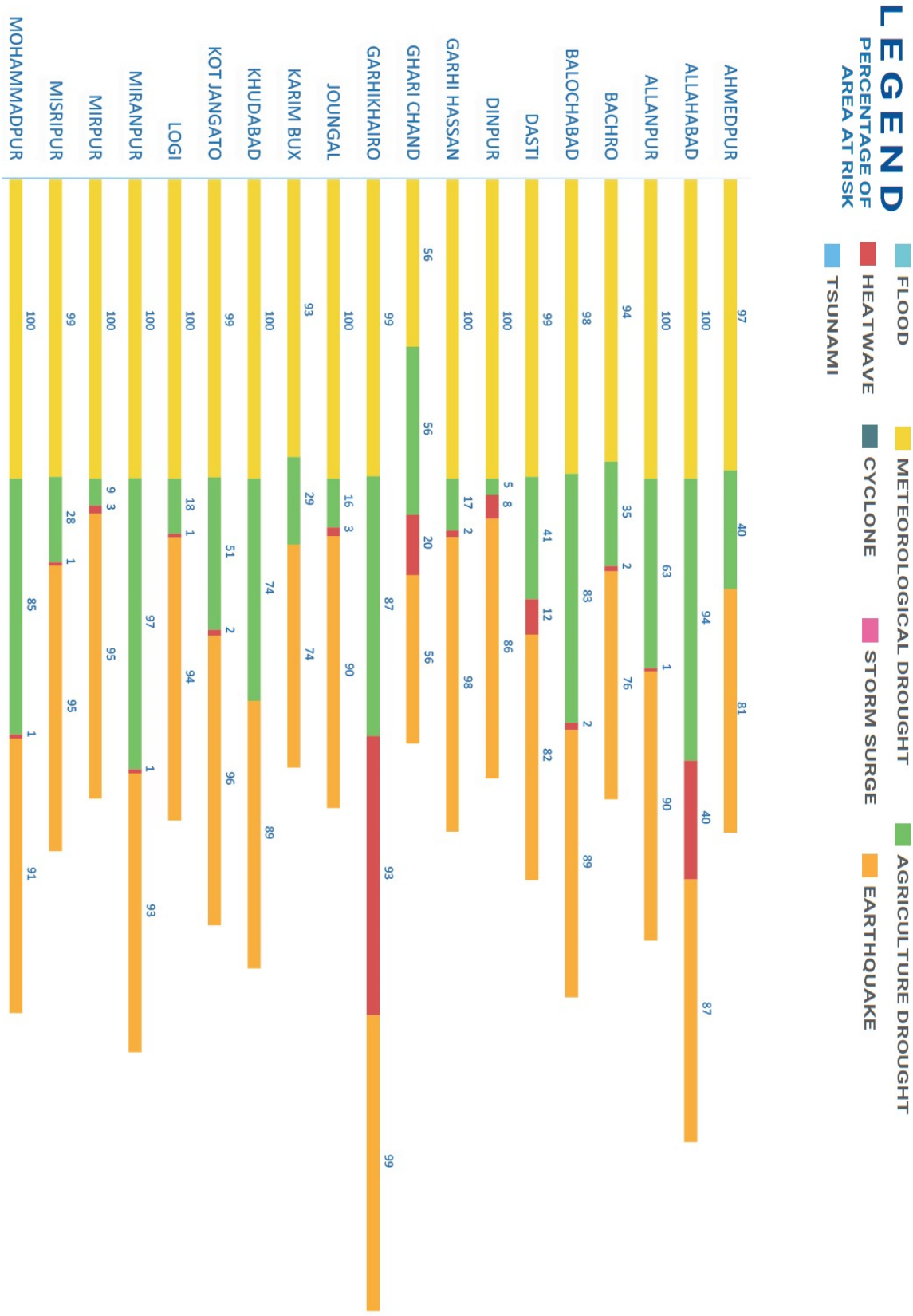
DEMOGRAPHY

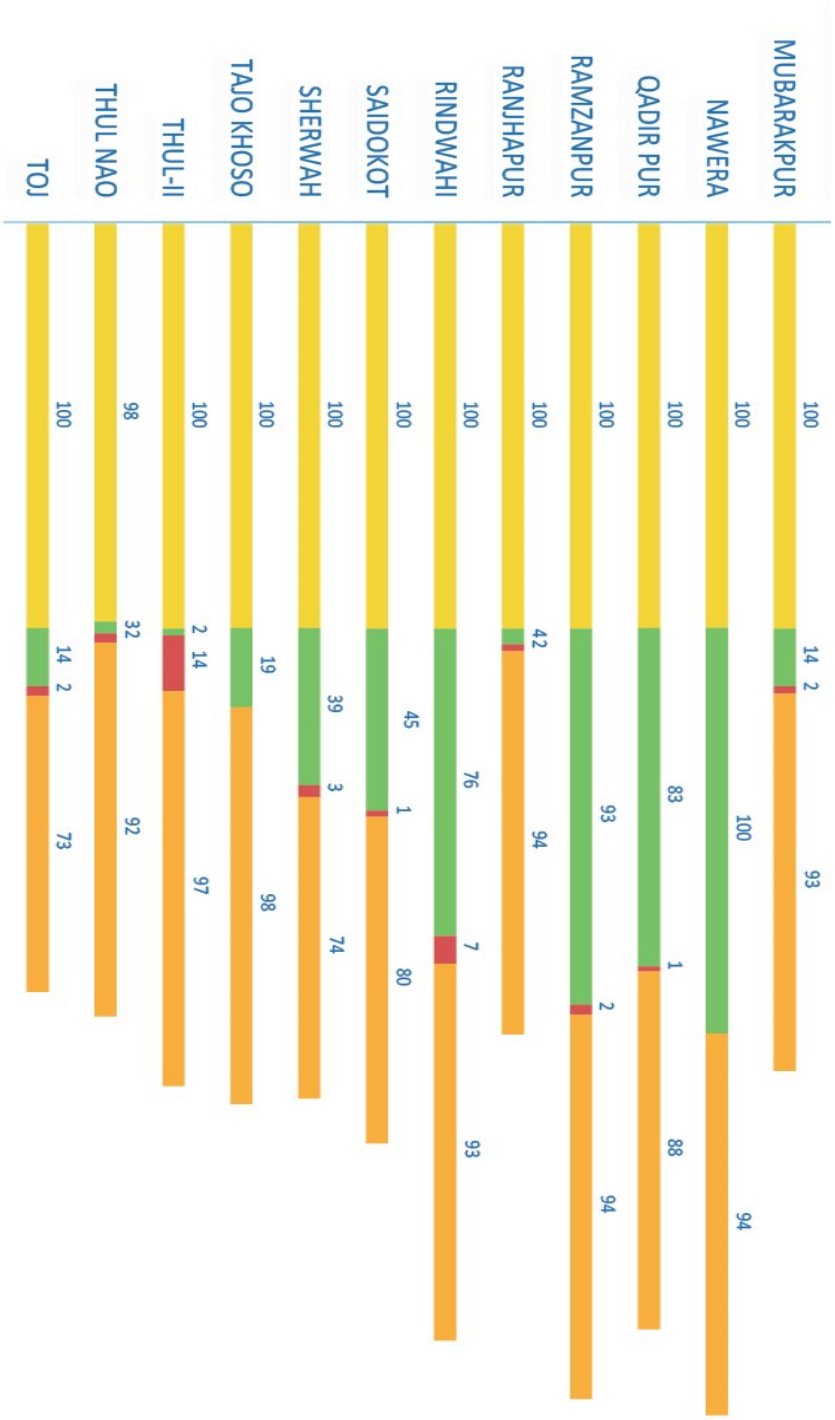
	Year-1998	Year-2017
Population	727,190	1,007,009
Urban	179,470	297,218
Rural	547,720	709,791
No. of Household	-	177,867
Average Annual Growth Rate 1998-2017	1.72 %	

ECONOMY

Industries	Mainly based on agriculture, agriculture oriented industries like husking and flour mills, cooking oils and embroided garments factories
Agriculture	**Production in M.tons as per (2016-17)**
Major Crops	
Wheat	82,179
Sugarcane	5,813
Rice	288,400
Minor Crops	
Jowar	80
Gram	1,867
Barley	245
Rapeseed And Mustard	5,128

TALUKA NAMES	UC NAMES
1. Garhi Khairo Taluka 2. Jacobabad Taluka 3. Thul Taluka	1. Ahmedpur 2. Allahabad 3. Allanpur 4. Bachro 5. Balochabad 6. Dasti 7. Dinpur 8. Garhi Hassan 9. Garhichand 10. Garhikhairo 11. Joungal 12. Karim Bux 13. Khudabad 14. Kot Jangato 15. Logi 16. Miranpur 17. Mirpur 18. Misripur 19. Mohammadpur 20. Mubarakpur 21. Nawera 22. Qadir Pur 23. Ramzanpur 24. Ranjhapur 25. Rindwahi 26. Saidokot 27. Sherwah 28. Tajo Khoso 29. Thul Nao 30. Thul-Ii 31. Toj


LEGEND
PERCENTAGE OF AREA AT RISK
FLOOD
METEOROLOGICAL DROUGHT
AGRICULTURE DROUGHT
HEATWAVE
CYCLONE
STORM SURGE
EARTHQUAKE
TSUNAMI
AHMEDPUR 97 40 81
ALLAHABAD 100 94 40 87
ALLANPUR 100 63 1 90
BACHRO 94 35 2 76
BALOCHABAD 98 83 2 89
DASTI 99 41 12 82
DINPUR 100 5 8 86
GARHI HASSAN 100 17 2 98
GHARI CHAND 56 56 20 56
GARHIKHAIRO 99 87 93 99
JOUNGAL 100 16 3 90
KARIM BUX 93 29 74
KHUDABAD 100 74 89
KOT JANGATO 99 51 2 96
LOGI 100 18 1 94
MIRANPUR 100 97 1 93
MIRPUR 100 9 3 95
MISRIPUR 99 28 1 95
MOHAMMADPUR 100 85 1 91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NAWERA
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RAMZANPUR
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RANJHAPUR
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RINDWAHI
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SAIDOKOT
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SHERWAH
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TAJO KHOSO
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UC WISE RISK PROFILE

Ahmedpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	98.231 sq km
		Pakka Planned Area	0.001 sq km
		Pakka Unplanned Area	0.854 sq km
		Range Land	0.031 sq km
		Bridges	3
		Education Facilities	35
		Health Facilities	1
		Settlements	64
		Irrigation and Drainage Network	18.794 km
		Railway Line	0.587 km
		Road Network	129.976 km
		Population	15077
		Household	2505
Meteorological Drought	Medium - Extreme	Settlements	64
		Agriculture Area	98.244 sq km
		Range Land	0.727 sq km
		Water Body	5.652 sq km
		Wet Area	13.886 sq km
		Population	11796
		Household	1958
Agricultural Drought	Low - High	Settlements	24
		Agriculture Area	43.68 sq km
		Range Land	0.919 sq km
		Water Body	7.261 sq km
		Wet Area	10.452 sq km
		Population	2205
		Household	366
Heatwave	Medium	Settlements	19
		Population	11578
		Household	1922
		Agriculture Area	0.057 sq km
		Pakka Planned Area	0.001 sq km
		Pakka Unplanned Area	0.846 sq km
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.
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone

Allahabad			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	125.822 sq km
		Pakka Planned Area	0.517 sq km
		Pakka Unplanned Area	0.785 sq km
		Range Land	0.011 sq km
		Bridges	2
		Education Facilities	64
		Mobile Towers	3
		Settlements	73
		Irrigation and Drainage Network	54.556 km
		Railway Line	8.62 km
		Road Network	203.375 km
		Population	25039
		Household	4534
Meteorological Drought	Medium - Extreme	Settlements	73
		Agriculture Area	126.003 sq km
		Bare Area with sparse Natural Vegetation	4.21 sq km
		Range Land	0.838 sq km
		Water Body	0.057 sq km
		Wet Area	13.07 sq km
		Population	19729
		Household	3572
Agricultural Drought	Low - Medium	Settlements	71
		Agriculture Area	154.839 sq km
		Bare Area with sparse Natural Vegetation	4.62 sq km
		Range Land	1.074 sq km
		Water Body	0.073 sq km
		Wet Area	12.968 sq km
		Population	19244
		Household	3486

Heatwave	Low - High	Settlements	41
		Population	19464
		Household	3525
		Agriculture Area	56.25 sq km
		Pakka Planned Area	0.515 sq km
		Pakka Unplanned Area	0.783 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Allanpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	140.031 sq km
		Natural Vegetation in Wet Areas	0.012 sq km
		Pakka Unplanned Area	1.586 sq km
		Range Land	0.083 sq km
		Education Facilities	80
		Settlements	69
		Irrigation and Drainage Network	56.564 km
		Road Network	178.169 km
		Population	32100
		Household	5721
Meteorological Drought	Medium - Extreme	Settlements	69
		Agriculture Area	140.326 sq km
		Natural Vegetation in Wet Areas	0.782 sq km
		Range Land	2.138 sq km
		Wet Area	13.752 sq km
		Population	25256
		Household	4500
Agricultural Drought	Low - Medium	Settlements	33
		Agriculture Area	111.317 sq km

		Natural Vegetation in Wet Areas	0.999 sq km
		Range Land	2.733 sq km
		Wet Area	12.073 sq km
		Population	14895
		Household	2655
Heatwave	Medium	Settlements	25
		Population	24777
		Household	4417
		Agriculture Area	0.133 sq km
		Pakka Unplanned Area	1.57 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Bachro			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	91.41 sq km
		Natural Vegetation in Wet Areas	0.067 sq km
		Pakka Planned Area	0.063 sq km
		Pakka Unplanned Area	1.906 sq km
		Range Land	0.116 sq km
		Bridges	1
		Education Facilities	54
		Settlements	79
		Irrigation and Drainage Network	28.72 km
		Railway Line	14.606 km
		Road Network	167.473 km
		Population	36030
		Household	6521
Meteorological Drought	Medium - Extreme	Settlements	79
		Agriculture Area	91.661 sq km
		Bare Area with sparse Natural Vegetation	3.375 sq km
		Natural Vegetation in Wet Areas	3.299 sq km
		Range Land	3.523 sq km

		Water Body	7.664 sq km
		Wet Area	5.094 sq km
		Population	28349
		Household	5132
Agricultural Drought	Low - Medium	Settlements	16
		Agriculture Area	30.205 sq km
		Bare Area with sparse Natural Vegetation	2.943 sq km
		Natural Vegetation in Wet Areas	4.238 sq km
		Range Land	4.493 sq km
		Water Body	9.832 sq km
		Wet Area	3.433 sq km
		Population	3663
		Household	667
Heatwave	Low - Medium	Settlements	49
		Population	27620
		Household	4998
		Agriculture Area	0.226 sq km
		Pakka Planned Area	0.062 sq km
		Pakka Unplanned Area	1.881 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Balochabad			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	88.943 sq km
		Natural Vegetation in Wet Areas	0.067 sq km
		Pakka Unplanned Area	2.313 sq km
		Range Land	0.057 sq km
		Bridges	1
		Education Facilities	35
		Health Facilities	1
		Petrol Pumps	1
		Settlements	62

		Irrigation and Drainage Network	47.648 km
		Railway Line	7.453 km
		Road Network	97.57 km
		Population	39881
		Household	7090
Meteorological Drought	Medium - Extreme	Settlements	62
		Agriculture Area	89.173 sq km
		Bare Area with sparse Natural Vegetation	0.52 sq km
		Natural Vegetation in Wet Areas	2.55 sq km
		Range Land	1.022 sq km
		Water Body	3.473 sq km
		Wet Area	1.86 sq km
		Population	31309
		Household	5565
Agricultural Drought	Low - Medium	Settlements	52
		Agriculture Area	95.444 sq km
		Bare Area with sparse Natural Vegetation	0.669 sq km
		Natural Vegetation in Wet Areas	3.28 sq km
		Range Land	1.317 sq km
		Water Body	4.463 sq km
		Wet Area	2.001 sq km
		Population	23061
		Household	4088
Heatwave	Medium	Settlements	39
		Population	30654
		Household	5452
		Agriculture Area	0.194 sq km
		Pakka Unplanned Area	2.29 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Dasti

Hazard Type	Risk	Elements at Risk	
Earthquake	Low	Agriculture Area	47.125 sq km
		Pakka Planned Area	6.727 sq km
		Pakka Unplanned Area	0.985 sq km
		Range Land	0.027 sq km
		Bridges	4
		Bus Stops	1
		Education Facilities	89
		Grain Mandi	1
		Health Facilities	16
		Mobile Towers	25
		Petrol Pumps	6
		Police Stations	5
		Post Offices	3
		Power Plants	2
		Settlements	66
		Tourist Places	1
		Irrigation and Drainage Network	25.798 km
		Railway Line	7.499 km
		Road Network	112.359 km
		Population	163810
		Household	28320
Meteorological Drought	Medium - Extreme	Settlements	66
		Agriculture Area	47.13 sq km
		Bare Area with sparse Natural Vegetation	0.326 sq km
		Range Land	0.574 sq km
		Water Body	0.651 sq km
		Wet Area	3.998 sq km
		Population	128021
		Household	22135
Agricultural Drought	Low - Medium	Settlements	11
		Agriculture Area	27.957 sq km
		Bare Area with sparse Natural Vegetation	0.419 sq km
		Range Land	0.729 sq km
		Water Body	0.833 sq km
		Wet Area	3.587 sq km
		Population	16208
		Household	2805
Heatwave	Low - Medium	Settlements	53
		Population	126720

		Household	21908
		Agriculture Area	0.165 sq km
		Pakka Planned Area	6.713 sq km
		Pakka Unplanned Area	0.973 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Dinpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	29.268 sq km
		Kachcha Area	0.371 sq km
		Natural Vegetation in Wet Areas	0.022 sq km
		Pakka Planned Area	1.638 sq km
		Pakka Unplanned Area	0.821 sq km
		Range Land	0.036 sq km
		Bridges	5
		Bus Stops	1
		Education Facilities	53
		Grid Stations	1
		Health Facilities	3
		Mobile Towers	4
		Petrol Pumps	1
		Settlements	49
		Irrigation and Drainage Network	16.893 km
		Railway Line	1.201 km
		Road Network	68.213 km
		Population	54789
		Household	9823
Meteorological Drought	Medium - Extreme	Settlements	49
		Agriculture Area	29.388 sq km
		Natural Vegetation in Wet Areas	0.786 sq km
		Range Land	0.337 sq km
		Water Body	0.437 sq km

		Wet Area	2.55 sq km
		Population	42919
		Household	7693
Agricultural Drought	Low	Settlements	2
		Agriculture Area	0.632 sq km
		Natural Vegetation in Wet Areas	0.991 sq km
		Range Land	0.423 sq km
		Water Body	0.543 sq km
		Wet Area	0.01 sq km
		Population	592
		Household	104
Heatwave	Low - Medium	Settlements	33
		Population	42328
		Household	7587
		Agriculture Area	0.124 sq km
		Kachcha Area	0.367 sq km
		Pakka Planned Area	1.633 sq km
		Pakka Unplanned Area	0.813 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Garhi Hassan			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	38.855 sq km
		Natural Vegetation in Wet Areas	0.018 sq km
		Pakka Unplanned Area	0.846 sq km
		Range Land	0.002 sq km
		Education Facilities	28
		Settlements	30
		Irrigation and Drainage Network	32.048 km
		Road Network	79.043 km
		Population	16894
		Household	3046

Meteorological Drought	Medium - Extreme	Settlements	30
		Agriculture Area	38.89 sq km
		Natural Vegetation in Wet Areas	0.377 sq km
		Range Land	0.01 sq km
		Water Body	0.371 sq km
		Population	13265
		Household	2389
Agricultural Drought	Low - Medium	Settlements	2
		Agriculture Area	7.82 sq km
		Natural Vegetation in Wet Areas	0.48 sq km
		Range Land	0.012 sq km
		Water Body	0.472 sq km
		Population	2257
		Household	412
Heatwave	Medium	Settlements	21
		Population	12914
		Household	2330
		Agriculture Area	0.091 sq km
		Pakka Unplanned Area	0.833 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Garhichand			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	8.703 sq km
		Pakka Unplanned Area	0.667 sq km
		Agriculture Area	50.264 sq km
		Kachcha Area	0.128 sq km
		Natural Vegetation in Wet Areas	0.012 sq km
		Pakka Planned Area	0.63 sq km
		Pakka Unplanned Area	0.944 sq km
		Education Facilities	15
		Mobile Towers	3
		Petrol Pumps	1

		Settlements	12
		Education Facilities	25
		Petrol Pumps	2
		Settlements	50
		Railway Line	2.867 km
		Road Network	11.446 km
		Irrigation and Drainage Network	13.823 km
		Railway Line	5.803 km
		Road Network	75.963 km
		Population	41787
		Household	6939
Meteorological Drought	Medium - Extreme	Settlements	12
		Settlements	50
		Agriculture Area	8.717 sq km
		Water Body	0.064 sq km
		Agriculture Area	50.34 sq km
		Bare Area with sparse Natural Vegetation	0.592 sq km
		Natural Vegetation in Wet Areas	0.447 sq km
		Water Body	0.094 sq km
		Wet Area	0.248 sq km
		Population	32848
		Household	5454
Agricultural Drought	Low - Medium	Settlements	12
		Settlements	50
		Agriculture Area	11.212 sq km
		Water Body	0.082 sq km
		Agriculture Area	64.765 sq km
		Bare Area with sparse Natural Vegetation	0.762 sq km
		Natural Vegetation in Wet Areas	0.576 sq km
		Water Body	0.121 sq km
		Wet Area	0.319 sq km
		Population	32850
		Household	5455
Heatwave	Low - Medium	Settlements	47
		Population	31987
		Household	5310
		Agriculture Area	0.273 sq km
		Kachcha Area	0.128 sq km
		Pakka Planned Area	1.281 sq km

		Pakka Unplanned Area	0.924 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Garhikhairo			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	25.516 sq km
		Pakka Planned Area	0.682 sq km
		Pakka Unplanned Area	0.153 sq km
		Bridges	2
		Education Facilities	28
		Health Facilities	1
		Police Stations	1
		Settlements	25
		Irrigation and Drainage Network	39.844 km
		Railway Line	2.573 km
		Road Network	57.356 km
		Population	13283
		Household	2441
Meteorological Drought	Medium - Extreme	Settlements	25
		Agriculture Area	25.326 sq km
		Population	10419
		Household	1912
Agricultural Drought	Low - Medium	Settlements	22
		Agriculture Area	28.167 sq km
		Population	10266
		Household	1885
Heatwave	Low - High	Settlements	25
		Population	10364
		Household	1904
		Agriculture Area	24.048 sq km
		Pakka Planned Area	0.682 sq km
		Pakka Unplanned Area	0.153 sq km

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

Joungal			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	69.674 sq km
		Forest Area	0.008 sq km
		Kachcha Area	0.82 sq km
		Natural Vegetation in Wet Areas	0.012 sq km
		Pakka Unplanned Area	1.281 sq km
		Range Land	0.185 sq km
		Education Facilities	43
		Health Facilities	2
		Settlements	73
		Irrigation and Drainage Network	42.604 km
		Road Network	55.874 km
		Population	35966
		Household	6533
Meteorological Drought	Medium - Extreme	Settlements	73
		Agriculture Area	69.902 sq km
		Forest Area	0.293 sq km
		Natural Vegetation in Wet Areas	0.329 sq km
		Range Land	3.636 sq km
		Water Body	0.224 sq km
		Wet Area	2.593 sq km
		Population	28326
		Household	5148
Agricultural Drought	Low - Medium	Settlements	4
		Agriculture Area	10.907 sq km
		Forest Area	0.37 sq km
		Natural Vegetation in Wet Areas	0.413 sq km
		Range Land	4.584 sq km
		Water Body	0.279 sq km
		Wet Area	0.015 sq km

		Population	807
		Household	144
Heatwave	Medium	Settlements	47
		Population	27658
		Household	5024
		Agriculture Area	0.165 sq km
		Kachcha Area	0.81 sq km
		Pakka Unplanned Area	1.267 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Karim Bux			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	107.054 sq km
		Forest Area	0.003 sq km
		Natural Vegetation in Wet Areas	0.038 sq km
		Pakka Unplanned Area	1.264 sq km
		Range Land	0.00017 sq km
		Education Facilities	32
		Mobile Towers	1
		Settlements	73
		Irrigation and Drainage Network	48.415 km
		Railway Line	0.867 km
		Road Network	170.898 km
		Population	21667
		Household	3917
Meteorological Drought	Medium - Extreme	Settlements	72
		Agriculture Area	107.285 sq km
		Forest Area	0.033 sq km
		Natural Vegetation in Wet Areas	1.579 sq km
		Range Land	0.007 sq km
		Water Body	23.888 sq km
		Wet Area	2.156 sq km
		Population	16933

		Household	3059
Agricultural Drought	Low - Medium	Settlements	9
		Agriculture Area	22.595 sq km
		Forest Area	0.041 sq km
		Natural Vegetation in Wet Areas	1.983 sq km
		Range Land	0.009 sq km
		Water Body	30.265 sq km
		Wet Area	0.024 sq km
		Population	1607
		Household	292
Heatwave	Medium	Settlements	21
		Population	16627
		Household	3004
		Agriculture Area	0.095 sq km
		Pakka Unplanned Area	1.252 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Khudabad			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	133.706 sq km
		Natural Vegetation in Wet Areas	0.057 sq km
		Pakka Unplanned Area	1.193 sq km
		Range Land	0.036 sq km
		Education Facilities	60
		Settlements	56
		Irrigation and Drainage Network	41.335 km
		Road Network	139.306 km
		Population	24159
		Household	4304
	Medium - Extreme	Settlements	56

Meteorological Drought		Agriculture Area	133.976 sq km
		Bare Area with sparse Natural Vegetation	6.23 sq km
		Natural Vegetation in Wet Areas	2.577 sq km
		Range Land	1.237 sq km
		Water Body	0.489 sq km
		Wet Area	6.094 sq km
		Population	18946
		Household	3379
Agricultural Drought	Low - Medium	Settlements	45
		Agriculture Area	124.847 sq km
		Bare Area with sparse Natural Vegetation	7.033 sq km
		Natural Vegetation in Wet Areas	3.28 sq km
		Range Land	1.576 sq km
		Water Body	0.627 sq km
		Wet Area	5.228 sq km
		Population	16744
		Household	2987
Heatwave	Low - Medium	Settlements	19
		Population	18650
		Household	3324
		Agriculture Area	0.199 sq km
		Pakka Unplanned Area	1.182 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Kot Jangato			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	101.028 sq km
		Pakka Unplanned Area	1.907 sq km
		Education Facilities	20
		Settlements	70
		Irrigation and Drainage Network	67.349 km
		Road Network	160.987 km

		Population	32640
		Household	5931
Meteorological Drought	Medium - Extreme	Settlements	68
		Agriculture Area	100.972 sq km
		Water Body	2.377 sq km
		Wet Area	1.141 sq km
		Population	25296
		Household	4593
Agricultural Drought	Low - Medium	Settlements	34
		Agriculture Area	65.715 sq km
		Water Body	3.054 sq km
		Wet Area	0.202 sq km
		Population	12097
		Household	2192
Heatwave	Medium	Settlements	52
		Population	24936
		Household	4527
		Agriculture Area	0.207 sq km
		Pakka Unplanned Area	1.881 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Logi			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	70.564 sq km
		Kachcha Area	0.151 sq km
		Natural Vegetation in Wet Areas	0.039 sq km
		Pakka Unplanned Area	0.626 sq km
		Range Land	0.005 sq km
		Bridges	2
		Education Facilities	38
		Health Facilities	1

		Mobile Towers	1
		Settlements	37
		Irrigation and Drainage Network	32.315 km
		Railway Line	4.121 km
		Road Network	113.41 km
		Population	13287
		Household	2396
Meteorological Drought	Medium - Extreme	Settlements	37
		Agriculture Area	70.679 sq km
		Natural Vegetation in Wet Areas	1.296 sq km
		Range Land	0.107 sq km
		Water Body	2.965 sq km
		Population	10454
		Household	1884
Agricultural Drought	Low	Settlements	3
		Agriculture Area	12.282 sq km
		Natural Vegetation in Wet Areas	1.65 sq km
		Range Land	0.134 sq km
		Water Body	3.794 sq km
		Population	1251
		Household	225
Heatwave	Medium	Settlements	19
		Population	10103
		Household	1821
		Agriculture Area	0.143 sq km
		Kachcha Area	0.148 sq km
		Pakka Unplanned Area	0.614 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Miranpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	117.491 sq km

		Natural Vegetation in Wet Areas	0.068 sq km
		Pakka Planned Area	0.203 sq km
		Pakka Unplanned Area	1.44 sq km
		Range Land	0.004 sq km
		Education Facilities	59
		Settlements	53
		Irrigation and Drainage Network	65.644 km
		Railway Line	5.346 km
		Road Network	171.139 km
		Population	33250
		Household	5928
Meteorological Drought	Medium - Extreme	Settlements	53
		Agriculture Area	117.567 sq km
		Natural Vegetation in Wet Areas	0.693 sq km
		Range Land	0.057 sq km
		Water Body	1.23 sq km
		Wet Area	7.279 sq km
		Population	26155
		Household	4662
Agricultural Drought	Low - Medium	Settlements	48
		Agriculture Area	147.136 sq km
		Natural Vegetation in Wet Areas	0.873 sq km
		Range Land	0.073 sq km
		Water Body	1.577 sq km
		Wet Area	8.672 sq km
		Population	23209
		Household	4137
Heatwave	Low - Medium	Settlements	24
		Population	25631
		Household	4568
		Agriculture Area	0.154 sq km
		Pakka Planned Area	0.203 sq km
		Pakka Unplanned Area	1.424 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	

Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone

Mirpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	37.978 sq km
		Pakka Planned Area	0.138 sq km
		Pakka Unplanned Area	0.893 sq km
		Range Land	0.037 sq km
		Bridges	1
		Education Facilities	55
		Health Facilities	1
		Mobile Towers	2
		Petrol Pumps	2
		Settlements	39
		Irrigation and Drainage Network	7.245 km
		Road Network	49.34 km
		Population	23483
		Household	4519
Meteorological Drought	Medium - Extreme	Settlements	39
		Agriculture Area	38.023 sq km
		Range Land	1.729 sq km
		Water Body	0.154 sq km
		Wet Area	0.026 sq km
		Population	18443
		Household	3549
Agricultural Drought	Low	Settlements	1
		Agriculture Area	2.347 sq km
		Range Land	2.204 sq km
		Water Body	0.191 sq km
		Population	559
		Household	100
Heatwave	Low - Medium	Settlements	34
		Population	18042
		Household	3473
		Agriculture Area	0.089 sq km
		Pakka Planned Area	0.135 sq km
		Pakka Unplanned Area	0.882 sq km

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

Misripur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	98.106 sq km
		Natural Vegetation in Wet Areas	0.027 sq km
		Pakka Unplanned Area	1.04 sq km
		Range Land	0.003 sq km
		Education Facilities	22
		Settlements	46
		Irrigation and Drainage Network	26.551 km
		Road Network	140.383 km
		Population	17809
		Household	3235
Meteorological Drought	Medium - Extreme	Settlements	46
		Agriculture Area	98.127 sq km
		Natural Vegetation in Wet Areas	0.307 sq km
		Range Land	0.005 sq km
		Water Body	3.182 sq km
		Wet Area	1.224 sq km
		Population	13958
		Household	2537
Agricultural Drought	Low - Medium	Settlements	13
		Agriculture Area	33.27 sq km
		Natural Vegetation in Wet Areas	0.383 sq km
		Range Land	0.006 sq km
		Water Body	4.084 sq km
		Wet Area	0.388 sq km
		Population	3742
		Household	683
Heatwave	Medium	Settlements	32

		Population	13539
		Household	2462
		Agriculture Area	0.131 sq km
		Pakka Unplanned Area	1.021 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Mohammadpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	88.047 sq km
		Natural Vegetation in Wet Areas	0.009 sq km
		Pakka Unplanned Area	1.186 sq km
		Range Land	0.042 sq km
		Education Facilities	46
		Settlements	42
		Irrigation and Drainage Network	19.562 km
		Road Network	108.088 km
		Population	24001
		Household	4274
Meteorological Drought	Medium - Extreme	Settlements	42
		Agriculture Area	88.183 sq km
		Bare Area with sparse Natural Vegetation	2.646 sq km
		Natural Vegetation in Wet Areas	0.601 sq km
		Range Land	1.546 sq km
		Water Body	0.184 sq km
		Wet Area	3.59 sq km
		Population	18925
		Household	3372
Agricultural Drought	Low - Medium	Settlements	34
		Agriculture Area	96.208 sq km
		Bare Area with sparse Natural Vegetation	3.388 sq km

		Natural Vegetation in Wet Areas	0.769 sq km
		Range Land	1.973 sq km
		Water Body	0.235 sq km
		Wet Area	3.107 sq km
		Population	15492
		Household	2761
Heatwave	Medium	Settlements	19
		Population	18529
		Household	3302
		Agriculture Area	0.09 sq km
		Pakka Unplanned Area	1.173 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Mubarakpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	94.877 sq km
		Forest Area	0.001 sq km
		Natural Vegetation in Wet Areas	0.003 sq km
		Pakka Unplanned Area	1.77 sq km
		Range Land	0.063 sq km
		Bridges	2
		Education Facilities	56
		Health Facilities	1
		Mobile Towers	3
		Petrol Pumps	4
		Settlements	58
		Irrigation and Drainage Network	79.844 km
		Railway Line	3.336 km
		Road Network	80.405 km
		Population	30300
		Household	5504
Meteorological Drought	Medium - Extreme	Settlements	58
		Agriculture Area	95.005 sq km

		Forest Area	0.021 sq km
		Natural Vegetation in Wet Areas	0.569 sq km
		Range Land	1.814 sq km
		Water Body	2.151 sq km
		Wet Area	3.048 sq km
		Population	23796
		Household	4322
Agricultural Drought	Low - Medium	Settlements	6
		Agriculture Area	12.867 sq km
		Forest Area	0.028 sq km
		Natural Vegetation in Wet Areas	0.732 sq km
		Range Land	2.294 sq km
		Water Body	2.744 sq km
		Wet Area	0.301 sq km
		Population	1090
		Household	198
Heatwave	Medium	Settlements	42
		Population	23230
		Household	4222
		Agriculture Area	0.16 sq km
		Pakka Unplanned Area	1.746 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Nawera			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	104.278 sq km
		Forest Area	0.001 sq km
		Natural Vegetation in Wet Areas	0.013 sq km
		Pakka Unplanned Area	0.836 sq km
		Range Land	0.087 sq km
		Education Facilities	30
		Settlements	36

		Irrigation and Drainage Network	57.017 km
		Railway Line	16.446 km
		Road Network	141.791 km
		Population	14936
		Household	2499
Meteorological Drought	Medium - Extreme	Settlements	36
		Agriculture Area	104.257 sq km
		Forest Area	0.017 sq km
		Natural Vegetation in Wet Areas	0.255 sq km
		Range Land	2.557 sq km
		Water Body	0.104 sq km
		Wet Area	3.932 sq km
		Population	11691
		Household	1956
Agricultural Drought	Low - High	Settlements	36
		Agriculture Area	134.2 sq km
		Forest Area	0.022 sq km
		Natural Vegetation in Wet Areas	0.328 sq km
		Range Land	3.293 sq km
		Water Body	0.134 sq km
		Wet Area	5.062 sq km
		Population	11691
		Household	1956
Heatwave	Medium	Settlements	16
		Population	11515
		Household	1924
		Agriculture Area	0.069 sq km
		Pakka Unplanned Area	0.829 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Qadirpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	89.832 sq km
		Natural Vegetation in Wet Areas	0.09 sq km
		Pakka Unplanned Area	1.265 sq km
		Range Land	0.033 sq km
		Education Facilities	41
		Settlements	49
		Irrigation and Drainage Network	36.976 km
		Road Network	124.342 km
		Population	22782
		Household	3823
Meteorological Drought	Medium - Extreme	Settlements	48
		Agriculture Area	90.036 sq km
		Natural Vegetation in Wet Areas	2.153 sq km
		Range Land	1.252 sq km
		Water Body	1.612 sq km
		Wet Area	7.566 sq km
		Population	17850
		Household	2994
Agricultural Drought	Low - Medium	Settlements	34
		Agriculture Area	95.549 sq km
		Natural Vegetation in Wet Areas	2.743 sq km
		Range Land	1.609 sq km
		Water Body	2.067 sq km
		Wet Area	8.504 sq km
		Population	9407
		Household	1585
Heatwave	Medium	Settlements	26
		Population	17499
		Household	2938
		Agriculture Area	0.095 sq km
		Pakka Unplanned Area	1.25 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	

Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone

Ramzanpur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	95.945 sq km
		Forest Area	0.00046 sq km
		Kachcha Area	0.714 sq km
		Natural Vegetation in Wet Areas	0.001 sq km
		Pakka Unplanned Area	1.692 sq km
		Education Facilities	55
		Health Facilities	1
		Settlements	36
		Irrigation and Drainage Network	21.611 km
		Railway Line	3.167 km
		Road Network	88.343 km
		Population	42454
		Household	7049
Meteorological Drought	Medium - Extreme	Settlements	36
		Agriculture Area	96.082 sq km
		Bare Area with sparse Natural Vegetation	2.174 sq km
		Forest Area	0.039 sq km
		Natural Vegetation in Wet Areas	0.031 sq km
		Water Body	0.129 sq km
		Wet Area	3.353 sq km
		Population	33270
		Household	5525
Agricultural Drought	Low - Medium	Settlements	33
		Agriculture Area	114.825 sq km
		Bare Area with sparse Natural Vegetation	2.796 sq km
		Forest Area	0.05 sq km
		Natural Vegetation in Wet Areas	0.04 sq km
		Water Body	0.163 sq km
		Wet Area	3.212 sq km
		Population	32777
		Household	5443
Heatwave	Medium	Settlements	23

		Population	32785
		Household	5445
		Agriculture Area	0.162 sq km
		Kachcha Area	0.713 sq km
		Pakka Unplanned Area	1.677 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Ranjhapur			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	30.394 sq km
		Pakka Unplanned Area	0.49 sq km
		Range Land	0.005 sq km
		Education Facilities	22
		Petrol Pumps	1
		Settlements	28
		Irrigation and Drainage Network	1.87 km
		Road Network	23.139 km
		Population	8393
		Household	1523
Meteorological Drought	Medium - Extreme	Settlements	28
		Agriculture Area	30.436 sq km
		Range Land	0.187 sq km
		Water Body	0.151 sq km
		Wet Area	1.497 sq km
		Population	6654
		Household	1210
Agricultural Drought	Low	Agriculture Area	1.164 sq km
		Range Land	0.235 sq km
		Water Body	0.188 sq km
		Wet Area	0.007 sq km
		Population	270
		Household	49
Heatwave	Medium	Settlements	21

		Population	6447
		Household	1173
		Agriculture Area	0.061 sq km
		Pakka Unplanned Area	0.485 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Rindwahi			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	47.928 sq km
		Forest Area	0.012 sq km
		Pakka Planned Area	2.499 sq km
		Pakka Unplanned Area	1.145 sq km
		Bridges	5
		Bus Stops	1
		Education Facilities	49
		Grain Mandi	1
		Grid Stations	2
		Health Facilities	3
		Industries	1
		Mobile Towers	8
		Petrol Pumps	10
		Police Stations	1
		Power Plants	1
		Settlements	44
		Irrigation and Drainage Network	22.441 km
		Railway Line	17.082 km
		Road Network	98.927 km
		Population	72602
		Household	12387
Meteorological Drought	Medium - Extreme	Settlements	44
		Agriculture Area	48.026 sq km
		Forest Area	0.068 sq km
		Water Body	0.469 sq km

		Wet Area	1.587 sq km
		Population	56810
		Household	9695
Agricultural Drought	Low - Medium	Settlements	18
		Agriculture Area	50.701 sq km
		Forest Area	0.084 sq km
		Water Body	0.59 sq km
		Wet Area	1.593 sq km
		Population	12427
		Household	2066
Heatwave	Low - Medium	Settlements	34
		Population	56131
		Household	9580
		Agriculture Area	0.18 sq km
		Pakka Planned Area	2.489 sq km
		Pakka Unplanned Area	1.139 sq km
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.	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Saidokot			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	51.043 sq km
		Kachcha Area	0.598 sq km
		Natural Vegetation in Wet Areas	0.054 sq km
		Pakka Unplanned Area	0.404 sq km
		Range Land	0.065 sq km
		Bridges	1
		Education Facilities	15
		Health Facilities	1
		Petrol Pumps	1
		Settlements	43
		Irrigation and Drainage Network	9.929 km

		Road Network	69.058 km
		Population	17096
		Household	3011
Meteorological Drought	Medium - Extreme	Settlements	43
		Agriculture Area	51.198 sq km
		Natural Vegetation in Wet Areas	2.299 sq km
		Range Land	2.725 sq km
		Water Body	2.741 sq km
		Wet Area	5.005 sq km
		Population	13370
		Household	2361
Agricultural Drought	Low - Medium	Settlements	19
		Agriculture Area	26.572 sq km
		Natural Vegetation in Wet Areas	1.643 sq km
		Range Land	3.455 sq km
		Water Body	2.926 sq km
		Wet Area	2.542 sq km
		Population	5206
		Household	906
Heatwave	Medium	Settlements	33
		Population	13119
		Household	2311
		Agriculture Area	0.28 sq km
		Kachcha Area	0.591 sq km
		Pakka Unplanned Area	0.399 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Sherwah			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	44.013 sq km
		Forest Area	0.0004 sq km
		Kachcha Area	0.123 sq km

		Natural Vegetation in Wet Areas	0.048 sq km
		Pakka Planned Area	0.459 sq km
		Pakka Unplanned Area	1.142 sq km
		Range Land	0.048 sq km
		Bridges	1
		Bus Stops	1
		Education Facilities	42
		Petrol Pumps	4
		Police Stations	1
		Settlements	64
		Irrigation and Drainage Network	16.553 km
		Railway Line	11.257 km
		Road Network	99.926 km
		Population	29588
		Household	5369
Meteorological Drought	Medium - Extreme	Settlements	64
		Agriculture Area	44.182 sq km
		Bare Area with sparse Natural Vegetation	0.35 sq km
		Forest Area	0.007 sq km
		Natural Vegetation in Wet Areas	1.551 sq km
		Range Land	1.255 sq km
		Water Body	11.921 sq km
		Wet Area	0.582 sq km
		Population	23217
		Household	4220
Agricultural Drought	Low	Settlements	18
		Agriculture Area	11.996 sq km
		Bare Area with sparse Natural Vegetation	0.012 sq km
		Forest Area	0.009 sq km
		Natural Vegetation in Wet Areas	1.866 sq km
		Range Land	1.566 sq km
		Water Body	15.312 sq km
		Wet Area	0.007 sq km
		Population	3553
		Household	649
Heatwave	Low - Medium	Settlements	49
		Population	22741
		Household	4122

		Agriculture Area	0.169 sq km
		Kachcha Area	0.121 sq km
		Pakka Planned Area	0.454 sq km
		Pakka Unplanned Area	1.132 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Tajo Khoso			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	62.055 sq km
		Kachcha Area	0.033 sq km
		Natural Vegetation in Wet Areas	0.001 sq km
		Pakka Unplanned Area	0.415 sq km
		Range Land	0.019 sq km
		Education Facilities	19
		Settlements	31
		Irrigation and Drainage Network	29.467 km
		Road Network	78.741 km
		Population	7669
		Household	1393
Meteorological Drought	Medium - Extreme	Settlements	31
		Agriculture Area	62.029 sq km
		Natural Vegetation in Wet Areas	0.011 sq km
		Range Land	0.163 sq km
		Water Body	1.301 sq km
		Population	6009
		Household	1091
Agricultural Drought	Low - Medium	Settlements	6
		Agriculture Area	14.09 sq km
		Natural Vegetation in Wet Areas	0.015 sq km
		Range Land	0.208 sq km
		Water Body	1.657 sq km
		Population	680

		Household	126
Heatwave	Medium	Settlements	9
		Population	5841
		Household	1062
		Agriculture Area	0.061 sq km
		Kachcha Area	0.033 sq km
		Pakka Unplanned Area	0.408 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Thul Nao			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	35.064 sq km
		Natural Vegetation in Wet Areas	0.011 sq km
		Pakka Planned Area	0.112 sq km
		Pakka Unplanned Area	0.662 sq km
		Education Facilities	28
		Petrol Pumps	1
		Settlements	40
		Irrigation and Drainage Network	10.04 km
		Railway Line	3.44 km
		Road Network	51.248 km
		Population	13247
		Household	2406
Meteorological Drought	Medium - Extreme	Settlements	39
		Agriculture Area	35.12 sq km
		Natural Vegetation in Wet Areas	0.388 sq km
		Water Body	0.688 sq km
		Wet Area	0.656 sq km
		Population	10407
		Household	1892

Agricultural Drought	Low	Agriculture Area	0.1 sq km
		Natural Vegetation in Wet Areas	0.49 sq km
		Water Body	0.882 sq km
		Wet Area	0.00029 sq km
		Population	415
		Household	76
Heatwave	Low - Medium	Settlements	27
		Population	10070
		Household	1830
		Agriculture Area	0.085 sq km
		Pakka Planned Area	0.111 sq km
		Pakka Unplanned Area	0.647 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Thul - II			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	12.469 sq km
		Natural Vegetation in Wet Areas	0.002 sq km
		Pakka Planned Area	1.839 sq km
		Pakka Unplanned Area	0.078 sq km
		Bridges	4
		Education Facilities	40
		Health Facilities	5
		Mobile Towers	4
		Petrol Pumps	2
		Police Stations	1
		Post Offices	1
		Settlements	19
		Irrigation and Drainage Network	3.965 km
		Road Network	36.805 km
		Population	38229
		Household	6835
	Medium - Extreme	Settlements	19

Meteorological Drought		Agriculture Area	12.508 sq km
		Natural Vegetation in Wet Areas	0.051 sq km
		Water Body	0.088 sq km
		Wet Area	0.048 sq km
		Population	29917
		Household	5348
Agricultural Drought	Low	Agriculture Area	0.136 sq km
		Natural Vegetation in Wet Areas	0.064 sq km
		Water Body	0.106 sq km
		Population	478
		Household	86
Heatwave	Low - Medium	Settlements	19
		Population	29542
		Household	5281
		Agriculture Area	0.097 sq km
		Pakka Planned Area	1.831 sq km
		Pakka Unplanned Area	0.076 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

Toj			
Hazard Type	**Risk**	**Elements at Risk**	
Earthquake	Low	Agriculture Area	70.358 sq km
		Forest Area	0.006 sq km
		Kachcha Area	0.284 sq km
		Natural Vegetation in Wet Areas	0.001 sq km
		Pakka Unplanned Area	1.916 sq km
		Range Land	0.171 sq km
		Education Facilities	48
		Health Facilities	1
		Settlements	69
		Irrigation and Drainage Network	31.128 km
		Road Network	51.331 km

		Population	37656
		Household	6845
Meteorological Drought	Medium - Extreme	Settlements	69
		Agriculture Area	70.672 sq km
		Forest Area	0.06 sq km
		Natural Vegetation in Wet Areas	0.072 sq km
		Range Land	9.657 sq km
		Water Body	1.608 sq km
		Wet Area	15.466 sq km
		Population	29717
		Household	5397
Agricultural Drought	Low	Settlements	2
		Agriculture Area	6.016 sq km
		Forest Area	0.06 sq km
		Natural Vegetation in Wet Areas	0.09 sq km
		Range Land	11.117 sq km
		Water Body	1.022 sq km
		Wet Area	0.181 sq km
		Population	1156
		Household	209
Heatwave	Medium	Settlements	46
		Population	29118
		Household	5293
		Agriculture Area	0.189 sq km
		Kachcha Area	0.282 sq km
		Pakka Unplanned Area	1.903 sq km
Riverine Flood	Nil	The UC falls out of vulnerable zone for Riverine Flood	
Storm Surge	Nil	The UC falls out of vulnerable zone for Storm Surge	
Tsunami	Nil	The UC falls out of vulnerable zone for Tsunami	
Cyclone	Nil	The UC falls out of vulnerable zone for Cyclone	

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

FUNCTION OF TALUKA DISASTER MANAGEMENT COMMITTEE

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

RESPONSIBILITY OF UNION COUNCIL DISASTER MANAGEMENT COMMITTEE

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

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

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

FUNCTION OF UCDMC

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

2. To prepare/update UC level disaster management plan for emergent hazards or new hazards caused by any disaster event.

3. To make an analysis of disaster risk and to prepare a list of vulnerable villages and areas of the concerned union councils.

4. To mobilize community for maintaining public ways, public streets, culverts, bridges and public buildings, and other development activities.

5. To coordinate with the village and neighborhood UCs in case of emergency in order to get quick information about the severity and extent of a disaster impact and report it to the TDMC and DDMA.

6. To report cases of handicapped, destitute and socially excluded groups to TDMC, DDMA and PDMA in order to streamline their special needs in relief and response operation.

7. Mobilizing and coordinating work of volunteers and ensuring community participation.

8. Conduct of search and rescue operations in coordination with the rescue teams and Police.

9. To provide assistance to other agencies for mobility/transport of staff, including rescue parties, relief personnel and relief materials. To communicate with the TDMC, DDMA or PDMA for required additional resources.

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

PROVINCIAL EMERGENCY OPERATION CENTER (PEOC)

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

The functions of PEOC are summarized below;

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

DISTRICT EMERGENCY OPERATION CENTER (DEOC)

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

FUNCTION OF DEOC

The functions of DEOC are appended below;

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

SECTOR WISE ROLES AND RESPONSIBILITIES OF GOVERNMENT FUNCTIONARIES

AGRICULTURE AND LIVESTOCK DEPARTMENT

Pre-Disaster

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

During-Disaster

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

Post-Disaster

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

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

PROVINCIAL DISASTER MANAGEMENT AUTHORITY (PDMA)

Pre-Disaster

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

During-Disaster

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

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

Post-Disaster

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

DISTRICT DISASTER MANAGEMENT AUTHORITY (DDMA)

Pre-Disaster

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

During-Disaster

- Mobilization of man and material resources
- For rescue and evacuation of people, provide and manage temporary shelter and life restoration equipment in disaster affected regions
- Coordinate with TDMC and line departments
- The DDMA shall lead the evacuation of people to safer places with the assistance of PDMA. DDMA shall also ensure safety, security, supply chain, life commodities and management of relief camps
- Only authorized officials of DDMA shall brief media on disaster situation and the response activities.

Post-Disaster

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

CIVIL DEFENSE

Pre-Disaster

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

During-Disaster

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

Post-Disaster

- Assist in rehabilitation process if required

EDUCATION DEPARTMENT

Pre-Disaster

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

During-Disaster

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

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

Post-Disaster

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

FINANCE DEPARTMENT

Pre-Disaster

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

During-Disaster

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

Post-Disaster

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

HEALTH DEPARTMENT

Pre-Disaster

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

During-Disaster

- Provide emergency treatment for the seriously injured
- Ensure emergency supplies of medicines and first-aid
- Supervise food, water supplies, sanitation and disposal of waste
- Assess and co-ordinate provision of ambulances and hospitals where they could be sent (public and private);

- Provide special information required regarding precautions for epidemics
- Set-up an information Centre to organize sharing of information for public information purposes
- Conduct disaster impact assessment on health
- Intervene in case of disease outbreak
- Medical camps and vaccination
- Ongoing surveillance with regard to health issues and disease outbreaks

Post-Disaster

- Conduct disaster impact assessment on health situation
- Prepare plan for the following year along with reports and submit to PDMA and concerned department.
- Medical camps and vaccination
- Rehabilitation of health infrastructure affected during disaster
- Preparation of impact assessment surveys covering strengths and weaknesses of interventions and impact on affected victims and dissemination of learning to PDMA and other concerned institutions

INFORMATION DEPARTMENT

Pre-Disaster

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

During-Disaster

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

Post-Disaster

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

PAKISTAN METEOROLOGICAL DEPARTMENT (PMD)

Pre-Disaster

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

During-Disaster

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

Post-Disaster

- Technical assistance in rescue and rehabilitation process

POLICE DEPARTMENT

Pre-Disaster

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

During-Disaster

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

Post-Disaster

- Assist in relief and rehabilitation process

REVENUE DEPARTMENT

Pre-Disaster

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

During-Disaster

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

Post-Disaster

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

ARMED FORCES

Pre-Disaster

- Coordinate with the DDMA in the pre-disaster planning

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

During-Disaster

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

Post-Disaster

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

SOCIAL WELFARE AND COMMUNITY DEVELOPMENT

Pre-Disaster

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

During-Disaster

- Provide information on the situation of the disaster to the DEOC
- Coordinate all NGOs / INGOs and civil society organizations working during the emergency response
- Monitor progress of relief operations in the affected areas
- In coordination with PDMA, Health, Revenue and other line departments, ensure delivery of relief to most vulnerable segments of society such as children, orphans, widows, destitute
- Assist and facilitate Damage and Needs Assessment teams from NGOs
- Share human resources with DDMA

Post-Disaster

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

NGOs / INGOs

Pre-Disaster

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

During-Disaster

- Collaborate and facilitate in relief operations

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

Post-Disaster

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

DISASTER MANAGEMENT GUIDELINES

INTRODUCTION

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

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

Earthquake	1. The geology of Sindh is divisible in three main regions, the mountain ranges of Kirthar, Pab containing a chain of minor hills in the west and in east it is covered by the Thar Desert and part of Indian Platform where the main exposure is of Karoonjhar Mountains, which is famous for Nagar Parkar Granite. 2. Some of prominent faults situated in Sindh are (a) Karachi-Jati, (b) Surjan-Jhimpir, (c) Pab Fault (d) Hub Fault and (e) Allah Bund-Rann of Kutch faults. 3. Though risk of geophysical hazards in Jacobabad district is low but still some actions must be taken to avoid losses in case of minor jolts. Urban settings are most likely to be affected by jolts. It is highly recommended to identify old and weak buildings in the cities and other urban settings of the district. Local concerned authorities may decide evacuation or retrofitting of such buildings / structures. 4. It is also recommended that, new housing schemes, societies and infrastructure be built with proper town planning and following Building Codes recommended for the zone in which Jacobabad district is situated. 5. Local government departments must be strengthened to manage situation arisen from earthquake jolts. Strengthening must include capacity building to act as first responder in any likely situation.
Heatwave	1. Historically, Jacobabad district has a Hot and Arid climate and is prone to severe heatwave seasons. However, most of the district is sparsely

	populated, which significantly lowers the chances of severe heatwave impacts. 2. Heatwaves are forecastable hazards and actions can be taken well before occurrence of heatwaves. The most suitable action is issuance of warnings and alerts in public for precautions and safety. Suitable media for the purpose is social media and SMS. 3. Scientific studies suggest that, frequency and intensity of heatwaves is increased due to climate change. Though climate change is global phenomena, however, its impacts can be minimized through local interventions. The most efferent 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.
Drought	1. Geographically, district Jacobabad has Hot and Arid climate. Average annual rainfall across the district is 83.34 mm. 2. Drought is also forecastable hazard and can be predicted well in advance. Though drought does not bring any prominent or famine like conditions in the 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 agricultural systems is also required. 4. Further, farmers may be encouraged for alternative crops during expected drought seasons. Also policies for compensation of framers must also be introduced to assist and encourage drought hit farmers.
Cyclone	According to MHVRA Study 2022, there is no Cyclone Hazard in Jacobabad district.

Tsunami	According to MHVRA Study 2022, there is no Tsunami Hazard in Jacobabad district.
Riverine Flood	According to MHVRA Study 2022, there is no Riverine Flood Hazard in Jacobabad district.

STANDARD OPERATING PROCEDURES

INTRODUCTION

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

ACTION PLAN FOR FORECASTABLE DISASTERS

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

Table 5: Action Plan for Heatwave Hazard Management

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

Table 6: Action Plan for Drought Hazard Management

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

Mobilization of NGOs, INGOs and individuals for stocking of food and life support items to prevent and mitigate famine conditions depending upon severity and spell of drought	During disturbance period	PDMA and DDMA

ACTION PLAN FOR UNFORECASTABLE HAZARDS

Earthquake

The earthquake is unforecastable hazard and does not provide reaction time to prevent damages. The recommended post disaster action plan are 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 and damages/losses)	Post disaster	PDMA

Coordination and mobilization of resources on Build Back Better principles	Post disaster	PDMA

SOP FOR PEOC AND DEOCs

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

    a. Action on receipt of early warning, safe evacuation, search and rescue, initial assessment, relief distribution, recovery and deactivation of response.

    b. Coordination and information dissemination

    c. Contingency planning and response actions

- For localized emergencies, the situation shall be dealt within the regular operating mode of the emergency management services in the district.

- DDMA shall activate the DEOC and take the operational lead for the district government response.

- The DEOC will serve as the center for receiving early warning and issuing information to public at village level, taking measures to evacuate people, updating relevant departments, response agencies, and media etc.

- The DEOC will lead the coordination and management of relief operations in affected areas in the district with the assistance of PEOC.

- DEOC will coordinate with all concerned departments and humanitarian agencies at district level.

- DEOC will coordinate for early recovery with the assistance of PDMA and other concerned departments.

- In standby position, PEOC and DEOC shall be alert and ready to start emergency operations. The PEOC shall coordinate with concerned departments like NDMA, PMD, etc. for regular updates on likely disaster events. Once the threat is established, the PDMA shall approve the alert and activate response mechanism of PEOC and DEOC.

- Once PEOC and DEOC activation is approved or issued, both centers will remain fully operational on 24/7 basis and coordination shall be established with all concerned departments.

- PEOC and DEOC will collect regular updates on disaster situation and after normalization of situation and with mutual consultation shall inform PDMA to issue stand down or disaster deactivation call and final report on emergency operations will be circulated to stakeholders.

- The operationalization of PEOC and DEOC means complete activation of centers during disaster situation. Management of PDMA shall ensure full functionalities of PEOC including stock for emergency food, office supplies, communication system with backup support, electricity generators, computers, screens, multimedia projectors and other necessary equipment. While Deputy Commissioner Jacobabad 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	According to MHVRA Study 2022, there is no risk of Riverine Flood in Jacobabad district.

Earthquake	
UCs at Risk	**All UCs**
General Description	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. Geologically, the district consists of alluvial deposits and desert. The northern border of the district is skirted by the Bugti hills, part of the Suleiman Mountains. 4. During the last 50 years, District Jacobabad has been affected mostly by aftershocks of earthquakes in neighboring Balochistan province. 5. On February 25, 2019, an earthquake of mild intensity measuring 4.1 on the Richter Scale jolted different areas of Jacobabad, however, no casualty or damage to property was reported. The epicenter of the earthquake was stated to be 20 km north of Jacobabad. 6. The earthquake hazard intensity for district Jacobabad is **"Low"** 7. The earthquake risk intensity for district Jacobabad is "**Low**".

Disaster Management Measures
Preparedness
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
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	1. Heatwave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. 2. Climatic condition of the district can be categorized as Hot and Arid (Climate Classification of Pakistan (Khan et al., 2010)). 3. The oppressive heat has been its identity as Jacobabad is one of the hottest places on the planet with temperatures climbing above 50 °C; rainfall is low, and mainly occurs in the monsoon season. 4. The highest recorded-temperature for Pakistan and for Asia was on June 12, 1919 of 52.8 °C at Jacobabad. 5. Four people died of heatwave on June 10, 2020 in Jacobabad. 6. According to MHVRA Study 2022, heatwave hazard intensity for district Jacobabad is **"High to Severe"** 7. According to MHVRA Study 2022, heatwave risk for district Jacobabad is **"Low to High"**.
Disaster Management Measures	
Preparedness	
1. Consistent future development strategy: Tree plantation, restoration of natural ecosystem, construction of environment friendly and well planned residential societies, offices, infrastructure and human dwellings. 2. Monitoring for hot weather alerts through local and international sources and issuance of timely Hot Day Advisories, and Hot Day Warnings. 3. Upgradation of major public health care facilities with necessary equipment and medicines to treat heatstroke patients. 4. Heatstroke awareness campaigns and wide public coverage through media, social media, SMS, NGOs and social welfare organizations. 5. Arrangements for uninterrupted supply of electricity and water in vulnerable areas.	
Response	
1. Mobilization of NGOs, social welfare organization and volunteers for arranging heatstroke facilitation camps and distribution of fresh drinking water in affected areas. 2. Local radio FM broadcasts to disseminate heatstroke safety and precautions. 3. Mobilize mobile medical teams for first-aid and other medical emergency support in affected area. 4. Record keeping of heatwave patients and fatalities.	
Recovery and Rehabilitation	
1. Post event review of heatwave plan and modifications if required.	

Drought	
UCs at Risk	**All UCs**
General Description	a. Climatic condition of the district can be categorized as Hot and Arid (Climate Classification of Pakistan (Khan et al., 2010)) b. Average annual rainfall received during a year across the district is 83.34 mm. c. Most of the agriculture water needs are being catered through canal irrigation system. d. According to MHVRA Study 2022, a. Meteorological drought hazard for district Jacobabad is **"Extreme"** b. Meteorological drought risk for district Jacobabad is **"Medium to Extreme"** c. Agricultural drought hazard for district Jacobabad is **"Mild to Severe".** d. Agricultural drought risk for district Jacobabad is **"low to High".**
Disaster Management Measures	
Preparedness	
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. 7. Building of small-scale reservoir for rainwater harvesting in vicinity of individual settlements.	
Response	
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.	

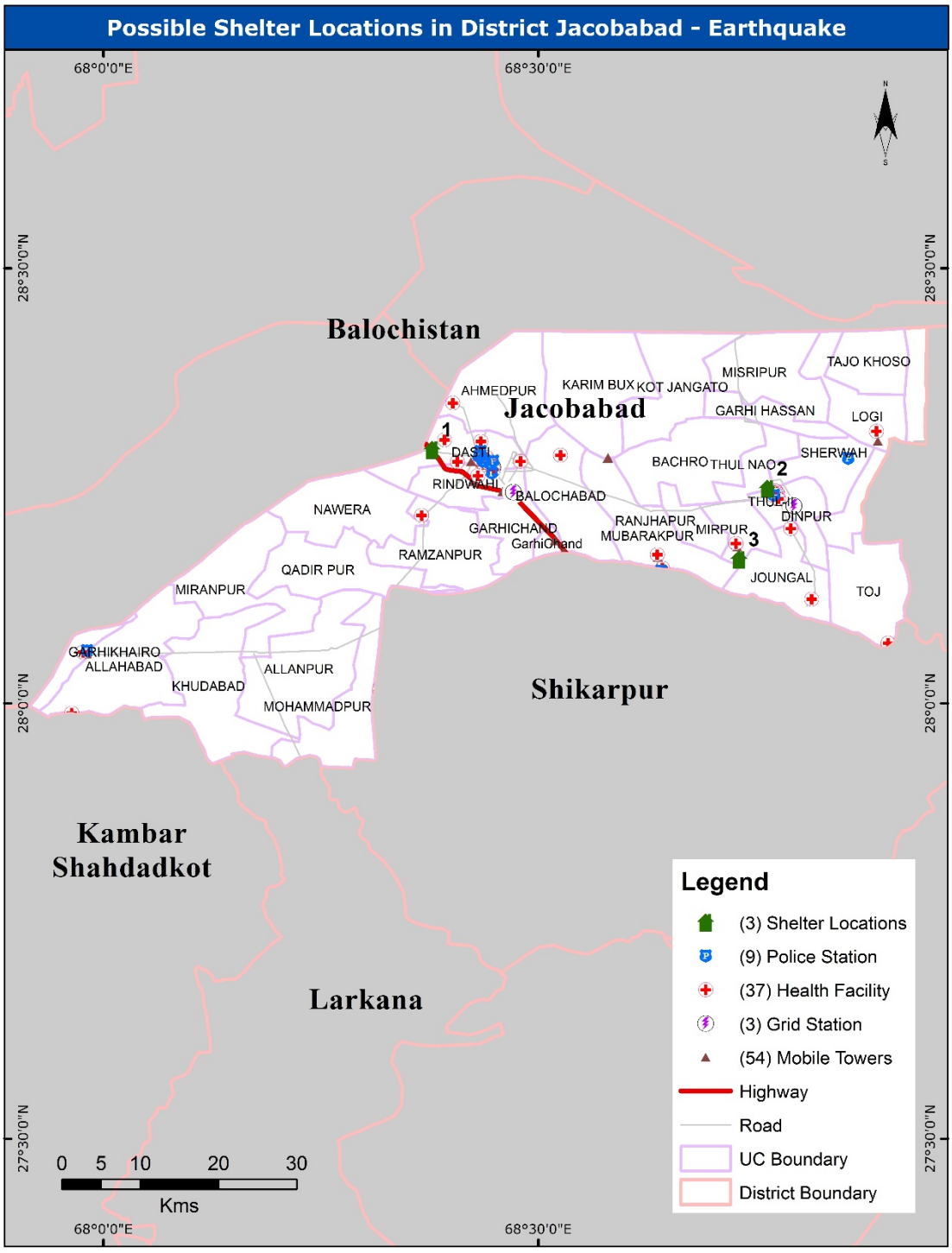
Recovery and Rehabilitation
1. Cash and in-kind support to farmers for next cropping. 2. Awareness and encouragement of farmers on best irrigation practices and water saving.

Tsunami	
UCs at Risk	According to MHVRA Study 2022, there is no risk of Tsunami in Jacobabad district.

Cyclone	
UCs at Risk	According to MHVRA Study 2022, there is no risk of Cyclone in Jacobabad district.

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 Jacobabad. PDMA may identify suitable partnering agencies / line departments to carry out and prioritize each proposed project.

Hazard wise list of Priority Disaster Risk Management Projects	
Disaster Risk Management Projects/ Studies	**Brief**
Earthquake	
1. Ensure implementation of building codes and standards.	Prepare policy and SOP to ensure new buildings in the district are constructed as per the seismic codes and standard of the area.
2. Identification and retrofitting of weak existing structures and unsafe buildings (schools, hospitals and government offices).	Coordinate with local community regarding unsafe buildings and regularly conduct building safety surveys to check structural integrity of buildings against the seismic risk of the district and take necessary retrofitting measures to strengthen weak structures. Create database of vulnerable and unsafe buildings and retrofitting measures taken to strengthen the structure of such buildings.
3. Preparation of rescue and rehabilitation plan	Coordinate with line departments to create a comprehensive plan with clearly defined roles and responsibilities of first responding departments, as well as, correspond with rescue agencies/NGOs for their role in an event of earthquake. The plan should also details the rescue equipment available with concerned departments
Drought	
1. Conduct feasibility study for identification of suitable sites for rainwater harvesting and aquifer recharge in the district.	The rainwater harvesting sites should be identified by using geospatial technologies and ancillary data, which can be used as clean water aquifers by communities, which in turn can use it for drinking, and irrigation purposes. Potential rainwater harvesting sites may be identified by using Analytical Hierarchy Process (AHP) and spatial analyst tool, with multiple thematic layers (rain data, population, digital elevation model, soil type, etc.)

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 – JACOBABAD DISTRICT

The existing nature of disaster in Jacobabad district can be categorized as low to extreme. The prominent hazard in the district is drought and to a certain extent, heatwave. The bigger threat here is posed by meteorological drought with risk ranging from medium to extreme in the district. Agricultural drought in the district ranges from low to high. 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 and tsunami. There is no risk of cyclone as well as riverine flood in the district. Jacobabad 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:

Table 8: Cost Benefit Analysis of Disaster Risk Measures in District Jacobabad

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

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

ANNEX – A – SHELTER LOCATIONS DESCRIPTION – EARTHQUAKE

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

Shelter location	Co-ordinates	Area (acres)	Estimated Tents (numbers)	Avg. elevation (ft)
1	Upper right corner: 28°17'52.63"N 68°22'53.83"E Upper left corner: 28°17'47.36"N 68°22'14.02"E Lower right corner: 28°17'23.01"N 68°23'23.44"E Lower left corner: 28°16'49.36"N 68°22'29.76"E	657	~29,000	181
2	Upper right corner: 28°15'0.04"N 68°46'4.74"E Upper left corner: 28°14'56.82"N 68°45'25.73"E Lower right corner: 28°14'42.01"N 68°46'10.25"E Lower left corner: 28°14'36.35"N 68°45'34.75"E	155	~6,900	200
3	Upper right corner: 28°10'22.33"N 68°43'38.94"E Upper left corner: 28°10'5.54"N 68°43'31.76"E Lower right corner: 28° 9'42.78"N 68°44'13.52"E Lower left corner: 28° 9'33.68"N 68°43'52.21"E	202	~9,000	204

A total of 3 shelter locations have been selected as Earthquake shelter places across district Jacobabad. 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 44,900 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 JACOBABAD

Equipment	Quantity
De-watering Machine	9
Vehicle / Bus/ Van/Truck/	22
Ambulances	17

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