

Monsoon Contingency Plan- 2008 (Draft)



National Disaster Management Authority
Government of Pakistan

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Acronyms

ADB	Asian Development Bank
AJK	Azad Jammu Kashmir
ARI	Acute Respiratory Infections
AIDS	Acquired Immunodeficiency Syndrome
ANDMA	Afghan National Disaster Management Authority
Approx	Approximately
CP	Contingency Planning
CMO	Camp Management Organization
CGI	Corrugated Galvanized Iron
CNG	Compressed Natural Gas
CWS	Church World Service
CBFF	Cloud Burst Flash Floods
C & W	Communication and Works
DDMA	District Disaster Management Authority
DMT	Disaster Management Team
DRM	Disaster Risk Management
D.I. Khan	Dera Ismail Khan
D.G.Khan	Dera Ghazi Khan
DCO	District Coordination Officer
Deptt	Department
Dist	District
DG	Director General
ERC	Earthquake Relief Cell
EW	Early Warning
ERRA	Earthquake Reconstruction and Rehabilitation Authority
EPI	Expanded Program on Immunization
Engrs	Engineers
FFD	Flood Forecasting Division
FFC	Federal Flood Commission
Fed Agencies	Federal Agencies
FPSP	Federal Flood Protection Sector Projects
FATA	Federally Administered Tribal Areas
FAO	Food and Agriculture Organization
FWO	Frontier Works Organization
FC	Frontier Constabulary
GLOF	Glacial Lake Outburst Flood
GTZ	German Technical Corporation
GSM	Global System of Mobile Communication
GHQ	General Head Quarter
HH	Household
HIV	Human Immunodeficiency Virus
HESCO	Hyderabad Electric Supply Company
INGOs	International Non Governmental Organization
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organization for Migration
IDP	Internally Displaced Persons
IWT	Indus Water Treaty
ICIMOD	International Centre for Integrated Mountain Development
ITN	Insecticide Treated Nets
IUCN	International Union for Conservation of Nature- World Conservation Union
ICT	Islamabad Capital Territory
KM	Kilo Meter
Kg	Kilogram
LOC	Line of Control
LBOD	Left Bank Outfall Drain
Ltrs	Litres
LPG	Liquefied Petroleum Gas
MT	Metric Ton
MSA	Maritime Security Agency

MINDEF	Ministry of Defence
MINFAL	Ministry of Food Agriculture and Livestock
MOH	Ministry of Health
M	Million
NDMA	National Disaster Management Authority
NGO	Non Government Organization
NCCMC	National Crisis Management Cell (Ministry of Interior)
NFI	Non Food Items
NWFP	North West Frontier Province
NIO	National Institute of Oceanography
NA	Northern Areas
NLC	National Logistics Cell
NHA	National Highway Authority
NIPS	National Institute of Population Studies
NIH	National Institute of Health
OCHA	Office for Coordination of Humanitarian Affairs
Org	Organization
OBM	Out Board Motor
PDMA	Provincial Disaster management Authority
PMD	Pakistan Meteorological Department
PARC	Pakistan Agricultural Research Council
PHE	Public Health Engineering
PRCS	Pakistan Red Crescent Society
Pop	Population
P&D	Planning & Development
PTCL	Pakistan Telecommunications Corporation limited
PIA	Pakistan International Airlines
PN	Pakistan Navy
PNSC	Pakistan National Shipping Corporation
PAF	Pakistan Air Force
PESCO	Peshawar Electric Supply Corporation
PR	Pakistan Railway
PHC	Primary Health Care
PSDP	Public Sector Development Program
PESCO	Peshawar Electric Supply Company
QESCO	Quetta Electric Supply Company
Rs	Pakistani Rupees
R&R	Relief and Rehabilitation
SDMA	State Disaster Management Authority
SOP	Standard Operating Procedure
Sq	Square
SAR	Search and Rescue
SUPARCO	Pakistan Space and Upper Atmosphere Research Commission
SCO	Special Communications Organization
SMBR	Senior Member Board or Revenue
UN	United Nations
UNHCR	United Nations Higher Commissioner for Refugees
UNDP	United Nations Development Programme
UNICEF	United Nations Children Fund
UNFPA	United Nations Population Fund
UNHABITAT	United Nations Human Settlement Programme
UNOCHA	United Nation's Office for the Coordination of Humanitarian Affairs
UNOPS	United Nations Office for Project Services
UC	Union Council
USC	Utility Stores Corporation
USD	United States Dollar
WAPDA	Water and Power Development Authority
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization
WATSAN	Water & Sanitation



Executive Summary

NDMA continues to emphasise upon the contingency process as a preparedness measure for response to natural hazards. Following contingency planning for winter hazards, this exercise focuses on planning for the oncoming monsoon season to identify and analyze related risks for their humanitarian impact, and to define roles and responsibilities of diverse national stakeholders for preparedness and response. The document also provides timely planning inputs for undertaking similar exercises down the implementation chain.

Key anticipated outcomes are: generate awareness for building institutional capacities for response, create political will for earmarking required resources, build integrated planning capacities, and most importantly define preparatory measures for monsoon hazards. The planning process must match complexity of the hazards confronted which over the years has grown much beyond the one hazard riverine floods phenomenon.

Riverine floods over the Indus Basin have cost more than \$ 6 billion in economic damage and over 6000 lives in Pakistan. It was after the 1976 floods that government decided to create Federal Flood Commission with a mandate to plan and implement flood prevention, impact mitigation and also create a floods early warning system. An elaborate system of water storage works and flood protection dykes have been created over the years, some protecting vital economic hubs. Work on deploying floods early warning system started in earnest in 1992 and Flood Forecasting Division (FFD), an affiliate body of Pakistan Metrological Department (PMD), forecasts and warns scores of national stakeholders on flood occurrence. The system created for flood management in the country is now being extended to meet other monsoon related hazards.

These include occurrence of tropical cyclones, flash floods, heavy precipitation related flooding in the major urban centres, and environmental hazards like sliding in the earthquake affected regions, glacial outburst flooding (GLOF) and sea water intrusion in Sindh. Changing weather patterns engender flash floods in the mountainous and adjoining regions due to heavy precipitation or in the wake of tropical cyclones. Flood forecasting system, however, needs substantial upgradation for furnishing early warning for flash floods . Devastation caused by tropical cyclone Yemyin in 2007 is an apt reminder of deficient cyclone impact mitigation works and inability to early warn vulnerable communities. Poor town planning causes virtual paralysis in cities like Karachi even as a consequence of moderate rains. We also have a very limited ability to monitor hazards associated with GLOF in the mountainous north.

Hazards combine to cause disasters. Confluence of floods waters from different river systems and releases from reservoirs cause major floods. Cyclones and heavy precipitation tend to generate flash floods. Therefore, summer monsoon hazards tend to be an accumulation of multiple -hazard impact and are rarely a stand alone phenomenon.

Riverine floods that occur in rivers Kabul, Swat and Indus tend to impact the populated districts of central and western NWFP. Flash floods occur astride these rivers to cause humanitarian losses. In Punjab districts adjoining Chenab and Jhelum rivers and Indus in the south tend to be more vulnerable. In Sindh, districts along Indus in the north and costal regions are vulnerable to riverine floods and tropical cyclones. Besides vulnerability of coastal regions to tropical cyclones, vast tracts of Balochistan are prone to flash flooding. Mountainous regions of AJK and Northern Areas are vulnerable to flash flooding and sliding activity and GLOF at alpine altitudes. Historical records of hazard occurrence and their impact are not generally well kept except for in Punjab and Sindh provinces. Estimates of humanitarian impact, elsewhere, were formed on stakeholders' consensus.

Preparing for the worst allows adequate preparedness for facing lesser dangerous options. Therefore, the worst case Scenario (Scenario B) envisages a combination of high to very high riverine floods and tropical cyclone of severe magnitude in the south and hazard analysis based on past precedence indicates a humanitarian caseload of: 8,221,795 population likely to be affected and 189,858 households likely to be dependent on relief support. National response has been planned on a need assessment spanning 15 days.

Provinces reflect diverse capacities to respond for reasons of institutional capacity, ability for integrated contingency planning and resource adequacy for emergency response. However, all provinces do undertake detailed pre-disaster response planning with armed forces that play a key role. Provinces that have faced riverine floods over the years have developed well honed integrated planning and pre and post floods coordination mechanisms.

In responding to a major monsoon disaster provincial inadequacy in search rescue capacity and in providing immediate relief are made up by resources deployed by the armed forces. Concurrent mobilization of national resource base occurs under the overall coordination of NDMA. Following removal of life threatening situations and meeting the basic shelter, health and food security needs the focus shifts to restoring livelihoods and bringing normalcy in social services delivery. This is where general inadequacy in both resources and planning is revealed in most of the provinces. Sectors that need to be supported substantially by both provincial resource mobilization and through external support are livelihood regeneration, livestock security, restoration of road access and potable water supply sources, supporting camp management, restoration of essential services like electricity and education.

The health response covers a wide array spanning emergency response, epidemic control, building surveillance and early warning capacity, malaria vector control and EPI coverage. Provinces need to mobilize resources for purchase of post disaster emergency medicines and in building up operational capacity for response. However, Ministry of Health in coordination with provincial and district health departments must assess critical deficiency in emergency response capacity for addressing shortfalls.

UN agencies and international NGOs are actively participating in the contingency planning process in concert with NDMA. To conclude, the contingency planning process intends capturing active participation of national stakeholders and external partners in achieving the intended objectives. UN agencies are also launching a US\$ 7 million Central Emergency Relief Fund (CERF) Project during and beyond the monsoon season which will provide support in Cyclone Yemyin hit regions of Sindh and Balochistan in livelihood regeneration, food security, emergency healthcare, water and sanitation, emergency shelter and support for Afghan refugees in health service delivery.

This exercise overly relies on primary sources for defining the evolution of flood preparedness capacity in Pakistan. Provincial workshops were held for situation specific hazard analysis, determining likely humanitarian caseloads and for mapping response resources. A parallel exercise involved much interaction with key Federal agencies relevant to the scope of the planning process for crystallising contours of the Federal response.

Introductory Portion

For an effective response to monsoon hazards NDMA has initiated the process of contingency planning (CP) with respect to major hazards that the country faces. The exercise encompasses CP for winter hazards (draft plan circulated for stakeholders feedback), for summer monsoon related hazards to include traditional riverine floods, sea based cyclones and precipitation instigated flash floods, earthquakes and drought and finally industrial hazards. Drafts covering these hazards will be circulated before end of the year. Simulation exercises involving key stakeholders will follow. CPs are, therefore, meant to have a preparedness enhancement focus to benefit disaster response.

Pakistan is situated in the South Asian region spanning 796,095 square kms. The country encompasses diverse physiological features to include the Himalayas, Karakoram and Hindukush Mountains in the north and northwest, vast plateaus in the south adjoin an elaborate Indus Basin fed agricultural system which tapers into the desert zone and the Indian Ocean. Precipitation and climatic conditions vary seasonally and geographically within these regions giving rise to varying opportunities for development as well as hazard occurrence. Mountainous regions and western coastal plains reveal a significant seismic vulnerability. River plains are prone to flooding causing huge socio-economic losses but whose scale seems to have abated over the recent years as a consequence of regional climatic changes. Emerging weather patterns, however, have prompted increased flash flooding in semi-mountainous and mountainous regions and a surge in sea based cyclones. Relative unpreparedness for these hazards has caused significant losses. Disaster risk assessment of Pakistan is included in Annexure A.

The latent socio-economic poverty and poor disaster awareness levels, more so in the rural regions, declining environmental health, inability to factor risk reduction in development practices, and poor state of disaster preparedness tend to exacerbate the impact of these disasters.

The monsoon CP exercise for 2008 will cover May – October period. The process will include detailed information sharing with the stakeholders to get inputs on (1) hazard mapping, (2) vulnerability assessments, i.e. likely affected and vulnerable caseloads, and (3) resource mapping, strategy making and tasking for response. Thus a draft Monsoon CP will access refined inputs from stakeholders.

Objectives. While encouraging stakeholders participation, following objectives will be strived for:-

- Analyse potential hazards with regards to their possible humanitarian impact and consequences.
- Provide a common strategic planning framework for all stakeholders and identify clear objectives, roles and responsibilities.
- Outline preparedness measures for supporting response.
- In the process, address vulnerable communities concerns.

Operational Objectives

- CP outcomes should reinforce response to monsoon related disasters and emergencies.
- Address humanitarian concerns arising out of complex emergencies
- Also address health, epidemic and pandemic instigated emergencies.
- Identify anticipated summer monsoon instigated environmental disasters along with response measures.
- Define essential coordination measures for instituting coherence in multiple stakeholders based response.

Process Steps

- Stakeholders' mobilization and participation through Monsoon CP exercise.
- Review existing plans, historical records spanning floods, cyclone occurrence and precipitation for hazard assessment.
- Determine disaster scenarios and corresponding humanitarian caseloads.
- Map resources for response and identify deficiencies.
- Define sectoral response strategies, plans and coordination measures
- For relevance CP to be updated consistent with disaster occurrence and response trends.

This exercise overly relied on primary sources for defining the evolution of flood preparedness capacity in Pakistan. Provincial workshops were held for situation specific hazard analysis, determining likely humanitarian caseloads and for mapping response resources. A parallel exercise involved much interaction with key Federal agencies relevant to the scope of the planning process for crystallising contours of the Federal response¹.

Coordination and Management Structures²

NDMA constitutes the focal point for coordinating national preparedness and response to disasters besides post disaster recovery and rehabilitation functions. Its functions include capacity development of national stakeholders, need assessments, resource mobilization and generating national response. This entails horizontal coordination with host of government line departments and autonomous bodies that furnish early warning, undertake search and rescue, conduct relief operations and meet needs of vulnerable segments. NDMA coordinates execution of these functions with armed forces, Emergency Relief Cell, National Logistic Cell, National Highways Authority, Pakistan Metrological Department, WAPDA and other relevant agencies Federal agencies. Vertical coordination occurs with PDMA with regards to post disaster assessments and execution of response.

NDMA also constitutes the point of contact for deploying external assistance for disaster response through UN agencies, INGOs and donors consistent with national policies. DMT forum aims at institutionalizing coordination and information sharing.

PDMA coordinate preparedness and response to disasters horizontally with line departments and key ministries and vertically with NDMA and DDMA. Similar processes are followed at the district tier by DDMA. Tehsil Disaster Management Authority performs such functions at sub-districts. Union Councils and Village Councils offer institutional support for coordination at the grass roots. Disaster management institutions at district and below also integrate inputs of INGOs / NGOs.

DDMA are responsible for planning and executing immediate response to disasters. They are supported by law enforcement agencies and paramilitary forces. Armed forces assistance is solicited for search and rescue, strategic and tactical air support and immediate relief. PDMA support the affected DDMA (s) by supplementing health, food security, restoration of land access and essential services, veterinary and other need based support. Assistance from NDMA is sought to supplement shortfalls.

With regards to the UN system and the international humanitarian community the Resident Coordinator harmonises the response to disasters within and with the national authorities. Operationally it is patterned consistent with the global cluster leads as reflected below.

¹ Contingency planning draws guidance from '*Inter-Agency Contingency Planning Guidelines for Humanitarian Assistance*', endorsed by UN Inter – Agency Standing Committee Working Group, November 2007

² Draws from National Disaster Risk Management Framework, National Disaster Management Authority, Government of Pakistan, February 2007

UN Global Cluster Leads³

Sector	Agency
Agriculture	FAO
Camp Management	UNHCR / IOM
Early Recovery	UNDP
Education	UNICEF and Save the Children
Emergency Shelter	UNHCR / IFRC
Emergency Telecom	OCHA
Food	WFP
Health	WHO
Logistic	WFP
Nutrition	UNICEF
Protection	UNHCR
Refugees	UNHCR
WATSAN	UNICEF

Matrix 1- UN Global Cluster Leads

For objective hazard analysis review of major hazards that are likely to occur during monsoon 2008 are described in succeeding paragraphs.

Hazard Context Analysis

Occurrence of following hazards in Pakistan is examined:-

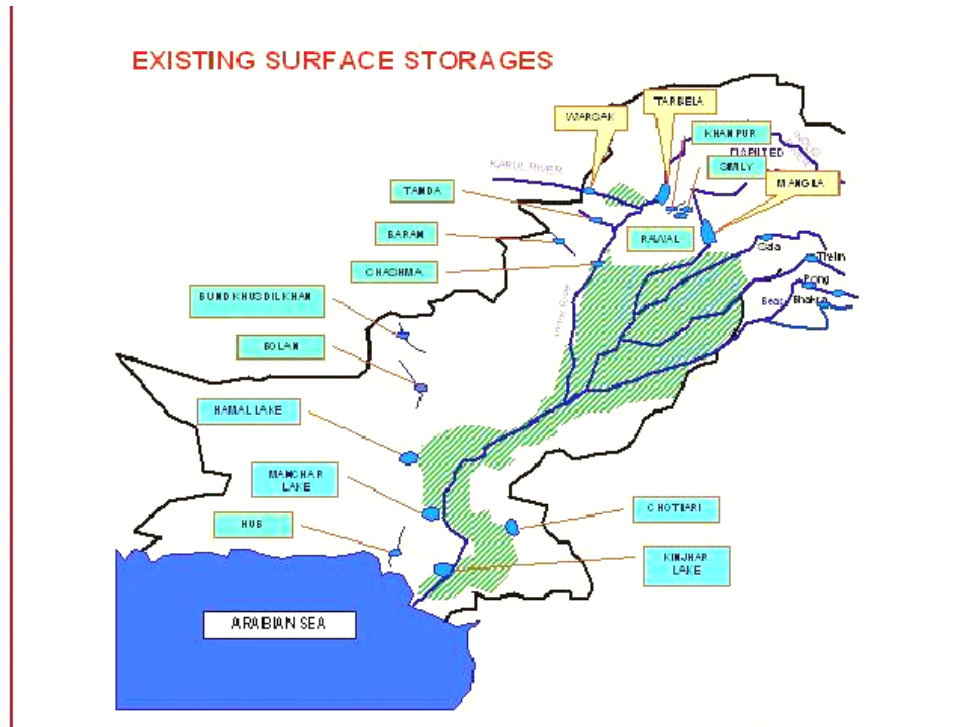
- Riverine floods
- Flash floods
- Tropical cyclones
- Heavy precipitation
- Urban flooding
- Environmental hazards like sliding
- Glacial Lake Outburst Flood (GLOF)
- Sea water intrusion (refer to Sindh hazard mapping)

Flooding in the Indus Basin

Indus Basin is one of the largest in Asia covering 1 million square kms. Besides the four South Asian countries it spans Afghanistan and China. 56% of the Basin is located in Pakistan comprising Indus and its tributaries: Kabul, Jhelum, Chenab, Ravi, Beas and Sutlej. Most of these rivers traverse through India and this vulnerability led to operationalization of the Indus Water Treaty (footnote) for equitable water use⁴.

³ UN Inter – Agency Contingency Planning Guidelines for Humanitarian Assistance, pp 38, November 2007

⁴ Indus Water River System, Flooding and Mitigation, by H. Rehman and A. Kamal, work for the Federal Flood Commission, Ministry of Water and Power.



Map 1. Existing Surface Storage
Source: FFD

Since creation of Pakistan floods along the Indus Basin have wrecked economic damage worth Rs 225 billion (about \$ 6 billion approx), primarily to the communication and irrigation infrastructure and about 7,800 lives have been lost. Historical record of flood damages incurred in Pakistan is reproduced below:-

Year	Unadjusted value of Property (Rs M)	Adjusted value of Property	Died	Villages affected
2007	Details not available		596	6498
Total		199210	7806	
1950	199.80	11282	2190	10000
1956	155.50	7356.00	160	11609
1957	152.50	6958.00	83	4498
1973	5137.00	118684.00	474	9719
1976	5880.00	80504.00	425	18390
1978	4478.00	51489.00	393	9199
1988	6879.00	25630.00	508	1000
1992V	34751.00	69580.00	1008	13208
1995	6125.00	8698.00	591	6852
2001	45.00	450.00	219	50
2003	5175.00	5175.00	484	4376
2004	15.00	15.00	85	47
2005	Details not available		59	1931
2006	Details not available		541	2477

Table 1. Flood Damage as a consequence of major river floods ⁵

River	Site	1			2			3	
		Cusecs	Date	Flood level	Cusecs	Date	Flood Category	Cusecs	Date
Indus	Tarbela	510000	31.7.89	High	500000	10.9.92	High	480000	26.7.95
	Attock	670000	1958	VH	653000	1966	VH	623000	1964
	Kalabagh	862000	2.8.76	EH	849245	10.9.92	EH	776000	7.58
	Chashma	786600	8.76	VH	689100	29.8.83	VH	668336	11.9.92
	Taunsa	789000	1958	VH	675233	7.8.76	VH	655079	14.9.92
	Guddu	1199672	15.8.76	EH	1172292	13.8.86	EH	1162653	31.7.88
	Sukkur	1166574	15.8.86	EH	1161000	1976	EH	1118856	31.7.88
	Kotri	980329	14.8.56	EH	826369	25.8.94	EH	799447	18.8.95
Jhelum	Mangla	1090000	10.9.92	EH	1045000	4.7.59	EH	730000	6.8.58
	Rasul	952170	10.9.92	EH	876000	5.7.59	EH	8600TD>860000	11.7.60
Chenab	Marala	1100000	26.8.57	EH	870795	5.7.59	EH	845090	10.9.92
	Khanki	1086410	27.8.59	EH	1021018	5.7.59	EH	1000496	10.8.73
	Qadiraad	948530	11.9.92	EH	878719	26.9.88	EH	873442	28.8.97
	Trimmu	943225	8.7.59	EH	888117	14.9.92	EH	706433	6.8.76
	Panjand	802516	17.8.73	EH	744152	18.9.92	EH	676722	27.9.50
Ravi	Jassar	680000	4.10.55	EH	Overflow	25.9.88	EH	328000	27.8.57
	Shahdara	576000	27.9.88	EH	542000	6.10.55	EH	225000	28.9.47
	Balloki	389845	28.9.88	EH	275000	22.9.50	EH	275000	8.10.55
	Sidhnai	330210	2.10.88	EH	244348	15.8.76	EH	212340	12.9.95
Sutlej	Sulemank i	598872	8.10.55	EH	399453	30.9.88	EH	360412	30.9.47
	Islama	492581	11.10.55	EH	308425	4.10.88	EH	285254	4.10.47

Note: H: High; VH: Very High; Extremely High: EH

Table 2: Peak River Discharge during Monsoon since 1947⁶

Floods occur as a consequence of the monsoon rains whereby weather systems developing in the Bay of Bengal deliver significant precipitation along the lower Himalayas in the catchment areas of rivers Jhelum, Chenab, Ravi, Beas and Sutlej, rarely in Indus which flows through Karakoram ranges into Pakistan. Floods normally occur in July – September when precipitation water input is augmented by snow melt. Occasionally snow melt dangerously peaks with rain water inflows to cause much havoc.

Enhancing regional warming is causing increasing glacial lake melts which tends to supplement the traditional flooding activity.

Summer Monsoons

Summer monsoons result in heavy cyclones and weather systems based precipitation originating from Bay of Bengal and also Arabian Sea. The Bay of Bengal related weather systems tend to traverse the Indian landmass and cause heavy precipitation along the southern reaches of Himalayas along Pir Panjal Range in Kashmir which constitutes the catchment region for all rivers except Indus. Offshoots of Hindu Kush like Koh-e-Sulaiman range limits monsoon impact in the west of the country. If the eastern monsoon system originating from Bay of Bengal were to combine with western weather systems it would result in very heavy precipitation which can contribute towards major floods like in 1992.

⁵ Ibid

⁶ Peak River Discharge during Monsoon since 1947, www.pakmet.com.pk/floodupdate/



Map 2: Track of Flood Producing Monsoon Weather System
Source: Pakistan Meteorological Department

Precipitation combines with glacier melts and flash flooding / hill torrents to cause floods. Synergy in the unfolding of these elements cause major floods. Another critical input is the water release from Tarbela and Mangla dams when at optimum levels. In 1992 such releases combined with flood water inflows to cause much downstream devastation.

Some of the weather systems originating from Bay of Bengal and to a lesser extent Arabian Sea result in occurrence of tropical cyclones in the North Arabian Sea which impact coast of Sindh and Balochistan like Cyclone Yemyin in 2007.

The Five Rivers

River Indus is joined by numerous tributaries like Shyok, Hunza and Yasin in Northern Areas and some in NWFP like River Kabul, Swat and Kurram and numerous minor channels. WAPDA has a network of telemetric rain & river gauges on some of the small rivers in remote areas of upstream Tarbela, which help in assessment of anticipated flow at Tarbela. However, the existing flood monitoring mechanism does not provide an efficient coverage to all river systems, therefore, any major water deluge is detected late practically close to Tarbela. Most of the water flowing in Indus originates from glacial melt which again is not amenable to monitoring. Flood water systems in Indus are, therefore, detected late. Indus water takes 21 days to traverse through to Guddu in Sindh.

Jhleum and Chenab rivers emanate from Pir Punjal Range in Indian Held Kashmir. Most flood water accumulates rapidly from hill torrents allowing minimal early warning time as it enters Pakistan. Chenab River, on the other hand, is flanked by the two Tawi rivers, major flood water drains, as it enters Pakistan and their combined impact cause flooding in populated areas of Maralla and downstream. Chenab threatens Wazirabad and Gujrat districts and River Jhleum causes flooding in Jhang district even in medium floods. Both rivers meet at Trimmu in Punjab which again is vulnerable to flooding in case of synchronized inflow.

Dam	Feet
Mangla Dam	1202.00 (without Mangla Dam Raising Project)
Tarbela Dam	1550 feet
Chashma reservoir	694.00 feet

Table 3 Optimum Reservoir Capacities
Source: Federal Flood Commission

India has water rights over Ravi and Sutlej and it trains their water through numerous storage and water diversion projects. Therefore, much impact of floods is absorbed in these works. Moreover configuration of these rivers allows relatively more early warning. Ravi, however, threatens Lahore and towns downstream in case of medium to high floods.

With much population pressure located within and along flood plains even low to medium floods can engender humanitarian emergency.

Issues associated with riverine flooding are summarised⁷ as:-

- In terms of impact riverine floods are more pronounced in causing socioeconomic losses
- Late receipt of early warning for floods in upper Indus
- Less early warning available for river Chenab floods upstream Marala Headworks in the occupied Jammu & Kashmir catchment areas of rivers Jammu & Jammu Twai.
- Maximum 150 minutes and minimum 30 minutes early warning time available for flood water inflows in Mangla Dam, due to its very close location to steep slope of catchment areas
- Occurrence of combination of flash and riverine floods along Chenab close to the catchment area
- Greater flood impact as a consequence of synergised water flows from Indus tributaries and from dam / reservoir releases
- Confluence of western and eastern weather systems (from Bay of Bengal) leads to heavy flooding as was the case in 1992.
- Importantly, relatively heavy flooding activity is expected in 2008 due to expected unusually high snowmelt in upper mountainous regions.
- Population intrusion in flood plains complicates response

General Information related to occurrence of riverine floods and monsoons is:-

- Flood classification of all rivers⁸ is annexed B.
- Flood season in Pakistan spans 1 July to 30 September.
- High level of preparedness and flood monitoring is maintained by key stakeholders
- Detailed and all stakeholders inclusive flood coordination occurs well before, upto and after the flood season

Flash Floods

Flash floods occur predominantly in mountainous and semi-mountainous regions and also in adjoining plains. While such floods are on the rise over the last couple of years because of changing weather patterns, its humanitarian consequences are accentuated owing to absence of any viable local early warning system and the sudden onset nature of the hazard. Moreover, most regions vulnerable to flash flooding lie outside the coverage of the early warning system deployed for riverine floods. A bird's eye view of areas that are vulnerable to flash flooding is as follows:-

Northern Areas. Hunza, Ghizar, Astore, Gilgit and Skardu valleys.

NWFP. Charsadda, Peshawar, Mardan, DI Khan, Swat, Mansehra, Upper and Lower Dir and Chitral valleys.

AJK. Muzaffarabad, Neelum, Bagh, Kotli and Bhimber districts.

Punjab. Sialkot, Wazirabad, Gujranwala, Gujrat, Bhakkar, Mianwali and DG Khan districts.

Balochistan. Sibi, Jhal Magsi, Bolan, Kech, Gwador, Kharan, Kalat, Khuzdar and Lasbela districts.

⁷ The Study of the monsoon related hazard occurrence has benefited much from the learned views of Mr Shaukat Ali Awan, Ex-Chief Meteorologist FFD Lahore

⁸ Source: Federal Flood Commission

Sindh. Dadu, Qambar- Shahdadkot, Larkana, Karachi, Hyderabad, Sanghar and Badin.

Issues associated with flash flooding are summarised as follows:-

- Wide vulnerability imprint, spanning all regions / provinces of the country
- Flash floods tend to occur more in recent years owing to changing weather patterns
- Near absence of early warning cover to warn vulnerable communities
- Being a sudden onset hazard, flash floods pose a grave threat to lives besides accentuating socio-economic poverty.

Tropical Cyclone

Historical Overview of Cyclone Occurrence in Pakistan

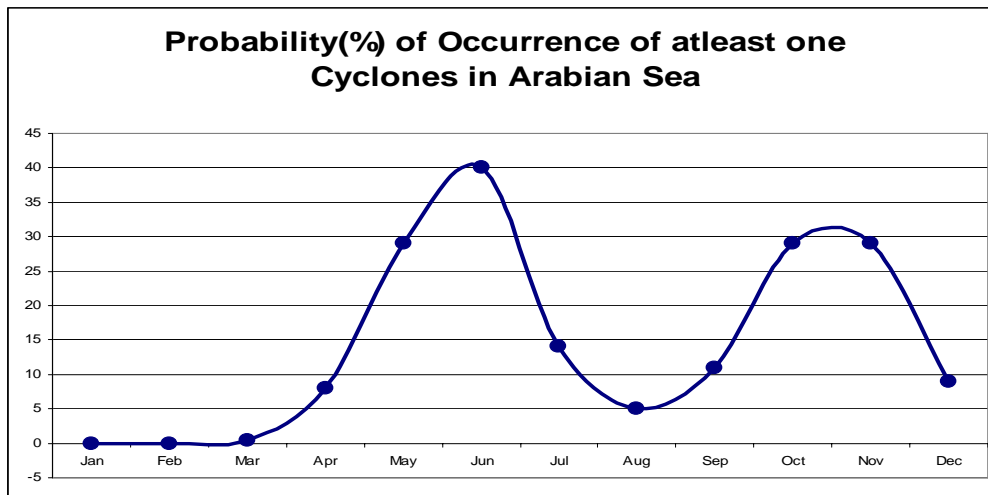
Over the past years cyclones tend to recur frequently though most do not seriously impact on Pakistan's coast. However, cyclone of 1999 seriously impacted Thatta and Badin districts of Sindh and affected 0.6 million people and caused loss of 202 lives. Cyclone Yemyin in 2007 had a much wider imprint spanning 26 districts of Balochistan and Sindh and affected 2.5 million people and caused loss of nearly 400 lives. In Sindh vulnerable regions are low lying and, therefore, cyclone surges extend quite some distances inland and water stagnates for long periods. Intense winds normally accompany cyclones and they cause widespread damage. For example winds preceding Cyclone Yemyin caused 142 deaths in Karachi and widespread damage to infrastructure.

PMD is responsible for tropical cyclone detection, tracking and issuance of early warning and updates. It works in concert with regional and World Metrological Organisation (WMO). Warnings and forecasts are disseminated by PMD Islamabad Office.

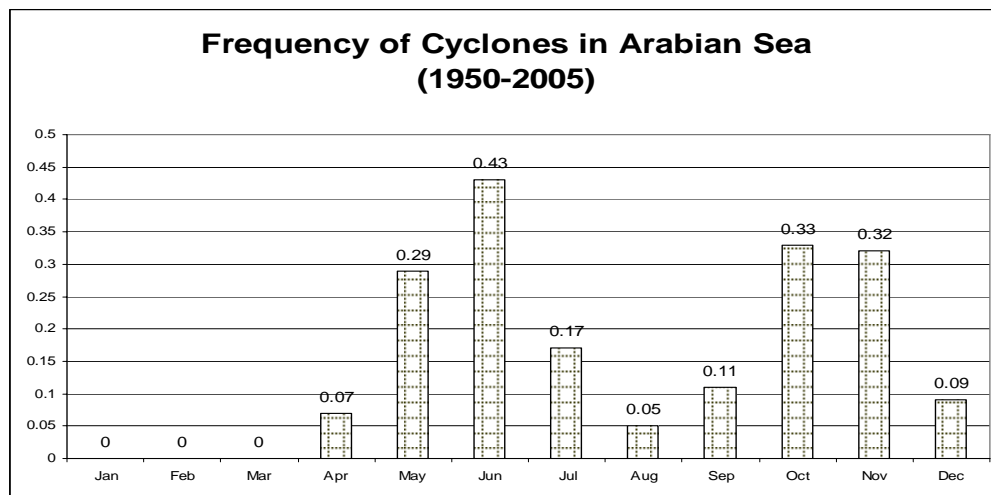
Name / Year	Impact	Losses	Response
Yemyin (26 June 2007)	Sindh & Balochistan coastal and adjoining regions	2.5 million affected. 7 districts of Balochistan and 2 of Sindh severely affected	Required national respons
Gonu 15 June 2007	Rains along Sindh coast and impacted in Oman	Nil	Mild
Tropical cyclone 04-A "Mukda" 21-24 Sep 2006	formed over eastcentral and adjoining northeast arabian sea	Nil	Nil
Onil Oct 2004	Sindh – Thatta and Badin	Local. Cyclone impacted with a reduced impact resulting in heavy local precipitation	Local response
Cyclonic storm formed during first fortnight of May 2004	Southeast Arabian Sea	Nil	Nil
Severe cyclonic storm formed in May 2001	East central arabian sea	Nil	Nil
Cyclone of May 1999	Seriously impacted Sindh coast and Districts Of Thatta and Badin	202 died, Houses fully / partially damaged 138,719	Major multi agency relief operation was launched
Cyclone storm June 1996	East Central Arabian Sea	Nil	Nil
Tropical storm 2 nd fortnight October 1996	Southeast Arabian Sea	Did not impact Pakistan coast	
Cyclone storm June 1996	East Central Arabian sea	Nil	Nil
Tropical cyclone Nov 1993	North Arabian Sea	Nil	Nil
15 Dec 1965	Karachi and Thatta	10,000 affected	Severe

Table 4- History of tropical Cyclone Occurrence and its impact
 Source: Pakistan Metrological Department, Karachi

Empirical data indicates that cyclones tend to occur in May – July and October – November timeframes in Pakistan.



Graph 1- Probability (%) of Occurrence of one Cyclone in Arabian Sea
 Source: Pakistan Meteorological Department



Graph2- Cyclone Incidence in Pakistan
 Source: Pakistan Meteorological Department

Impact of Cyclone Yemyin and Flash Floods June – July 2007

- 2,5 million affected approximately
- 400 died.
- Poor reach of early warning to vulnerable communities.
- Massive federal response launched for SAR, provision of emergency shelter, healthcare and food support worth Rs.1 billion
- GOP paid Rs 1.4 billion as relief compensation to 63,620 seriously affected families
- Assistance worth \$ 22 million were provided by friendly countries and through bilateral assistance
- UN agencies and INGOs provided essential relief and livelihood regeneration capacity

Issues with Tropical Cyclones Response

- Cyclones tend to occur in May and June and in September and October, before or in the aftermath of flood season.
- There are serious gaps in disseminating early warning to vulnerable communities
- Negligible early warning is available for accompanying flash floods
- Widespread damage and loss of life occurs due to high winds preceding cyclones
- There is near absence of cyclone impact mitigation works along the vulnerable regions
- There is a need to streamline cyclone response plans which normally involve multiple agencies.

Urban Flooding

Ill planned urban development has resulted in very limited urban storm water absorption capacities. This problem is more acute in Sindh where absence of gradients and near absence of functioning sewerage systems capable of absorbing flood water influx in cities like Karachi, Hyderabad and smaller cities experience partial or near complete inundation even after medium intensity rains. Urban flooding is also witnessed in Rawalpindi where Leh Nullah tends to flood low lying areas where severe flooding occurred following cloud burst in July 2001. Similarly, Lahore and many other cities of Punjab and even NWFP face such problems in the event of medium to heavy rains.

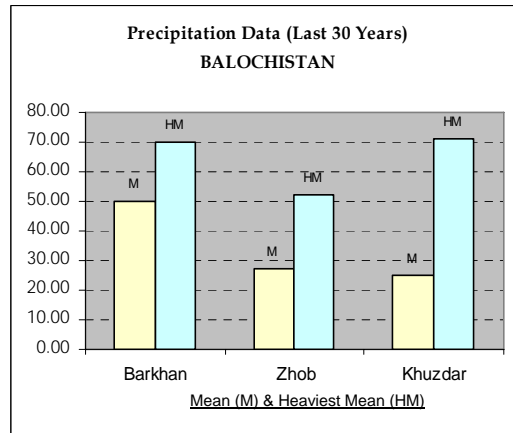
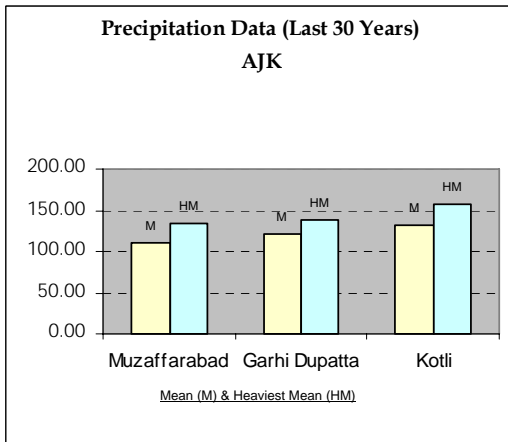
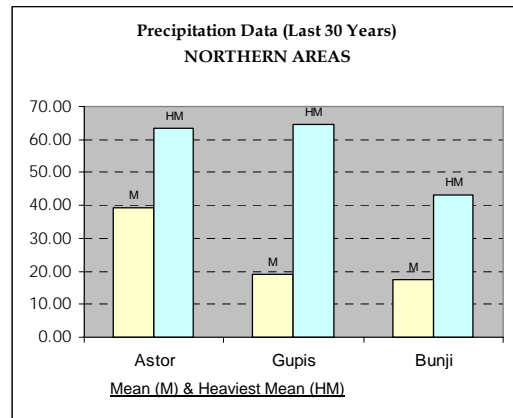
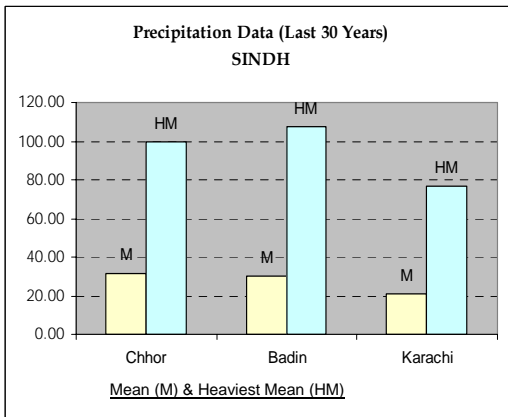
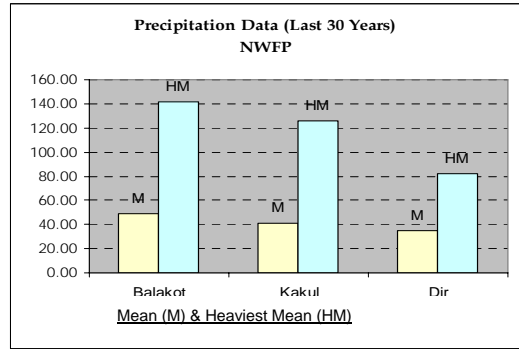
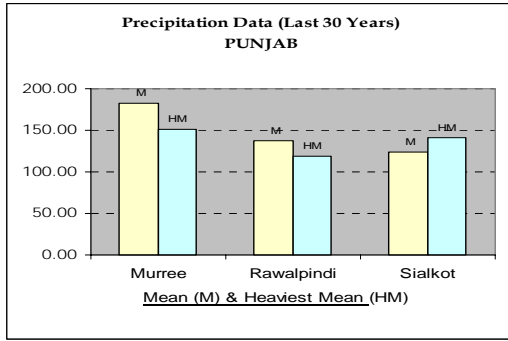
Issues with urban flooding response are:-

- Ill conceived urban planning
- Poor flood water drainage works which includes infrastructure and pumping facilities.
- Near absence of flood water protection works like dykes
- Sub-standard emergency response services which includes search and rescue capacity. Immediate reliance on armed forces occurs in a serious situation.

Precipitation

PMD maintains precipitation record, shown graphically below and in Annexure C, which shows mean average rainfall recorded over last 30 years and the heaviest rainfall recorded over 24 hours again over the last 30 years. On comparison likely deviations in rainfall occurrence which may give rise to emergencies or accentuate flood impact are revealed.

Precipitation forecasting occurs progressively from seasonal forecasts, to weekly forecasts, 24 hours forecast and immediate ones. During the monsoon period PMD disseminates precipitation forecasts to host of other national end-users



Graph 3: Provincial Summer Precipitation Profile
Source: Pakistan Meteorological Department

Issues with Excessive Precipitation

It tends to cause riverine and flash floods in vulnerable regions. However, owing to low terrain configurations in lower Sindh heavy precipitation leads to prolonged flooding in urban and rural regions causing much socio-economic losses.

Glacial Lake Outburst Flood (GLOF)

As per experts there are 5218 glaciers in Pakistan with a total of 2420 lakes. Out of which 52 lakes are considered dangerous. Though past history of GLOF is not documented but records indicate GLOF occurrence in Ghizar Valley in Ishkoman region in 1960 and in Hunza region in 1892-93. Similarly Shingo Basin, Astor, areas south of Gilgit and in the Jhelum Valley are also vulnerable.

The capability of remote sensing of glacial regions for agricultural use was acquired in 1992 and upgraded by ICIMOD and with Japanese support. An agreement for GLOF monitoring was arrived at with ICIMOD in 2003, though Pakistan maintains a very limited capacity and relies more on external support.

Since 2003, starting from the Astor Basin, all glacial basins have been inventoried for geo coordinates, numbered, named and their physical configuration have been recorded. However, there is not much of follow-up and monitoring and disaster simulation cum preparedness emphasis.⁹

Flood Management

Federal Flood Commission

It took series of devastating floods for the government to finally decide on their proactive management. Following floods of 1976, Federal Flood Commission (FFC) was created with the mandate to undertake comprehensive flood protection spanning: flood impact prevention and mitigation works especially in areas of high economic sensitivity, defining standards for such works; putting in place a nation wide flood early warning system, and; review / approve flood protective works schemes prepared by provinces.

FFC prepared First Flood Protection plan by 1978. It envisaged reducing flood losses, prioritized flood protection for areas of greater economic interests. The Second plan was initiated in 1988. Federal Flood Protection Sector Projects (FPSP) phase 1 has been completed and phase 2 is underway. About 5600 kms of embankments have been constructed along major rivers and their tributaries and 600 spurs to protect the embankments.

Numerous legal instruments cover flood protection in Pakistan which include Punjab Irrigation Act 1873, NWFP Act 1893, Punjab Soil Reclamation Act of 1952, Water Users Association ordinance 1981, Indus River System Act 1992 have been put in place¹⁰.

Planned expenditures for flood mitigation for the year 2007-2008 is reproduced below. Major flood projection and mitigation works undertaken by the provinces are reflected in Annexure D. Overview of financial allocation made so far to provinces and other heads is reflected below in Table 5.

⁹ Dr Rakhshan Roohi, Pakistan Agricultural Research Council

¹⁰ *Indus Water River System, Flooding and Mitigation*, by H. Rehman and A. Kamal, work for the Federal Flood Commission, Ministry of Water and Power

(Rs. In million)

Name of Province/Federal Line Agencies	PSDP Allocation	Revised Allocation	Funds Released as 1 st half
Punjab	688.500	419.110	344.250
Sindh	474.300	474.300	237.150
NWFP	168.300	168.300	84.150
Balochistan	122.400	122.400	61.200
FATA	45.900	45.900	22.950
AJ&K	15.300	15.300	7.650
Northern Areas	15.300	15.300	7.650
Priority Flood Works in the Provinces and Federal Line agencies to be carried out as decided by Federal Minister for W & P.	<u>180.000</u>	<u>180.000</u>	<u>90.000</u>
Punjab	95.000	95.000	47.500
Sindh	15.190	15.190	7.595
NWFP	34.810	34.810	17.405
Northern Areas	15.000	15.000	7.500
PMD	20.000	20.000	10.000
Islamabad Capital Territory	30500	3.500	0.000
Federal Flood Commission	85.500	65.500	10.929
Flood Protection Sector Project-III	1.000	1.000	0.000
Total:-	1,800.000	1,510.610	865.929

Table 5. Overview of Financial Allocations for Flood Impact Mitigation Works
Source: Federal Flood Commission

Flood Forecasting and Dissemination of Early Warning

Following floods of 1992, a comprehensive Indus Forecasting system was launched with the assistance of ADB. It is an ongoing work executed by FFC. Flood Forecasting Division (FFD) Lahore which is part of PMD, under takes dissemination of flood early warning to national stakeholders through an institutionalized process that connects inputs down to vulnerable communities using multiple channels.

Accurate forecasts with regards to precipitation are disseminated by PMD one week in advance and progressively these are issued till one hour before occurrence. Relatively long term seasonal forecasts, on the contrary, are considered less accurate. For example such forecasts proved partially incorrect in winters 2007 / 08 as more than predicted rain and snowfall fell in the region including the mountainous areas of Pakistan.

Therefore, despite less rains in March, FFD maintains that the cloud cover in the mountainous regions has prevented early snow melt. Therefore, flood inflows during the summers are likely to have significant snow melt content.

Flood forecasting occurs through a four fold input system which includes:-

- Network of weather radars
- Telemetric system which sends real time inputs on water flows
- Satellite coverage which includes both indigenous capacity and through WMO network
- Ground observation through PMD ground station deployed across the country

Among weather radars deployed across the country more significant are the Doppler radars that furnish quantified inputs and are deployed in Lahore, Sialkot and Mangla to cover the flood catchment region.

WAPDA has installed telemetry gauges along the rim of rivers in the catchment region and along some major rivers and it monitors water flows in these channels and provides real time information to FFD.

Provincial Irrigation Departments also monitor river flows in respective provinces and they also communicate inputs to FFD. Indus Water Commission (IWC) receives flood information from India and its inputs also end up with FFD.

FFD (PMD) in Lahore constitutes the nerve centre for flood early warning in the country. Warning is sent to over 100 end users who include disaster management agencies, provincial and affected district administrations, armed forces, FFC, WAPDA, Irrigation departments, maritime agencies and airspace users. However, NDMA provides early warning to key national stakeholders. Critical warnings are communicated verbally besides other channels to relevant stakeholders.

Early warning within districts to vulnerable communities is communicated through the following channels:-

- Revenue Department down to 'patwaris', who work in group of 3-4 villages.
- Police wireless network deployed in police stations across the district.
- Through the Forestry Department in forested districts
- Through mosque committees and other grass root organizations
- However, experience shows that vulnerable communities tend to keep each other informed courtesy the ever widening GSM network

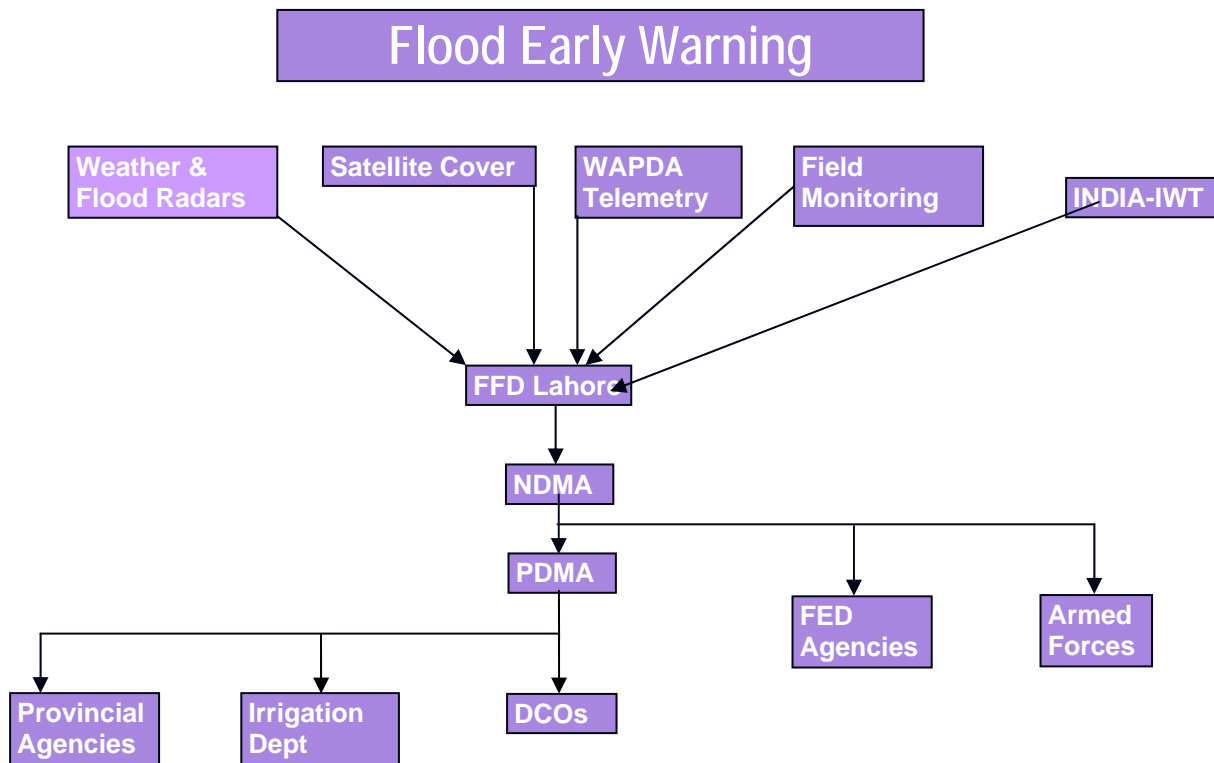


Figure 1– Flood early warning and dissemination

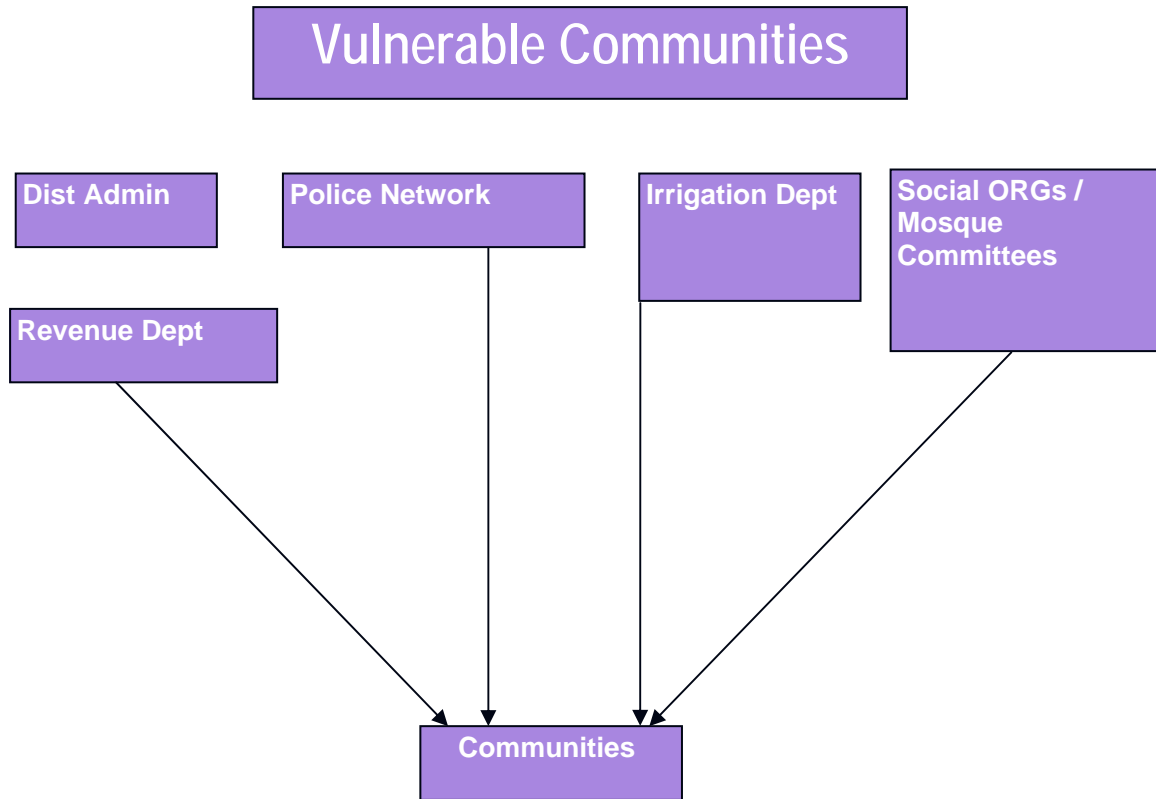


Figure 2- Community level information dissemination
Source: Pakistan Meteorological Department

Coordination for Floods Response

Under the supervision of Ministry of Water and Power, FFC is responsible for coordination of flood impact mitigation, prevention, preparedness and response. PMD assumes responsibility for ascertaining and communication of early warning to relevant national stakeholders. Armed forces coordinate response related measures.

NDMA assumes responsibility for coordinating hazard risk reduction, preparedness and response related measures related to multi-hazard planning for riverine floods, flash floods and cyclones.

PDMA's pivot provincial coordination for flood preparedness which includes inputs from Agriculture Department for flood prevention and mitigation and host of measures involving numerous provincial departments and ministries for preparedness and response.

Flood conferences are held normally well before and before onset of flood season and then post flood season to take stock of damage and remedial works for flood impact mitigation. .

Agencies Working for Flood and Cyclone Impact Control and Response

Their summarised roles are reproduced below:-

Agency	Task
NDMA	Responsible for comprehensive national response to the floods cum monsoons hazards in DRM, preparedness and response context
FFC	Responsible for flood mitigation and response
PMD	Provides early warning to all stakeholders for floods and cyclones
WAPDA	Regulates flood water outflow from reservoirs and monitors water flow in catchments areas
Pakistan armed forces	Flood response in aid of provincial authorities and coordination role
ERC	Provide support to reinforce flood response
PDMA	Responsible for entire spectrum of disaster management, response in particular with regards to monsoon hazards
FFD	Early warning for riverine floods
NCCM	Reinforces Ministry of Interior based emergency response if required
Civil Defence	Reinforces flood response at the local level
Provincial Agriculture Department	Responsible for flood mitigation works in the province and flood water monitoring
Provincial Health, Livestock, C&W, PHE, Food Deptts	Provides preparedness and response support in respective area of work
PARC	Works in glacial outburst monitoring with ICIMOD

Table 6– Role of Key Stakeholders in Flood Response

Summary of Vulnerable Districts province wise - Annexure E.

Flood Preparedness . Some of such issues¹¹ which require urgent attention are:-

- Improvement of flood warning system against flash floods and cyclones and along River Tawi. (DRM)
- Improvement in flood mitigation works over river Kabul and Swat; (DRM)
- Deployment of dewatering equipment in urban areas in the event of heavy rains (response)
- Defining extent of floods plains and checking of encroachment (DRM)
- Induction of new flood equipment including for night rescue by provinces (Response)
- Chart change of course in River Ravi (DRM)
- Improvement of flood early warning along River Tawi (DRM)
- Repair of flood protection bunds, FP Bund along Indus in Sindh in particular. (DRM)
- Streamlining SOPs for operation of breaching sections along protection bunds. (Response)
- Construction of additional spillway and breaching section on Mirani Dam in Balochistan (DRM)
- Improvement in drainage in Pat Feeder Canal (DRM)

¹¹ Minutes of post flood conference held in GHQ (Engineer's Directorate) of 15 Jan 2008.

Conclusions on Flood Management in Pakistan

- Flood management spans disaster prevention risk reduction and response.
- However, in response governmental biases have been identified in safeguarding affected regions.
- Despite putting in place an effective early warning system, gaps exist in terms of warning communities and vulnerable segments in the context of flash flood in particular.
- Disaster risk reduction considerations are not yet fully factored in the development. Left Bank Outfall Drain (LBOD) case in Sindh is a case in point as the project has over the years engendered more disasters than prevention.
- PDMA's and other critical provincial / disaster response departments remain under resourced which impacts upon their efficacy during response.
- Through the assistance & coordination of FFC, PMD has installed a series of Quantitative Precipitation Measurement (QPM) Doppler Weather Radars around the flood catchment region in lower Indian Held Kashmir which allows quantified precipitation forecasting to facilitate flood early warning.
- Being a relatively new institution PDMA's have yet to assume their centrality in coordination of disaster response.
- Finally, armed forces play a major role in both monitoring national preparations with regards to monsoon floods and in response, in particular.

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Summary of Hazard Risk Analysis

Hazard	Shortfall in Preparedness	Probability of Occurrence	Risk Factor
Riverine Floods	<ul style="list-style-type: none"> • Quality of mitigation / prevention works • Physical vulnerability viz flood path • Availability of response stores • Capacity building for response • Availability of essential relief stores • Mental awareness / preparedness for disaster response • Quality of early warning 	Likely to occur in monsoon season 2008 owing to heavy predicted snowmelt. The quantum could be from medium to heavy. More likely in Indus, Jhelum and Chenab. Heavy precipitation can add to their quantum and humanitarian impact	Medium to high
Flash Floods	<ul style="list-style-type: none"> • Very poor quality / non-existent mitigation works • Physical vulnerability viz flood path • Non existent local disaster response capacity • Poor awareness and capacity building for response • Extremely poor quality of early warning 	High possibility of occurrence in the semi-mountainous and mountainous regions of AJK, NWFP, NA, Balochistan and Punjab.	Very high
Sea based Cyclones	<ul style="list-style-type: none"> • Non- existent cyclone impact mitigation works • Poor quality of early warning to isolated communities • Non existent local impact mitigation / response capacities • Poor local capacity building for response • Poor awareness level 	Relatively high possibility of occurrence priority regions are:- <ul style="list-style-type: none"> • Along Sindh coast • Along Sindh and • Balochistan coast 	Very high
Urban Flooding	<ul style="list-style-type: none"> • Ill conceived urban planning • Weak infrastructural capacity to absorb • Excessive rain water • Weak emergency response services 	Karachi Hyderabad Rawalpindi Lahore Smaller cities of lower Sind	Very high
Sliding Activity	No effective DRM strategy put in place to Check sliding, mudslide and other rain	Vulnerability is severe in earthquake zone districts of	Very high

	Instigated environmental damage	Mansehra and Battagram in NWFP and in Muzaffarabad and Bagh in AJK	
Heavy precipitation and Cloud Burst	It can be termed as a sudden onset emergency and poor or nonexistent early warning and mitigation works tend to enhance its impact	<ul style="list-style-type: none"> • Semi-mountainous regions of:- • NWFP, • AJK, • northern Punjab • Mountainous regions of Balochistan • Urban flooding 	Determined on short term forecasts

Determination of Scenarios + Planning Assumptions

Scenario A. (Moderate in impact) Low to heavy floods riverine floods with flash flooding and cloud burst activity in semi-mountainous and mountains regions instigated by commensurate precipitation levels causing local emergencies. Precipitation instigated road blocks and mud slides experienced in earthquake affected districts of NWFP and AJK. Cyclone activity impacting upon two to three coastal districts in Sindh / Balochistan.

Triggers

- Dissemination of relevant levels of flood early warning by FFD Lahore
- Dissemination of relevant level of flood alert issued by FFD
- PMD issues cyclone warning, alert and updates
- NDMA issues national early warning.
- DDMA / local authorities determine that the disaster is beyond their capacity to manage and that it requires a higher level of response.
- PDMA may also determine that disaster requires Federal intervention.
- NDMA to identify operationalization of Scenario A based on inputs by relevant stakeholders and mounts need based Federal response.

Response Level. Local response by affected DDMA and PDMA and need based Federal response by NDMA. Armed forces will be employed in search and rescue operations and provision of immediate relief. Overall response to include relief compensation, shelter, food security and health support. A viable strategy for support of vulnerable will be put in place.

End State.

- Termination of hazards perceived under Scenario A as identified by PMD, FFD and NDMA.
- Evidence based termination of relief support to the vulnerable or seriously affected population by NDMA.
- Possibility of early recovery launch.

Scenario B. (Most Dangerous in impact) Heavy to super heavy riverine flooding, significant flash flooding and cloud burst activity owing to heavy precipitation in mountainous and semi-mountainous regions causing sliding activity and severing population segments. Cyclone activity experienced affecting up to eight to ten districts in Sindh and / or Balochistan causing widespread destruction along coastal region and massive inland flash flooding

Note. The scenario does not address humanitarian consequences of tropical cyclone impacting upon the city of Karachi, for which there is no historical precedence. However, such an eventuality is likely to exact a very heavy humanitarian toll. In Cyclone Yemyin in 2007 pre-cyclone precipitation and winds impacted the city in which 142 died besides causing serious damage to infrastructure

Triggers

- Dissemination of flood early warning and cyclone alert by FFD and PMD
- Situation updates disseminated by FFD and PMD
- National early warning issued by NDMA
- Seriously affected DDMA determine provincial support for response.
- Seriously affected PDMA determine need based Federal support for response.
- NDMA to identify operationalization of Scenario B and launches Federal response.

Response Level. Local response by affected DDMA and PDMA and need based Federal response by NDMA. Armed forces will be employed in search and rescue operations and provision of immediate relief. Overall response to include shelter, food security and health support, and disbursement of relief compensation and reopening of severed road communication. Strategic air assets employed to bolster relief operations. A viable strategy for support of vulnerable will be put in place. Voluntary international response is anticipated consistent with national policies.

End State

- Termination of hazards perceived under Scenario B as identified by PMD, FFC and NDMA.
- Evidence based termination of relief support to the vulnerable or seriously affected population by NDMA.
- Early recovery launched / planned.

Scenario C. (least likely but dangerous in impact) Normal to low flooding along major rivers and medium to heavy localised flash flooding and cloud burst activity in mountainous and semi-mountainous regions causing severance of road communication and isolation of population segments. However, major cyclone activity experienced along major portions of Sindh and Baluchistan coasts affecting 6-8 districts, causing widespread devastation along costal zones and heavy inland flash flooding.

Note. The scenario does not address humanitarian consequences of tropical cyclone impacting upon the city of Karachi, for which there is no historical precedence. Such an eventuality is likely to exact a very heavy humanitarian toll

Triggers and End State similar to Scenario B.

Response Level. Local response by affected DDMA's and PDMA's and need based Federal response by NDMA. Armed forces will be employed in search and rescue operations and provision of immediate relief. Use of naval and air assets is foreseen in support of relief operations. Overall response to include relief compensation, shelter, food security, health support and reopening of road communication. A viable strategy for support of vulnerable communities will be put in place. Voluntary external assistance is foreseen in this scenario consistent with national policies.

Planning Assumptions

Scenario B. The response will be based on the most dangerous scenario and it will cater for Scenarios A and C.

Likely Relief Caseload

Provinces	Anticipated Affected Population	Anticipated Relief Caseload
Punjab	4,308,510	Pop 565,731 – HHs 94,288
Sindh	1,575,785	Pop 231,424 – HHS 38,570
NWFP	337,500	Pop 54,000 – HHs 9,000
Balochistan	1,700,000	Pop 240,000 – HHs 40,000
AJK	168,750	Pop 27,000 – HHs 4,500
Northern Areas	131,250	Pop 21,000 – HHs 3,500
Total	8,221,795 (8.2 million)	Pop 1,139,155 – HHs 189,858

- Response estimates for the likely relief caseload are planned for 15 days and this is likely to meet prolonged relief needs as disasters tend to apply a spatially varied footprint, thus engendering varying humanitarian needs.
- Latent vulnerabilities that tend to exacerbate disaster response stem from socioeconomic poverty which holds truer for relatively backward regions of Balochistan, rural Sindh, AJK and Northern Areas. Refer to socioeconomic indicators of the affected districts in Annexure F.
- In terms of operational constraints response to monsoon disasters in Balochistan is impaired by vast spaces and a fragile land communication infrastructure that is highly susceptible to disruptions. In case of mountainous regions

of NWFP, AJK and NA, the response again is undermined by high vulnerability of the communication infrastructure to geographical barriers.

- Armed forces support, therefore, remains critical to the search and rescue and the emergency response in particular airborne response in far isolated distant regions, more so for sudden onset flash floods that allow little early warning is available to vulnerable communities.
- Mobilised national and provincial response reinforces armed forces response and it brings together provincial and national stakeholders consistent with needs. The national response constitutes the mainstay of response to major disasters.
- Quality of district and provincial response in health, food security, shelter, access to potable water, livestock support and resumption of education and livelihoods are based on within province resource mobilisation and / or promptness and quality of external support.
- Response to urban flooding is likely to remain deficient due to infrastructural insufficiency and weak administrative control of mega cities like Karachi having numerous autonomous administrative structures, and poor emergency response services

Planning Assumption for Scenario A

Likely Relief Caseload

Provinces	Anticipated Affected Population	Anticipated Relief Caseload
Punjab	2,975,050	Pop 389,569 – HHs 64,928
Sindh	808,430	Pop 123,020 – HHs 20,502
NWFP	150,000	Pop 24,000 – HHs 4,000
Balochistan	468,750	Pop 75,000 – HHs 12,500
AJK	75,000	Pop 12,000 – HHs 2,000
Northern Areas	56,250	Pop 9,000 – HHs 1,500
Total	4,533,480 (4.5 million)	Pop 632,589 – HHs 105,430

Assumptions applicable to Scenario B also apply to Scenario A.

Planning Assumptions for Determining Relief Caseloads

- Drawing from historical precedence relief case load for riverine flood relief case load is 13% of the affected population and for flash floods, 16 % of total affected population. The latter approximates the example of Cyclone Yemyin
- Riverine Floods Punjab case load has been determined on flood damage records 1992 (Scenario B) and 1988 (Scenario A) floods.
- Riverine floods Sind case load has been ascertained from floods cum heavy rains damage records of 1994 (Scenario B) and from 1992 (Scenario A)
- Sindh cyclone figures have been determined from record of Yemyin, 2007 (Scenario B) and of 1999 Cyclone (Scenario A).
- Relief caseloads of Balochistan have been determined from record of Cyclone Yemyin 2007 (Scenario B) and of Mekran Cyclone 1997(Scenario A).

- Owing to difficulty in access of historical records of monsoon disaster occurrence in NWFP, AJK and Northern Areas, relief case loads have been determined through a combination of accessing old records and stakeholders consensus.
- In case of ambiguity in determining the basis for calculation relief case loads have been kept on a higher scale.

Likely Pattern of Occurrence of Monsoon Emergency

- Dissemination of relevant levels of flood early warning by FFD Lahore
- Relevant level of flood alert issued by FFD
- PMD issues cyclone warning, alert and updates
- DDMA / local authorities determine that the disaster is beyond their capacity to manage and that it requires a higher level of response.
- PDMA also determine that disaster requires Federal intervention.
- NDMA to identify operationalization of relevant scenario based on inputs by relevant stakeholders and mounts Federal response.
- Flood and cyclone warning alerts and updates issued by PDMA and enforcement of provincial / affected district flood response plans
- Early warning disseminated to likely affected communities with regards to flood and flash floods.
- Relocation of vulnerable communities to safer locations as per local plans
- Sharing of information with UN agencies / international community on likely flood occurrence and national response plans.
- Note. Many of these actions occur concurrently

Complex Emergencies

Compared to winters the internal strife situation in NWFP regions of North and South Waziristan has improved with change in the political environment in the country. Low scale counter insurgency operations, however, continue and the local and provincial governments are taking care of the humanitarian fallout which is negligible.

Some locally displaced population has either temporarily migrated to other regions or found shelter among kith and kin. Camps for IDPs established with the support of Pakistan Red Crescent Society (PRCS) are largely unoccupied. Access to the region is limited for security reasons and at this stage no major humanitarian fallout is anticipated. However, PDMA NWFP and NDMA are monitoring the situation for humanitarian support¹².

There could be humanitarian fallout accruing from military activity directed against similar elements in the adjoining Afghan territory for which the possibility of deploying NDMA – ANDMA joint mechanisms and SOPs should be explored.

Periods of tension in Indo-Pakistan relations corresponds with much military activity along the Line of Control in Kashmir which includes unrestrained employment of direct and indirect firing weapons. This tends to put at risks lives and property of population residing within 5 – 10 kilometres of Line of Control. The humanitarian fallout accruing from military activity is responded to the armed forces, local and State governments. However, presently the security situation in the region is calm.

¹² Derived from Home Department and Relief Commissioner NWFP and NDMA assessments.

Complex Emergencies – Planning Assumptions

- Escalation in internal conflict in Waziristan or Swat regions of NWFP is likely to cause population exodus / dislocation.
- In a worst case scenario in NWFP up to 10,000 IDPs for likely to be housed in relief camps for varying durations.
- Deterioration in provision of essential services is likely in strife torn regions.
- Current government policy excludes UN agencies and NGOs from providing humanitarian relief or services for security reasons.
- PRCS will assist NDMA and law enforcement agencies in provision of humanitarian assistance.

Health Assessment for Monsoons Emergencies¹³

Background

Every year the monsoon season brings heavy rains to Pakistan. These heavy rains augmented by increased flow of water in the rivers due to snow melting at the river sources brings flood to the plains. Although preparation for monsoon floods is a routine activity in all flood prone districts but unfortunately this planning was never done effectively and efficiently, leaving gaps which cause difficulties in implementing the response to any flood situation. Flood may occur with little or no warning in any of the flood risk districts of Pakistan affecting population in terms of morbidity, disability, and mortality.

Federal/Provincial/District health authorities may need to respond to the immediate health needs of the affected population. For a successful response health authorities need to plan based on the prevailing disease situation in the districts/province.

Goal

To reduce morbidity, disability and mortality in post flood scenarios by planning an effective and efficient response through contingency planning.

Potential Health Impacts of Floods

The potential of floods to deteriorate the health situation of population summons special attention. Severe floods can not only cause destruction to health care infrastructure but it will also affect health indicators of the affected population. The displaced population becomes highly vulnerable to endemic diseases as lack of safe water and sanitation facilities, create poor hygiene particularly in temporary shelters, and establish conditions conducive for vector borne diseases. These conditions amplify the risk for spread of epidemic prone diseases such as acute watery diarrhea (AWD), Typhoid Fever, malaria, measles, relapsing fever and acute respiratory illnesses. The damaged/blocked roads /infrastructure decrease access to health services and increase the challenges for timely and effective delivery of preventive, promotive and curative health services.

Disease scenarios during Monsoons

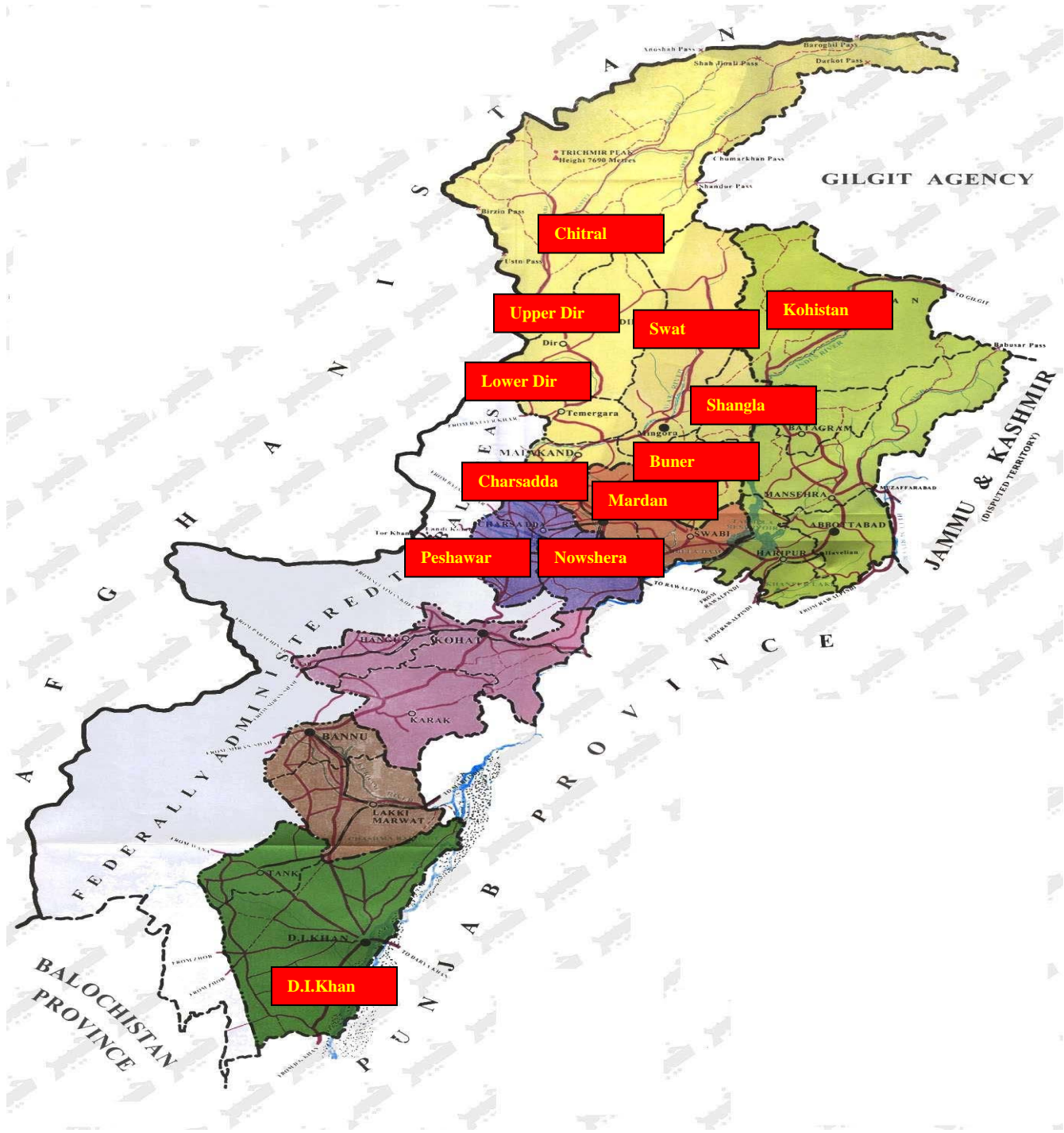
MONSOON SEASON		
June to September		
Epidemic – Prone Diseases	High Alert	Med Alert
CCHF		
Dengue		
Diphtheria		
Acute Gastroenteritis		
Acute Viral Hepatitis		
Influenza / SARS*		
Leishmaniasis		
Malaria		
Measles		
Mening. Meningitis		
Pertussis		
Poliomyelitis		
Typhoid Fever / Salmonellosis		
	High Alert = Peak occurrences in the Monsoon Season	
	Medium Alert = Present in Pakistan and may show outbreak in the Monsoon Season	

Reference:- Seasonal Awareness and Alert Letter (SAAL), 9th issue for Monsoon Season (Jun 2007 – Sep 2008), published by National Institute of Health (NIH), MoH.

¹³ Input provided by WHO.

Provincial Hazards Risk Analysis and Resource Mapping

NWFP



NWFP's peculiar physical configuration makes it vulnerable to diverse range of summer hazards as some heavily populated districts constitute catchment areas of major rivers where minor tributaries proliferate, thus creating flash floods vulnerability. Some districts are traversed by fully formed, mature rivers and they are vulnerable to spill over impact during floods. Physical configuration of northern and north-eastern portion of the province is excessively mountainous spanning from Chitral up in the north to districts of Upper and Lower Dir, Shangla and Swat and Mansehra which are prone to flash flooding, cloud bursts, sliding activity. District Chitral is even vulnerable to GLOF. Therefore, depending on the intensity of monsoon precipitation and ice melt, NWFP is vulnerable to sudden onset hydro-meteorological disasters which require time sensitive response and quick surge. Northern and western parts of the province receive comparatively less summer monsoon rains. Indus, Kabul, Kurram and Gomal are the major rivers traversing the province, though the latter three constitute tributaries of Indus.

The province, on the other hand, has yet to raise PDMA and disaster management functions are split between three agencies: Home Department, Relief Commissioner and FATA Secretariat for tribal areas which tends to complicate articulation of response and increases reliance on armed and para-military forces. However, the Province is attempting to address the situation through creation of PDMA. Armed forces tend to readily assume such responsibilities despite their widespread deployment on internal security operations. There is also a need to streamline inter-departmental coordination for flood response. Hazard assessments of vulnerable districts follows.

Precipitation Data. Annexure C

Socioeconomic profile of Vulnerable Districts. Annexure F

Districts / Agencies	Hazards
Charsadda	Flash Floods, Riverine flood
Nowshera	Riverine Floods
DI Khan	Riverine and Flash floods
Peshawar	Riverine and Flash floods
Mansehra	Flash floods, sliding, cloud burst
Mardan	Flash floods
Swat	Flash floods, cloud bursts
Lower & Upper Dir	Flash floods, cloud bursts
Shangla	Flash floods
Buner	Flash floods and cloud bursts
Chitral	Flash floods, sliding
Kohistan	Flash floods, sliding
Malakand Agency	Flash floods
Kurram Agency	Flash floods

Table 7: Districts Vulnerable to Monsoon Emergencies

Charsadda

Riverine Floods

- Experiences flooding from River Kabul. In 2006, 15,300 families were displaced owing to sudden onset floods in the River. Remains vulnerable.
- Also vulnerable to flash flooding in river Swat which tends to meander across the district emerging from mountains in Tangi area in the upper part of the district. Flash floods along River Swat led to collapse of Charsadda – Peshawar bridge in 2006-2007

Flash Floods. Vulnerable to flash floods along Jindi Nullah and Shobla Nulah, both seasonal water channels.

Peshawar

Riverine Floods. District is vulnerable to flooding in river Kabul and 95 houses damaged in 2005 due to floods in the River.

Flash Floods. Locals have trained the water courses of River Kabul tributaries for agricultural and domestic use which causes spill over in populated areas after even moderate precipitation.

DI Khan

Riverine Floods. Is vulnerable to flooding along River Indus, in particular Paharpur Tehsil. In 2005 70 villages were flooded affecting 5000 households.

Flash floods. The district is excessively vulnerable to flash floods along five nulahs, seasonal water channels, flowing into Indus off Koh-e-Sulaiman ranges to its west as part of the 'Razkoi system'.

Swat

It is vulnerable to flooding along River Swat and its tributaries. Flash floods caused collapse of Kanju Bridge in 1976.

Mardan

The district is vulnerable to flash floods along Kalpani Nullah. In 2006 approximately 100 died and 10, 000 families were affected by flash floods in the Nullah.

Nowshera

Riverine Floods. Is excessively vulnerable to floods in River Kabul. In 2006 20,000 families were temporarily displaced due to floods in the River

Mansehra

- 100 families were affected by flash floods in Kunhar and Siran rivers in 2001.
- 75 families were affected and 5 died owing to sudden change in the course of Kunhar River in 2006.
- Intense sliding activity has been experienced in both summers and winter in the earthquake affected regions of Mansehra and adjoining Battagram districts
- 30 died due to cloud burst in Dadar in 2001

Lower Dir

It is vulnerable to flooding along River Swat and its tributaries.

Upper Dir

Flash Floods. Vulnerable to flash flooding among distributaries of Swat River

Cloud Bursts. 28 deaths occurred in village Ushairay Dara owing to cloud burst in 2007.

Shangla

Vulnerable to flash flooding along river Shangla and smaller tributaries of Indus and also to cloud bursts.

Chitral

It is vulnerable to flash floods in Chitral River, more so in the Darosh region

Buner

Cloud Burst. 30 died owing to cloud burst in 2001 in village Ghwar Durra.

Kohistan

- **Flash floods.** Being a mountainous district it is vulnerable to flash floods to local nullahs that constitute tributaries of Indus.
- **Cloud Burst.** 22 died in 2007.

Total Likely Caseloads in worst case scenarios¹⁴

Overview of Flood Protection Works

As per Mr Zahid Abbas, SE Floods, Department of Irrigation NWFP Rs 168.3 million were received for such works and priority districts for flood risk management work are : -

Likely Humanitarian Caseload in Worst Case Scenario B	
Affected Population	Likely Relief Load
	Riverine / flash floods - 22,000
	Flash Floods - 32,000
Total pop – 337,500	Total Pop - 54,000
	Total HHs - 9,000
Likely Humanitarian Caseload for Moderate Scenario A	
Total pop – 150,000	Total pop - 24,000
	HHs - 4,000

- Desilting of Warsak Dam is critical as overflows can cause serious damage in regions including parts of Peshawar district
- DI Khan along River Indus
- Nowshera along river Kabul
- Charsadda along River Kabul
- Peshawar along River Kabul
- Mardan along Kalpani Nullah

Proposals for works in following districts await funding support which require Rs 271 million over and above FFC current allocation;-

- Along Swat River
- In Mansehra along Kunhar River
- In Malakand Agency along Swat River
- Lower and Upper Dir along Swat River
- Lakki Marwat along Kurram River
- Jhok ladhu domwstreram of DI Khan along Indus

Resources for Flood Response

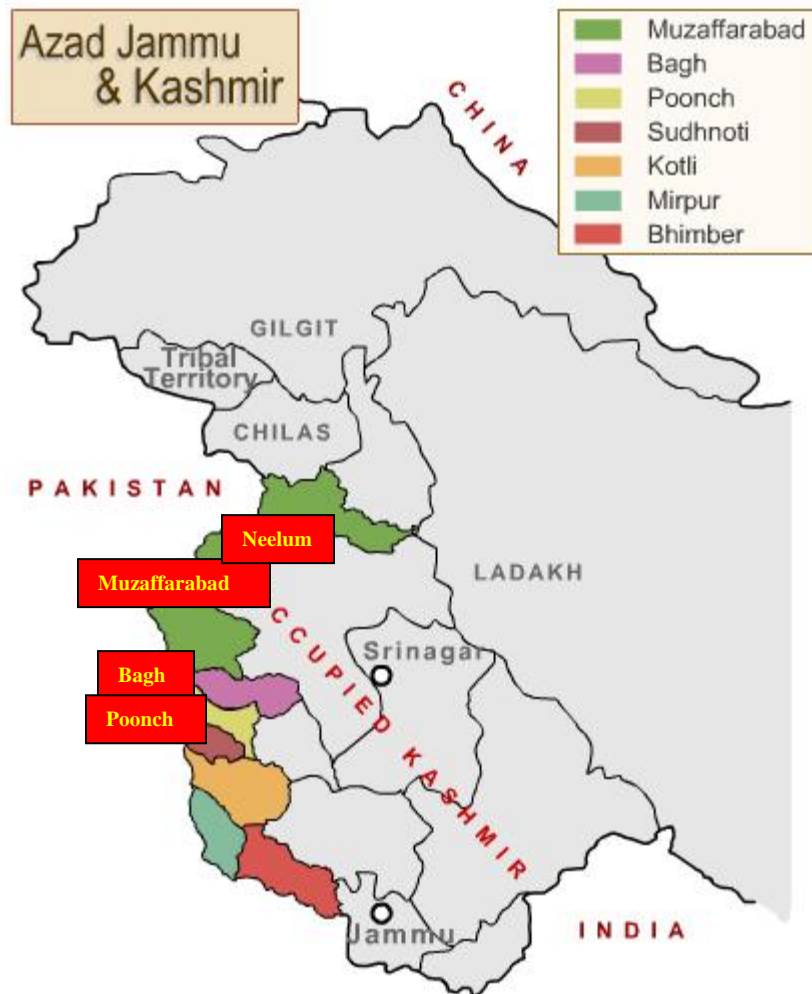
Resources for flood and larger provincial response to monsoon emergency / disaster situation are given Annexure G. To summarize, the province is grossly deficient in flood response stores as they have 42 rescue boats and close to 2000 tents. Food warehouses exist across the province but emergency food supply is procured by the Relief Commissioner off the market. Province is likely to generate Rs 50-60 million for livestock rehabilitation response. Province is likely to generate resources for hiring heavy plant for reopening severed roads. To summaries, in case of worst case scenario, NWFP would require need based support in:-

- Shelter
- Emergency health
- Potable water
- Nutrition support for vulnerable
- Regeneration of livelihoods

¹⁴ Caseload worked out on stakeholders consensus as past record of humanitarian impact of natural disasters could not be accessed. Caseload for moderate scenario (A) taken as 50% of the worst case scenario (B)

Provincial resource persons are reflected in Annexure H

Azad Jammu and Kashmir (AJK)



Precipitation Data. Annexure C

Social Profile of Vulnerable districts. Annexure F

Most of AJK falls within the summer monsoon zone except for district Neelum whose northern portion receives comparatively less rain. Nearly all districts of State are located within catchment area of rivers Jhelum and Chenab and, therefore, they remain vulnerable to excessive and abrupt flooding even after moderate to heavy precipitation. Districts Muzaffarabad, Bagh and partly Poonch and Neelum have experienced excessive top soil and surface degradation as a consequence of October 05 earthquake and are prone to sliding activity.

AJK, it so transpires, is extremely vulnerable to flash floods that occur without warning. While most households are located on higher ground but the communication infrastructure remains vulnerable to severance both due to flash floods and sliding activity, causing population isolation in remote region. Therefore, early reopening of roads to restore accessibility remains critical for response.

While State Disaster Management Authority has recently been constituted, but relief and disaster response assets are distributed among numerous State organizations, requiring integration in response. The State certainly falls short of resources in meeting disaster response surge but it can draw from vast Army deployed assets which include aviation, heavy plant and medical installations, some in very remote and disaster prone areas. Vulnerable districts are described below: -

Districts	Hazards
Neelum	Flash floods, slides
Muzaffarabad	Riverine floods, flash floods, slides
Bagh	Flash flooding, slides
Poonch	Flash floods, slides
Bhimber	Flash floods

Table 8: Districts Vulnerable to Monsoon Emergencies

Muzaffarabad –

Riverine Floods. During the heavy floods experienced in river Jhelum in 1992, most local bridges were destroyed and nearly 1000 families were locally displaced. This is not a common phenomenon but a disaster of this magnitude can recur.

Flash Floods. Makri Nullah which traverses through Muzaffarabad City was a source of local emergency owing to cloud burst related local flooding in 2004. Kazi Nag Nullah close to LOC causes similar local emergencies.

Environmental Hazard. Zilzal lake has been formed in Chikar owing to blockage of water channel as a consequence of the October 05 earthquake. It is 3.5 kms long and 400 feet in depth and excessive water spillover can endanger town of Hattian Balan. 12 UCs in Pattika, Muzaffarabad city and Hattian Balan have been rendered vulnerable to precipitation activated sliding activity affecting a population of approx 100,000. This vulnerability is likely to persevere.

Neelum District

Floods. While the 1992 flood damaged most bridges along River Neelum, the district is excessively vulnerable to flash flooding as a consequence of rains. Flash floods tend to temporarily block Neelum. Nakdar, Shuntar and Shoai Nullahs have cause similar disruption in recent years.

Environmental Degradation. Three UCs with a pollution of 45,000 are vulnerable because of excessive surface soil degradation in lower Neelum Valley.

Bagh District

Flash Flooding. Mal Nullah poses hazard to Bagh City after excessive rains.

Environmental Damage. 10 UCs with a population of 130,000 approx have suffered excessive top soil damage owing to October 05 earthquake and is vulnerable to precipitation based local hazard .

Poonch District

Poonch River and Ranger Nullah in Bandi Abbaspur tends to cause local flash floods and emergencies and four UCs and are a potential source of hazard to the local population. Earthquake generated top soil degradation accentuates the hazard.

To a lesser extent but southern **districts of Kotli and Bhimber** are also vulnerable to precipitation instigated flash floods due. Numerous such incidents have occurred in the past along Band Nullah in Kotli.

Likely Humanitarian Impact

Likely Humanitarian Caseload in Worst Case Scenario B	
Affected Population	Likely Relief Load
	Flash Floods - 30,000
Total pop – 168,750	Total Pop (Flash Floods) - 27,000
	HHS - 4,500
Likely Humanitarian Caseload for Moderate Scenario A	
Total pop – 75,000	Total pop - 12,000
	HHS - 2,000

Response to Disasters¹⁵

Reopening of Road communication. Past experience indicates that road blocks that occur owing to summer or winter hazards are opened within 2-3 days. Assets available are support from Army operational units, FWO and local C&W Department. This does not apply to local roads in remote regions which remain severed for relatively longer periods. However, AJK government will require external assistance in case of a severe disaster.

Food Security. Food Department maintains 15 days reserve food stocks in the state during summers. Under ordinary circumstances no major problem is foreseen in the State. However, there could be a negative impact if the ongoing food crisis persists as that could have the impact of lowering reserves stocks. Moreover food crisis has generated an artificial demand which is eating up reserve stocks.

Health Response. For emergency response the local Health Department is likely to face shortage of antibiotics, analgesics, anti-snake venom and epidemic control medicines with regards to gastroenteritis and cholera. Numerous army medical field units and base hospitals do supplement the emergency medical health support to vulnerable population.

Emergency Response Stores. Annexure G.

Flood Mitigation / Prevention Works. These are undertaken by C&W Department. During year 2007 / 08 two mitigation works of Rs 30 million were completed in River Tawi. Three schemes worth Rs 16 million are planned for Mal River, Bagh district, Mandi Kotli in Kotli district in Garhi Duppatta along Jhelum in Muzaffarabad district.

There is a need to undertake disaster prevention work on Zilzal lake due to threat its outbreak presents to Hatian Town in Muzaffarabad.

In case of a major disaster external support will be required in following sectors:-

- Emergency shelter
- Emergency health
- Access to potable water
- Nutrition
- Regeneration of livelihood

¹⁵ AJK Departments of Health, Food and SCO produced response plans.

Punjab



Out of 51 million acres of area in Punjab, 7.7 million acres lies in the active flood zone. Of 73.62 million population, 14.72 million lies in the flood zones. Floods in the rivers Jhelum, Chenab, Ravi and Sutlej (India having water rights over the latter two owing to Indus Water Treaty) result as a consequence of monsoon precipitation rains received in the Pir Punjal Range (IHK) catchment region. Floods in Chenab and Indus, however, originate from a combination of rains and snow melt. Peak flood season spans July to September but floods are known to occur in June and as late as October¹⁶.

¹⁶ Information extracted from DG PDMA's presentation to Chief Minister on flood preparedness

Besides riverine floods heavy precipitation tends to cause serious hill torrents generated along the borders of Punjab and Balochistan in DG Khan and Rajanpur, in Khushab in north. Flash flooding in the plains occurs through numerous seasonal water channels in Sialkot – Jammu region that tend to impact districts Lahore, Gujranwala and Shiekhupura.

Heavy rains also tend to cause urban flooding notably in Rawalpindi where Leh Nullahs inundates low lying regions. Similar patterns occur in Lahore and other cities.

Changing weather patterns causing rising incidence of flash floods and cloud bursts.

While the early warning receipt and dissemination systems are streamlined in Punjab, however, vulnerability lies less in Chenab river as the border geography allows very less early warning where hill torrents cause rapid inflows in to the river and adjoining channels: Munawar Tawi and Jammu Tawi. Flood waters from Jhelum and Chenab tend to combine their impact in Trimu region and downstream.

Districts Vulnerable to Monsoon / Flood Hazards

District	Hazards
Sialkot	Riverine floods (Chenab), flash floods
Wazirabad	Riverine floods (Chenab), flash floods
Muzzafargrah	Riverine floods (Indus)
Rajanpur	Riverine floods (Indus), flash floods
Dera Ghazi Khan	Riverine floods (Indus), flash floods
Jhang	Riverine floods (Jhelum and Chenab)
Narowal	Riverine floods (Chenab), flash floods
Mandi Bahauddin	Riverine floods (Jhelum)
Jhelum	Riverine floods (Jhelum)
Sheihkupura	Riverine floods (Ravi), flash floods
Layyah	Riverine floods (Indus)
Gujranwala	Riverine floods (Chenab)
Khushab	Riverine floods (Jhelum), flash floods
Mianwali	Riverine floods (Indus)
Sargodha	Riverine floods (Jhelum)
Bahawalnagar	Riverine floods (Sutlej)
Gujrat	Flash floods
Rawalpindi	Flash floods

Table 9: District Vulnerable to Monsoon Emergencies

Past Flood Damages

Floods of 1992. These were among the worst recorded in Punjab and its impact approximates with the severity described in Scenario B – most dangerous (heavy to super heavy floods). Its cumulative humanitarian and economic impact is as follows:-

Worst affected districts. Jhang (893196), Sargodha (640045), Rajanpur (120559) and Muzzafargrah (357250)

- Population Affected. 4121,010 (4.12 million)
- Villages affected. 7,435
- Dead 435
- Area affected 5,788,330 acres
- Crops affected 2,843,497 acres

- Houses damaged 270,653
- Cattle heads lost 73,751
- Required massive rescue and relief support

Floods of 1998

Comparatively of lesser gravity in terms of losses, its impact approximates with Scenario A (medium impact). Its humanitarian and economic impact is as follows:-

Worst Affected Districts. Sahiwal (429728), Sheihkupura (406574), Bahawalnagar (269143), Gujranwala (198723) and Sialkot (187291)

- Population Affected. 2,881,300 (2.8 million)
- Villages affected 4,035
- Dead. 234
- Area affected (acres) 3,462,534 acres (3.4 million)
- Cropped area affected. 1,293,398 acres (1.2 million)
- Houses destroyed. 361,854
- Houses damaged. 176,528
- Cattle heads lost. 29,865
- Required selective SAR and relief support

Floods of 2006

These fall in the normal floods category requiring at best local relief support. Summary of losses are:-

- Population affected. 301,437 (0.3 million)
- Villages affected. 1,383
- Deaths 137
- Area affected 897,246 acres (0.8 million)
- Cropped area affected 203,937 (0.2 million)
- Houses completely damaged 3,254
- House partially damaged 7,357
- Cattle head lost 141

Likely Humanitarian Caseload in Worst Case Scenario B	
Affected Population	Likely Relief Load
Riverine floods (floods of 1992)	
Total pop - 4,121,010	Total pop - 535,731
	Total HHs - 89,288
Flash floods	
Total pop -187,500	Total pop - 30,000
	Total HHs - 5,000
Total Pop - 4,308,510	Total HHs - 94,288
Likely Humanitarian Caseload for Moderate Scenario A	
Riverine floods (floods 1988)	
Total pop - 2,881,300	Total pop - 374,569
	HHs - 62,428
Flash Floods	
Total pop - 93,750	Total pop - 15,000
	Total HHs - 2,500
Total pop - 2,975,050	Total HHs - 64,928

Summary of Flood Mitigation Works Annexure D.

Pre and Post Floods Coordination Measures

Pre-Flood Coordination. Includes following actions at the provincial level:-

- Post preceding year's flood conference at Engineer's Directorate, GHQ to identify shortfalls and determine important pre-flood actions.
- Pre Flood NDMA conference to review preparations for flood season with reference to shortfalls
- Annual meeting in June by the FFC to review the flood preparedness
- Special Flood Situation Review meeting by the FFC to review ongoing flood situation and to further consolidate necessary measures to prevent and mitigate flood hazard
- Coordination conference with local Army authorities
- Coordination with FFC to take stock of national preparedness for floods
- Flood instructions issued by PDMA
- Flood coordination with provincial departments and agencies and DCOs of affected districts
- Updating of provincial coordinated flood preparedness and response plans
- Distribution of key flood response equipment to response agencies, boats, OBMs etc in coordination with Army.
- Visit by DG PDMA and other key stakeholders to all vulnerable sites
- Joint Army and civil authorities' inspection of breaching sites and flood protection bunds.
- Coordination with donor agencies

Preparedness Measures during Floods

- Need based meeting of Provincial Flood Review Committee
- Monitor dissemination of early warning to vulnerable districts.
- Setting up of need based relief camps where health, shelter and livestock disease control measures are enforced
- Mobilize situation based provincial response

Punjab Departmental Response Plans¹⁷

Health Department. Arranges for vaccines for anti – rabies, snake and live saving medicines. Has sufficient stocks and also organizes static and mobile health camps as per plans. Health Department maintains an emergency control room and works in close coordination with PDMA and other response agencies.

Livestock Department. Working out of a comprehensive plan livestock department undertakes pre-flood vaccination in vulnerable regions. 33% quota of provincial livestock medicines are kept for emergency response and Province makes for additional needs, if any. Livestock Department arranges for need based camps during response and provides on site services. It also generates mobile emergency services

WASA. Works in storm water de-induction for urban flooding, based on response plans and SOPs

Punjab Highway Department. Mobilizes and pre-places heavy plant as per plan and emerging flood situation. It maintains an operational room for situation monitoring and close coordination with NHA, FWO and NLC for streamlining Federal response if and when a situation so demands.

Social Welfare Department. Mobilises volunteers and the social sector for flood response in vulnerable districts. Similarly it mobilises relief goods and streamlines local action plans for their dissemination.

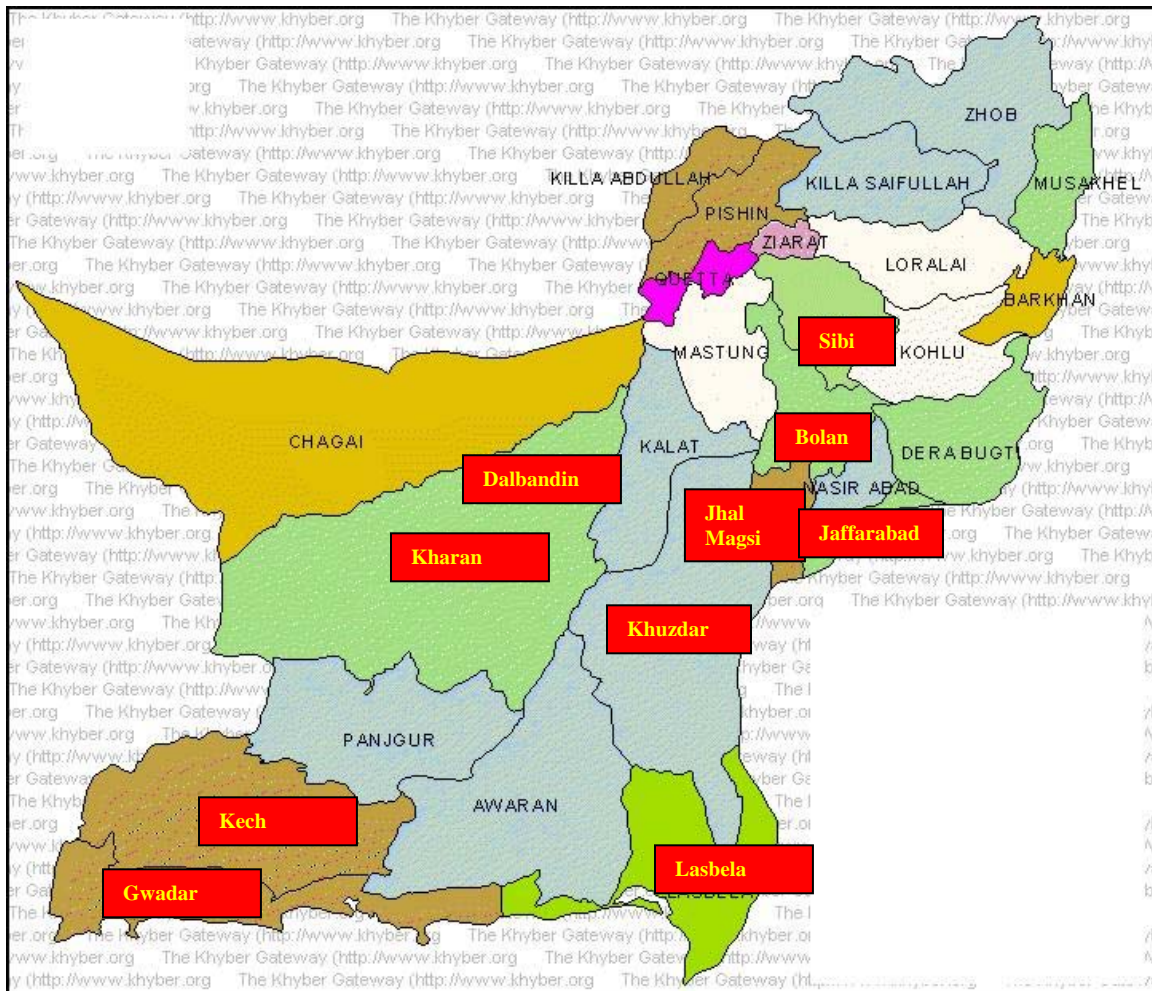
Food Department. Ensures that sufficient need based stocks of food are made available.

WAPDA. Mobilises resources and pre-places them in critical locations for speedy restoration of power losses.

PRCS and Civil Defence. Both mobilise response at provincial and local levels consistent with their respective flood plans.

¹⁷ PDMA shared plans of all key departments for flood response.

Balochistan



Precipitation Data. Annexure C

Social Indicators of Vulnerable Districts. Annexure F

Cyclone Yemyin amply highlighted Balochistan's vulnerability to sea based cyclones and flash floods caused by heavy precipitation. Historical records indicate earlier occurrence of similar emergency and disaster situations though with a limited footprint. Three regions of the province are vulnerable to such hazards: districts Kech and Gwadar in the Mekran region, the 'kutchi' plains that accumulate water drained from numerous mountainous channels and include districts Sibi, Bolan, Jhal Magsi and Jaffarabad. The third region spans Kalat and Lasbela districts where flood water drains into the sea from higher regions.

Flood waters also tend to cause 'sheet flow' effect by consecutive breaching of protection and irrigation dykes that cause local flooding impact thereby damaging infrastructure and standing crops. This phenomenon occurs in most rain fed regions of the province. Such hazards primarily cause economic damage and loss of livelihoods.

Development projects tend to exacerbate the impact of disasters. Cases in point are Shadikot Dam which was washed down by flood waters in district Gwador in early 2003 and even Mirani Dam in district Kech which came close to meeting the same fate as a consequence of Cyclone Yemyin in 2007. Coming to 'katchi' plains, a flood prone area, Pat Feeder and Kirthar canals tend to block flood water flow thus contributing in enhanced flood impact.

Imposing operational constraints tend to inhibit response to disasters. Foremost being vast distances and sparse population which makes access to the affected areas and information difficult. This raises the level of difficulty in mounting response. Local vulnerabilities are accentuated by the fact that flood vulnerable regions of the province do not enjoy early warning cover.

Despite creation of PDMA, the province still needs to create the culture of integrated planning involving departments vital for response. Resource shortfalls encourage an early reliance on the Federal agencies, in particular for reopening floods severed routes.

Army and Frontier Corps Balochistan, paramilitary force, play a dominant role in responding to disasters in the Province. Pakistan Navy responds along the coastal regions.

Precipitator Data. Annexure C.

Social Indicators of Vulnerable Districts. Annexure F.

Districts Vulnerable to Monsoon / Flood Hazards

District	Hazards
Kech	Tropical Cyclone, Flash floods
Gwador	Tropical Cyclone, Flash floods
Jhal Magsi	Flash floods
Kharan	Flash floods
Bolan	Flash floods
Khuzdar	Flash floods
Lasbella	Tropical Cyclone, Flash floods
Sibi	Flash floods
Jaffarabad	Flash floods
Dalbadin	Flash floods

Table 10: Districts Vulnerable to Monsoon Emergencies

Cyclone Yemyin

Its likely reoccurrence figures in Scenarios 2 and 3, though historical records indicate that cyclones with such a large footprint are rare. In the ensuing flash floods, 700.000 cusecs of water drained from katchi plains, equivalent to heavy floods in Indus. The water drained south to cause much havoc in northern Sindh.

Seriously Affected Districts. Kech (342308 population affected), Jhal Magsi (107146), Jaffarabad (238240), Gwador (113990), Kharan (201649) and Khuzdar (271999).

- Affected Population. 1,742,911
- Died 215
- Area affected 347,190 acres ?
- Completely damaged houses 40,048 households
- Partially damaged houses 100,000
- Villages damaged / destroyed 5,000

Flash Floods

Flash floods bearing major seasonal rivers are:-

Nihang River	Kech
Kech River	Kech
Pralli	Lasbela
Urnach	Khuzdar
Talli, Moollah, Bolan, Sukleji	Katchi plains. Traverse Sibi, Bolan and Jhal Magsi districts
Zhob	Zhob

Mekran Cyclone of 1997

The cyclone impacted Mekran region comprising districts Gwador, Kech and to a lesser extent Chagai and Dalbadin, contiguous districts. Tehsils Sundsar, Dasht and Tumb of Gwador and Kech districts were seriously affected. River Nihang and Kech caused widespread flooding in a region approximating 8000 square kilometres.

Humanitarian relief support was provided to approximately 10,000 – 15,000 population in the worst affected regions whereas nearly 100,000 were affected. Response included employment of Army, Frontier Corps and Navy.

This example highlights the possibility of much cooperation between Iran and Pakistan in disaster response in Mekran and in the coastal regions.

Likely Humanitarian Impact

Likely Humanitarian Caseload in Worst Case Scenario B	
Affected Population	Likely Relief Load
Cyclone Yemyn	
Total pop – 1,700,000	Total pop - 240,000
	Total HHs - 40,000
Likely Humanitarian Caseload for Moderate Scenario A	
Mekran Cyclone of 1997	
Total pop - 468,750	Population - 75,000
	HHs - 12,500

Sectoral Capacities for Disaster Response¹⁸

Health

Common diseases / health hazards during the summer monsoons are malaria, snake bite and skin diseases. There were approximately 200,000 recorded patients as a consequence of Cyclone Yemyin and among them highest incidence was of malaria, followed by diarrhea, ARI and snake bites. There were 7 reported cases of cholera.

While the provincial health department has no dedicated funds for emergency response it did generate Rs 20 million (Cyclone Yemyin) for purchase of emergency medicines and there was an unmet demand by the provincial health department of Rs 2 million. However, the Province received much assistance from Federal government, UN agencies and many other sources.

Yemyin experience highlighted that while there is generally less deficiency in human resource in launching health response but assistance was required in purchase of life saving medicines and in meeting operational costs associated with mounting a surge capacity

PDMA – Relief Stores

Annexure G.

C & W and NHA

While the provincial C & W Department has a very limited emergency capacity for reopening local / provincial roads it relies much on support from NHA, FWO, NLC and NHA's local partners as was the case in Yemyin response.

Livestock. In mounting the response to Cyclone Yemyin Livestock Department claims to have ample human resource but it required external support in purchase of emergency medicines, operational costs and animal fodder. The Department at present has neither any capacity nor orientation for emergency response.

Irrigation Department

The Province has till now received its 50% share of flood regulation and prevention works which is being utilized for repair of infrastructure damaged as a consequence of Cyclone Yemyin. However, there is a need for major investments in such works. For example there is a need to build an auxiliary spill way in Mirani Dam for regulation of flood water.

Social Welfare Department

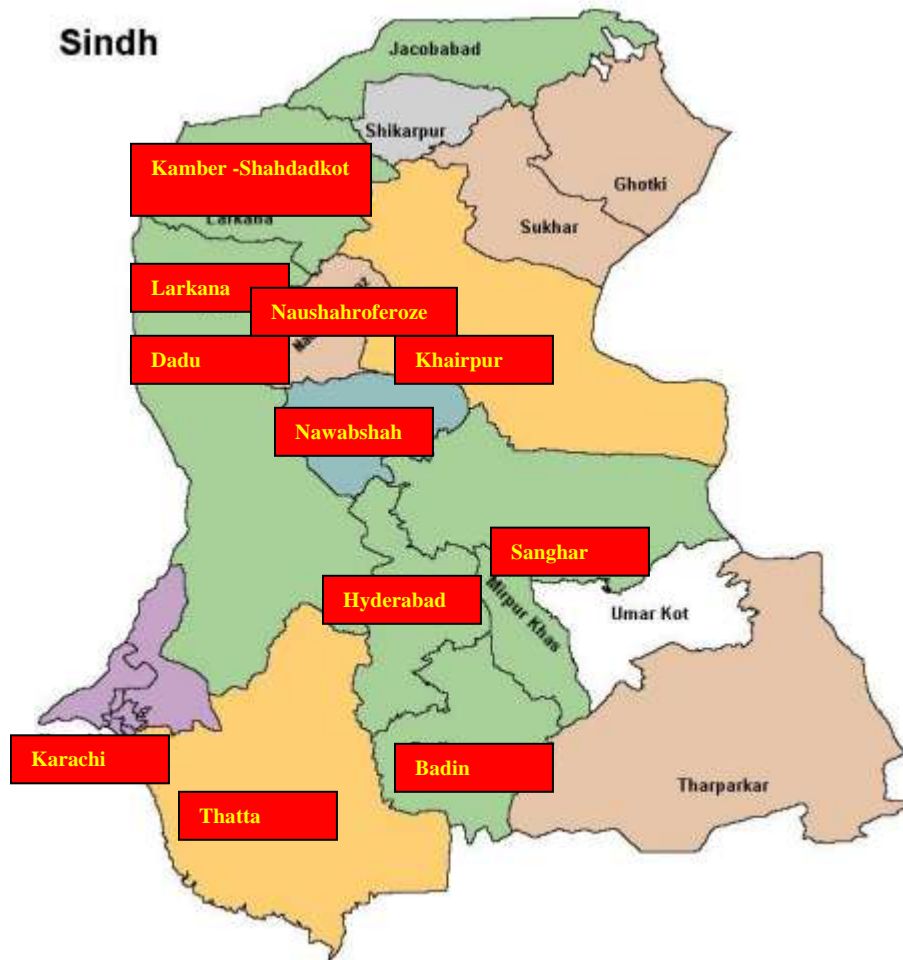
The Department worked with UN agencies in carrying out assessments of vulnerable and in providing them with assistance with UN support. However, it has no plans to replicate the vulnerability assessment exercise before the flood season or to share their inputs with other provincial response agencies.

Food Security. The provincial Food Department maintains warehouses in all regions but it does not have a disaster response focus, and routine consumption stocks can be diverted for this purpose. As a matter of practice PDMA / Province provides funds to district authorities for purchase of food items for response or the Province receives external support as in the case of Cyclone Yemyin.

Electricity Resumption

Lack of access was the major impediment for QESCO (provincial electricity supply company) in restoring severed electricity. It claims to have the request surge capacity in responding to major disasters.

¹⁸ Balochistan Irrigation and Power and Health Departments produced emergency response plans.



Province of Sindh is traditionally vulnerable to riverine floods, cyclones, precipitation generated flash flooding and urban flooding, primarily in the cities of Karachi and Hyderabad. In fact historical evidence suggests that natural and man made disasters exact a significant toll in human lives in Karachi alone.

Sindh province has developed an elaborate riverine flood protection system comprising spurs, dykes and flood water escape channels along River Indus. Being a lower riparian province, it normally gets more early warning which allows local administration to relocate vulnerable population from the flood path to safer locations. Communities residing in vulnerable zones are traditionally sensitized on such issues and once flood threat is imminent they do cooperate. However, recent flood experiences indicate that some of the flood protection works should be remodelled consistent with emerging flood patterns like the FP Bund guarding right bank of Indus in upper Sindh which was severely damaged last year due to flash floods.

Cyclone Yemyin revealed vulnerability of Indus right bank upper Sindh districts to flood water draining south from 'katchi' region of Balochistan. This is a recurring phenomenon and flash floods tend to impact districts Larkana, Kamber- Shahdadkot and Dadu. Flash floods also result from heavy precipitation in Kirthar Range flanking Dadu district in the west.

Lower Sindh districts, owing to their low lying physical configuration, are prone to flooding owing to unusual precipitation. For example parts of Hyderabad City lie 6 feet below adjoining Indus water flow level. Widespread

urban and rural flooding as a consequence of heavy rains occurred in the region in late 2006. Low lying coastal districts of Thatta and Badin are also prone to sea intrusion.

Army supports the provincial government in response to all types of hazards and also in coordinating response.

Developmental schemes also tend to exacerbate disaster impact like the Left Bank Outfall Drain which tends to both overflows under heavy precipitation and also due to reverse sea inflow in District Badin. The Drain has been the cause of many local disasters¹⁹.

Precipitation Data. Annexure C

Social indicators' of Vulnerable Districts. Annexure F

Districts Vulnerable to Monsoon / Flood Hazards

District	Hazard
Karachi	Urban flooding, man made hazard intensify impact
Badin	Cyclone, precipitation based flooding, sea intrusion
Thatta	Cyclone, precipitation based flooding, sea intrusion
Dadu	Riverine Flood, Flash Floods
Kambar - Shahdadkot	Riverine Flood, Flash Floods
Larkana	Riverine Flood, Flash Floods
Khairpur Miran	Riverine floods
Naushero Feroz	Riverine floods
Nawab Shah	Riverine floods
Sanghar	Riverine floods, precipitation based flooding
Hyderabad	Riverine flooding, urban flooding

Table 11: Districts Vulnerable to Monsoon Emergencies

Historical Precedence of Riverine Floods and Impact - Floods and Rains of 1994

- Population affected 690,035
- Lives lost 218
- Villages Affected 7,900
- Area affected 3,743,978 acres
- Cropped area affected 2,744,750 acres
- Houses fully / partially damaged 511,940
- Cattle head perished 6,090
- Seriously Affected districts Thatta, Dadu, Kambar, Nawabshah, Nausheroferoz

Floods of 1992

- Population affected 210,948
- Lives lost 232
- Area affected 9,617,845 acres
- Cropped area affected 3,844,983 acres
- Houses fully / partially destroyed 578,321
- Cattle head perished 67,104
- Seriously affected districts Hyderabad, Dadu, Sanghar, Larkana

¹⁹ Senior Member Board of Revenue and Provincial Relief Commissioner provided an elaborate review of Province's preparedness for monsoon emergencies

Floods of 1995

- Population Affected 5,04,455
- Lives lost 114
- Area affected 745,850 acres
- Cropped area affected 105,725 acres
- Houses partially / fully damaged 21,289
- Cattle head perished 1,397
- Seriously affected districts Dadu, Larkana and Khairpur

Historical Precedence of Cyclone / Flash Floods Impact**Cyclone Yemyin -2007**

- Population Affected 391,507
- Died 177 (142 died in Karachi)
- Area affected 669,843 acres
- Cropped area affected 114,825 acres
- Houses fully / partially damaged 34,418
- Relief Compensation (Rs 15000 / HH) 23,620 (Kambar: 15,726, Dadu: 7,904)
- Cattle head perished 40,204
- Seriously affected districts Kambar-Shahdadkot, Dadu and Karachi

Its impact corresponds with tropical cyclone scenarios mentioned in Scenarios B and C.

Cyclone in Thatta and Badin in 1999

- Population affected 597,482
- Died 202
- Area affected 1,453,279 acres
- Cropped area affected 400,977 acres
- Houses fully / partially damaged 138,719
- Cattle head perished 29,606
- Seriously affected districts Thatta and Badin

Its impact corresponds with tropical cyclone mentioned in Scenario A.

Heavy Precipitation in Lower Sindh in October 2006

- Population affected 1,570,881 (1.5 million)
- Dead 162
- Cropped area affected 109,559 acres
- Houses destroyed / damaged 13,546
- Seriously affected districts Hyderabad, Mirpurkhas and Sanghar

Sea Intrusion in Thatta and Badin Disitrcs

- Thatta 11,40,556 acres
- Badin 79,804 acres
- Note. 59,000 acres is canal fed land

Likely Humanitarian caseload in Worst Case Scenario B		
Affected Population	Likely Relief Load	
Riverine floods (floods of 1994)		
Total pop - 690,035	Total Pop	- 89,704
	Total HHs	- 14,950
Flash floods – Yemyin 1997		
Total pop - 885,750	Total Pop	- 141,720
	Total HHs	- 23,620
Total pop	1,575,785	Total HHs - 38570
Likely Humanitarian caseload for Moderate Scenario A		
Riverine floods (floods 1992)		
Total pop - 210,948	Total pop	- 27,423
	Total HHs	- 4,570
Flash Floods – Thatta and Badin 1999		
Total pop - 597,482	Total pop	- 95,597
	Total HHs	- 15,932
Total pop - 808,430	Total HHs	- 20,502

Flood Management in the Province²⁰

Early Warning

Relief Commissioner receives early warning from PMD and through media monitoring. Information is disseminated to concerned provincial departments and districts and subsequently actions are initiated by district authorities to relocate the vulnerable population. However, past experiences including Cyclone Yemyin indicated that both the provincial and district governments took appropriate measures to warn and relocate vulnerable population.

Coordination

Flood coordination in the province occurs more vertically between Relief Commissioner and DCOs and other provincial departments with their district counterparts like health and C&W Departments. Army authorities undertake overall coordination within the province. PDMA, it is recommended, should play a more visible role in lateral flood coordination.

Flood Mitigation Efforts

Vulnerable points in the province are:-

- Remodelling FP Bund to flood resistant specifications
- Addressing Guddu Barrage left bank silting
- Repair of Indus – Ghauspur – Kashmore – Kandhkot Bund
- Repair of some flood protection bunds in Larkana districts
- Ongoing flood mitigation and protection works are reflected in Annexure D.

Sectoral Response for Rural Sindh

Nearly all departments of the province are involved in flood response planning and response but they do not have exclusive budgets for emergency response traditionally key response departments are provided financial support through Senior Member Board or Revenue (SMBR) who is also the Relief Commissioner. Assistance is also provided by the Federal Government and UN agencies / donors.

²⁰ Sindh Agriculture and Livestock Departments produced emergency response plans

Livestock department was provided Rs 4 million by SMBR for response to Cyclone Yemyn. Similarly W & S Department has a very limited capacity to repair provincial / local roads and they rely on assistance from NHA, FWO, NLC and Army engineers in responding to major disasters.

While the health department claims self sufficiency in human resource it requires external support in purchase of emergency medicines and gearing up logistic support. Same applies to Public Health Engineering response for restoring potable water supply.

HESCO (electric supply company for rural Sindh) maintains that given access, the Company can address monsoons related losses in quick time.

Relief stores with PDMA. Annexure G.

Capacity for Urban Hazards Response

Massive investment is required in preparation of drainage systems, dykes, creation of dewatering capacity and in building capacities of emergency response services by providing them life boats and training them in search and rescue. Similarly efforts should be made to remove serious hazard sources like massive bill boards felling that caused loss of precious liver owing to fast winds preceding Yemyin in 2007.

Provincial Resource Mapping and Determination of External Support for Disaster Response

Note. Needs based on worst case scenario B

NWFP

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial ²¹ Resource Mobilization	Likely Federal External Support ²²
SAR and Emergency Relief Support	Armed forces and possibly FC NWFP will be employed in SAR and immediate response in support of affected DDMA's.				
Shelter	-Tents- 1.5 / family -Blankets- 6 / family -Stove / cooking utensils set – 1 / family - Mosquito net for 50% relief caseload	-Tents 1,932* -Blankets 3,028*	-Tents - 13,500 -Blankets - 54,000 -Stove/ cooking utensils set - 9,000 - Mosquito net -27,000	-Tents 4,627 -Blankets 20,833 -Stove/ cooking utensils 3,600 -Mosquito net 10,800	-Tents 6,941 -Blankets 30,584 -Stove / cooking utensils 5,400 -Mosquito net 16,200
Food Security	- 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs) - 13,813.8 ton wheat is kept reserve for serious food insecurity	- Wheat 13,813 tons - Rice 795 bags - Tea 495 kgs	Mixed food 360 MT	Mixed food 144 MT	Mixed food 216 MT
Emergency Health	<ul style="list-style-type: none"> The province needs to make a health emergency monitoring and response plan and undertake resource mobilization for meeting critical medicines like anti-snake venom, malaria and epidemic control measures relevant to flood hazards. ERRA will supplement emergency health response in earthquake hit districts 				
Access to Potable Water	- Drinking water – 2 ltrs / person / day (15 days) - Water purification tablets – 50 tablets / family for 15 days		Emergency response - drinking water– 1,620,000 ltrs -Water purification tablets – 450,000 -Restoration of local water supply -Organizing local water tankering services by local administration	-Drinking water 648,000 ltrs -Water purification tablets 180,000	- Drinking water 972,000 ltrs -Water purification tablets 270,000
Livestock	Provincial support will be required in purchase of emergency medicines, fodder and meeting operational costs associated with surge.				
Restoration of Livelihood	<ul style="list-style-type: none"> Need based provincial inputs will be required for providing agriculture and livestock inputs for restoring livelihoods Federal support will be required in the event of a major disaster 				
Re-opening of communication	Federal support will be required for reopening provincial and even local highways. However, province needs to make a comprehensive plan and pre-position earth moving material close to flood vulnerable locations				
Restoration of Electricity	Local electricity company (PESCO) have resources but require pre-positioning emergency response resource close to vulnerable districts, Chitral in particular.				

²¹ Calculated at 40% of total need and less *

²² Calculated at 60% of total need and less *

Punjab

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial Resource Mobilization ²³	Likely Federal/ External Support ²⁴
SAR and Emergency Response	Affected DDMA's will be assisted by the armed forces and Punjab Rangers for SAR and Immediate in case of a major emergency / disaster				
Shelter	- Tents- 1.5 / family - Blankets- 6 / family - Stove / cooking utensils set – 1 / family - Mosquito net for 75% relief caseload	Tents 4,000*	- Tents - 141,432 - Blankets – 565,728 - Stove/ cooking utensils set - 94,288 - Mosquito net -424,296	-Tents- 82,459 -Blankets 339,436 -Stove / cooking utensils set 56,572 - Mosquito net 254,577	-Tents – 54,973 -Blankets 226,292 -Stove cooking utensils set 37,716 -Mosquito net - 169,719
Food Security	-2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)		Mixed food 3,772 MT	Mixed food 2,263 MT	Mixed food 1,509 MT
Emergency Health	Health response in Punjab is well planned with Health Department and vulnerable districts pre-positioning live saving medicines for flood hazards and static and mobile response teams operations are organized in vulnerable districts				
Access to Potable Water	- Drinking water- 2 ltrs / person / day (15 days) -Water purification tablets – 50 tablets / family for 15 days		Emergency response -Drinking water – 16,971,930 ltrs -Water purification tablets – 4,714,400 - Restoration of local water supply -Organizing local water tankering services by local administration	-Drinking water 10,183,158 ltrs -Water purification tablets 2,828,640	-Drinking water 6,788,772 ltrs -Water purification tablets 1,885,760
Livestock	Provision is made for pre-placing emergency livestock response needs like medicines, static and mobile camps and emergency provision of fodder				
Restoration of Livelihood	<ul style="list-style-type: none"> • PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs • Federal support will be required for a major disaster 				
Restoration of Land Routes	Reopening of severed land communication is planned by utilizing provincial and Federal resources. Heavy plant is pre-positioned at critical locations				
Restoration of Electricity	Local electricity companies need to deploy emergency response resources close to the vulnerable districts for prompt post – floods resumption of electricity.				

²³ Calculated at 60% of total need and less*²⁴ Calculated at 40% of total need and less*

Sindh

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial Resource Mobilization ²⁵	Likely Federal/Extern al Support ²⁶
SAR and Emergency Response	Armed forces and Rangers will be employed for SAR and immediate response within the province and along coastal regions in concert with PDMA and affected DDMA's				
Shelter	-Tents- 1.5 / family - Blankets- 6 / family - Stove / cooking utensils set – 1 set / family - Mosquito net for 75% relief caseload	-*Tents 5,000	- Tents – 57,855 - Blankets – 231,424 - Stove/ cooking utensils set - 38,570 - Mosquito net - 173,568	- Tents - 21,142 - Blankets - 92,569 - Stove / cooking utensils set - 15,428 -Mosquito net – 69,427	-Tents - 31,713 -Blankets – 138,855 -Stove / cooking utensils set – 23,142 - Mosquito net - 104,141
Food Security	- 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)		Mixed food 1,543 MT	Mixed food 617 MT	Mixed food 926 MT
Emergency Health	Over the past years Sindh province has organized effective emergency health response employing static and mobile facilities. However, external support is required in purchase of emergency medicines and in meeting operational expenses associated with surge in response				
Access to Potable Water	- Drinking water- 2 ltrs / person / day (15 days) -Water purification tablets - 50 tablets / family for 15 days		Emergency response - Drinking water – 6,942,720 ltrs - Water purification tablets – 1,928,500 - Restoration of local water supply - Organizing local water tankering services by local administration	-Drinking water 2,777,088 ltrs - Water purification tablets 771,400	-Drinking water 4,165,632 ltrs -Water purification tablets 1157,100
Livestock	In province resource mobilization is required for meeting needs of emergency medicines purchase, operational expenses associated with a major response and to provide emergency fodder				
Restoration of Livelihood	<ul style="list-style-type: none"> • PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs • Federal support may be required for a major disaster 				
Restoration of Land Routes	Support of Federal agencies will be required for reopening severed provincial roads in case of a disaster with wide imprint				
Restoration of Electricity	Local electricity companies will be required to undertake resource mobilization and pre-positioning of emergency repair capacity close to vulnerable districts for early restoration of electricity				

²⁵ Calculated at 40% of total need and less*²⁶ Calculated at 60% of total need and less*

Balochistan

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial Resource Mobilization ²⁷	Likely Federal External Support ²⁸
SAR and Emergency Relief support	Armed forces supported by FC Balochistan will support PDMA and affected DDMA in SAR and emergency relief support for disaster response in the province and long the coastal regions				
Shelter	- Tents- 1.5 / family - Blankets- 6 / family - Stove / cooking utensils set – 1 set / family - Mosquito net for 75% relief caseload	- Tents 6,000* -Blankets 8,000*	- Tents – 60,000 -Blankets – 240,000 - Stove/ cooking utensils set – 40,000 -Mosquito net – 180,000	-Tents 16,200 -Blankets 69,600 - Stove / cooking utensils set 12,000 - Mosquito net 54,000	-Tents 37,800 - Blankets 162,400 -Stove / cooking utensils set 28,000 -Mosquito net 126,000
Food Security	- 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)	- Mixed food 45.98 MT - Food packets 10,000 (nos)	Mixed food 1600 MT	Mixed food 480 MT	Mixed food 1,120 MT
Emergency Health	The province needs to make a health emergency monitoring and response plan and undertake resource mobilization for meeting critical medicines like anti-snake venom, malaria control measures and epidemic control measures relevant to flood hazards.				
Access to Potable Water	- Drinking water- 2 ltrs / person / day (15 days) -Water purification tablets – 50 tablets / family for 15 days		Emergency response - Drinking water - 7,200,000 ltrs -Water purification tablets – 2,000,000 - Restoration of local water supply - Organizing local water tankering services by local administration	-Drinking water 2,160,000 ltrs -Water purification tablets 600,000	-Drinking water 5,040,000 ltrs -Water purification tablets 1400,000
Livestock	<ul style="list-style-type: none"> • Requires internal resource mobilization for meeting emergency medicines, operational expenses and purchase of animal fodder • External support may be required 				
Restoration of Livelihood	<ul style="list-style-type: none"> • PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs • Federal support will be required. 				
Restoration of Land Routes	Federal agencies like NHA, FWO and NLC would be required to support provincial efforts to reopen local and provincial roads severed by floods.				
Restoration of Electricity	Local electricity companies will be required to undertake resource mobilization and pre-positioning of emergency repair capacity close to vulnerable districts for early restoration of electricity				
Fuel	Arrangements will have to be made for propositioning of fuel for meeting routine needs and also for generation of electricity				

²⁷ Calculated at 30% of total need and less*²⁸ Calculated at 70% of total need and less*

AJK

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial Resource Mobilization ²⁹	Likely ³⁰ Federal/E xternal Support
SAR and Emergency Relief support	Pakistan Army will support SDMA / affected districts in SAR and emergency relief support for local emergencies and major disaster				
Shelter	- Tents- 1.5 / family - Blankets- 6 / family - Stove / cooking utensils set – 1 set / family - Mosquito net for 50% relief caseload	- * Tents 1,685 (CMO) - * Tents 282 (R&R Dept) - *Blankets 4,468 (CMO) - * Blankets 120 (R&R Dept) - Cooking stoves 720 (CMO) - CGI& Ceiling sheets 187 (R&R Dept)	- Tents – 6,750 - Blankets – 27,000 - Stove/ cooking utensils set – 4,500 - Mosquito net – 13,500	- Tents 1,434 -Blankets 6,723 - Stoves / cooking utensils sets 1,134 - Mosquito net 4,050	-Tents 3,349 - Blankets 15,689 - Stoves / cooking utensils sets 2,646 - Mosquito net 9,450
Food Security	- 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs) - 2460 MT flour is kept reserve for serious food insecurity	Flour 2,460 MT	Mixed food 180 MT	Mixed food 54 MT	Mixed food 126 MT
Emergency Health	<ul style="list-style-type: none"> • AJK emergency health response will require external assistance in case of a major disaster for purchase of emergency medicines and meeting operation expenses. However, Pakistan Army field medical units that are widely deployed in the province will provide critical emergency support in isolated regions • ERRRA will supplement emergency health response in earthquake hit districts 				
Access to Potable Water	- Drinking water- 2 ltrs / person / day (15 days) - Water purification tablets – 50 tablets / family for 15 days		Emergency response - Drinking water – 810,000 ltrs - Water purification tablets – 225,000 - Restoration of local water supply - Organizing local water tankering services by local administration	-Drinking water 243,000 -Water purification tablets 67,500	- Drinking water 567,000 ltrs -Water purificatio n tablets 157,500
Livestock	Requires internal resource mobilization for meeting emergency medicines, operational expenses and purchase of animal fodder External support may be required				
Restoration of Livelihood	PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs Federal support will be required.				

²⁹ Calculated at 30% of total need and less *³⁰ Calculated at 70% of total need and less*

Restoration of Land Routes	Armed forces field engineering assets will be employed to reinforce local capacities to reopen roads severed by disasters
Restoration of Electricity	Local electricity company has limited resources to restore electricity in the event of a major disaster. Would require external support from WAPDA

Northern Areas

Sectors	Issues/ Planning Criteria	Resources Available	Needs	Provincial Resource Mobilization ³¹	Likely Federal/ External Support ³²
SAR and Emergency Response					
Shelter	- Tents- 1.5 / family - Blankets- 6 / family - Stove / cooking utensils set – 1 set / family - Mosquito net for 50% relief caseload	-*Tents 547	- Tents – 5,250 - Blankets – 21,000 - Stove/ cooking utensils set – 3,500 - Mosquito net – 10,500	- Tents 1,410 - Blankets 6,300 - Stove / cooking utensils set 1,050 - Mosquito net 3,150	- Tents 3,293 - Blankets 14,700 - Stove / cooking utensils set 2,450 - Mosquito net 7,350
Food Security	- 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)		Mixed food 140 MT	Mixed food 42 MT	Mixed food 98 MT
Access to Potable Water	- Drinking water- 2 ltrs / person / day(15 days) - Water purification tablets – 50 tablets / family for 15 days		Emergency response - Drinking water – 630,000 ltrs - Water purification tablets – 175,000 - Restoration of local water supply - Organizing local water tankering services by local administration	- Drinking water 189,000 ltrs - water purification tablets 52,500	Drinking water 441,000 ltrs - water purification tablets 122,500

³¹ Calculated at 30% of total need and less *

³² Calculated at 70% of total need and less*

Summary of Resource Mapping + External Support for Monsoon Disaster Response Based on Worst Case Scenario (Scenario B)

Shelter (Tents)

	NWFP	Punjab	Sindh	Balochistan	AJK	NA	Total
Resources Available	1,932	4,000	5,000	6,000	1,967	547	19,446
Need	13,500	141,432	57,855	60,000	6,750	5,250	284,787
Provincial Mobilization	4,627	82,459	21,142	16,200	1,434	1,410	127,272
Federal/External Mobilization	6,941	54,973	31,713	37,800	3,349	3,293	138,069

NFI for Federal / External Mobilization: -

- Blankets: 588,520
- Stove/cooking utensils set 99,354
- Mosquito net 432,860

Food Security (20 kg Mixed Food Bags in Metric Tons)

	NWFP	Punjab	Sindh	Balochistan	AJK	NA	Total
Need	360	3,772	1,543	1,600	180	140	7,595
Provincial Mobilization	144	2,263	617	480	54	42	3,600
Federal/External mobilization	216	1,509	926	1,120	126	98	3,995

Access to Potable Water (Drinking Water in Litres)

	NWFP	Punjab	Sindh	Balochistan	AJK	NA	Total
Need	1,620,000	16,971,930	6,942,720	7,200,000	810,000	630,000	34,174,650
Provincial Mobilization	648,000	10,183,158	2,777,088	2,160,000	243,000	189,000	16,200,246
Federal/External mobilization	972,000	6,788,772	4,165,632	5,040,000	567,000	441,000	17,974,404

Federal / External Mobilization for Water Purification tablets: 4,992,860

Federal Agencies Inputs for Monsoon Contingency Planning

Agency	Responsibility/ Sectors	Contributions To Monsoon Disaster Situations
NDMA	Coordinated implementation of national monsoon hazards disaster preparedness and response measures	<ul style="list-style-type: none"> • Provides national early warning of monsoon disasters. • Monitor national preparedness for monsoon emergencies • Facilitate resource mobilisation for national response based on historical precedence • Facilitate PDMA's / DDMA's response to monsoon emergencies / disaster situations • Launch a coordinated national response to monsoon disasters if a situation so arises
Ministry of Water and Power	Responsible to the national government for flood mitigation and overall management	<ul style="list-style-type: none"> • Responsible for national flood preparedness • Undertakes national coordination to this effect • Allocates resources to FFC for flood prevention and mitigation works
FFC	Executive national agency for flood impact mitigation preparedness and management of national response	<ul style="list-style-type: none"> • Preparation of flood protection plans for the country • Monitors execution of flood protection plans in the country • Approves flood control and mitigation schemes for the country • Defines policy and supervises reservoir control in floods • Plan flood early warning up-gradation in concert with PMD • Plan repairs to damages to flood protection infrastructure • Monitor flood protection works • Issue updates on flood situation in relevant flood categories
PMD	Tropical Cyclone and precipitation early warning and situation monitoring	<ul style="list-style-type: none"> • Provides early warning and updates on tropical cyclones • Provides weather forecasts and updates especially in flash flood prone regions. • Provide empirical data on precipitation to allow for provincial comparative monitoring of precipitation patterns
FFD	Flood situation early warning and monitoring	<ul style="list-style-type: none"> • Monitors precipitation patterns in the flood catchment regions • Issues flood early warning and situation updates to all national stakeholders on daily basis. • Monitors the overall flood situation for updating preparatory and response measures in concert with other stakeholders • Works as the national nerve centre for flood monitoring and early warning. • Develops new techniques in flood management and early warning through research & experience.
WAPDA	Flood monitoring and reservoir control	<ul style="list-style-type: none"> • Monitor flood inflows through telemetric system and other resources and provide real time information to FFD • Execute reservoir control in the context of flood management in concert with FFC and other key stakeholders • Facilitate / support regional electricity supply companies in early restoration of electricity in disaster response
MOH	Emergency health and epidemic and	<ul style="list-style-type: none"> • Monitor overall national preparedness for monsoon emergencies and response from health perspective • Mobilise resources to meet shortfall in provincial resources with

	pandemic control	<p>regards critical life saving medicines</p> <ul style="list-style-type: none"> • Undertake measures to improve upon national health monitoring during the monsoon season • Monitor the national emergency response and facilitate making up of shortfall in resources • Direct and facilitate epidemic and pandemic control measures.
Pakistan Army	<p>Immediate Relief</p> <p>Tactical air Support</p>	<ul style="list-style-type: none"> • Launch SAR and immediate post disaster relief operations • Provide emergency health care, shelter, food support and combat engineer support. • Deploy helicopter support in mountainous regions in support of relief operations • Reinforce capacities of affected DDMA's
Pakistan Air Force	Strategic Air support	<ul style="list-style-type: none"> • Strategic airlift for support national response national response. • Participate in post disaster heli-based SAR and relief operations.
Pakistan Navy	<p>SAR and Relief Operations</p> <p>Early warning</p>	<ul style="list-style-type: none"> • Provide post –disaster SAR and relief support to PDMA's Balochistan and Sind along coastal regions • Provide local early warning to PDMA Sindh and Balochistan for coastal precipitation related hazards. • Reinforce post-disaster national logistic effort along the coastal regions.
Ministry of Interior (Crisis Management Cell)	Internal Security	<ul style="list-style-type: none"> • Maintain law and order in disaster affected areas and uninterrupted prosecution of relief operations
National Highway Authority	Infrastructure restoration	<ul style="list-style-type: none"> • Early restoration of national highways in support of national response plan. • Pre-deployment of heavy plant in critical areas for all hazards emergencies. • Support provincial C&W Departments in early post disaster reopening of severed provincial roads critical for response.
ERRA	Multi sector relief support	Support immediate relief: emergency health, shelter, WATSAN, camp management in earthquake region
Emergency Relief Cell	Post disaster relief support	<ul style="list-style-type: none"> • Maintain stocks of critical post disaster stocks of relief stores consistent with monsoon contingency planning. • Release relief stocks in support of national response plan. • Mobilise need based relief stores from the open market in support of national response plan. • Receive and deploy external donor support for disaster response consistent with national response plan.³³
Utility Stores Corporation	Post disaster food security	<ul style="list-style-type: none"> • Meet need based post disaster emergency food security needs as per national response plan. • Maintain food stocks to cater for contingency planning relief caseloads for all hazards.
National Logistic Cell (NLC)	Strategic post disaster logistic support	<ul style="list-style-type: none"> • Provide logistic support for post –disaster relief stores in support of national plan. • Undertake logistic tracking to monitor relief supply consistent with the needs.
Pakistan Railway (PR)	<p>Restoration of rail infrastructure</p> <p>Post disaster</p>	<ul style="list-style-type: none"> • Facilitate in transportation of post disaster relief stores as per national response plan • Ensure early restoration of rail traffic in disaster affected regions.

³³ http://www.pakistan.gov.pk/divisions/ContentInfo.jsp?DivID=13&cPath=118_122&ContentID=252

	logistic support	
SUPARCO	Early Warning	<ul style="list-style-type: none"> • Furnish satellite based long term weather prediction • Satellite based monitoring to assist post hazard relief operations. ³⁴
Maritime Security Agency	Post disaster Relief Support Early warning Post disaster logistic support	<ul style="list-style-type: none"> • Undertake post disaster SAR and relief operations along the coastal regions. • Provide early warning of sea based hazards to PDMAs Sindh Balochistan. • Support national post disaster logistic effort in the coastal regions.
Coastal Guards	Post disaster relief operations Post disaster logistic support	<ul style="list-style-type: none"> • Undertake post disaster SAR and relief operations along the coastal regions. • Support national post disaster logistic support effort in the coastal regions
PNSC	Post disaster logistic support	Support national post disaster logistic effort in the coastal regions
MINFAL	Post disaster restoration of livelihood and support to Livestock	<ul style="list-style-type: none"> • Agricultural and rangelands rehabilitation • Reinforce provincial efforts with regards to seeds and fertilizers distribution to the disaster affectees as a livelihood regeneration measures • Reinforce provincial capacities for livestock emergency support.
Ministry of Social Welfare	Support to the Vulnerable	Prosecute need base measures for support to the vulnerable in coordination with other national and non-governmental stakeholders
Ministry of Foreign Affairs	Afghan Transit	<ul style="list-style-type: none"> • On need basis undertake coordination with Iran and Afghanistan for a possible joint disaster response to monsoon emergencies. • Serve as the point of contact for coordinating external assistance in the event of disaster
PIA	Post disaster strategic airlift	• Undertake post disaster strategic airlift in support of national response logistic plan

³⁴ <http://www.suparco.gov.pk/pages/functions.asp>

Summary of Federal Agencies Contributions for Monsoon / Floods Emergency / Disaster Situation

Sectors	Agencies
Disaster Early Warning	NDMA, PMD, FFD, WAPDA, SUPARCO
SAR and Immediate Relief	NDMA, Pakistan Army, Pakistan Navy, PAF, MSA, Coast Guards and PDMAs
Material Support Disaster Response	ERC, USC, ERRA (for earthquake affected region)
Emergency Health Support, WATSAN & Epidemic / Pandemic Control	MOH, armed forces (emergency health support), ERRA (for earthquake affected region), PRCS
Logistic Support for Disaster Response	PAF, Pakistan Army, NLC, Pakistan Railways, PNSC, PIA
Infrastructure Rehabilitation	NHA, FWO, NLC, Pakistan Railway
Livelihood Support	MINFAL, NDMA, PDMAs and armed forces (for possible disbursing of cash grants), Bait-ul-Maal, Ministry of Religious Affairs and Zakat
Support to the Vulnerable	Ministry of Social Welfare and above agencies for cash disbursement as relief measure
Livestock Support	MINFAL
Law and Order	Ministry of Interior (Crisis Management Cell)
External Assistance and possible coordination of response	Ministry of Foreign Affairs

UN / PRCS / INGOs Inputs for Monsoon Contingency Planning

Agencies	Shelter / NFI	Food Security	Livelihoods	Health	WATSAN	Education	Camp Management
PRCS / IFRC							
UNHCR							
UNOCHA							
WFP							
UN HABITAT							
UNICEF							
WHO							
UNFPA							
IOM							
UNDP							
UNOPS							

Note. UN agencies to also indicate resources that are being deployed as part of the CERF Project

National Response

Sectoral Strategies and Plans

Aim

- Provide guidance for sectoral strategies
- To lay down preparedness parameters of key national and provincial stakeholders for floods and monsoon emergencies
- Define coordination guidelines for national response
- Define roles and responsibilities for national response

Proposed Response Standards. Annexure J

Alert Levels

- Alert Level 1 – Identifies materialisation of Scenario A
- Alert Level 2 - Identifies materialisation of Scenario B.
- To be activated by NDMA

Sectors Response

Early Warning

Objective. Provide early warning to vulnerable communities and all national stakeholders for disaster response.

Preparedness and Response Measures

Responsibility	Task s
NDMA	<ul style="list-style-type: none"> • Responsible for national monsoon emergency early warning for flood, cyclones and other hazards to key national and provincial stakeholders
FFC	<ul style="list-style-type: none"> • Make up for resource shortfall in upkeep of national floods / cyclone early warning capability • Monitor efficient functioning of national early warning system
FFD	<ul style="list-style-type: none"> • Ensure apt preparedness of early warning infrastructure and weather radars prior to onset of the monsoon season • Monitor precipitation patterns in flash flood prone regions and provide early warning to relevant PDMA's and DDMA's and other national stakeholders • Provide timely early warning of concerned national stakeholders of likely flood incidence
PMD	<ul style="list-style-type: none"> • Ensure apt preparedness of early warning infrastructure and weather radars prior to onset of the monsoon season • Provide early warning of tropical cyclone incidence and furnish updates through monitoring • Furnish early warning of high winds and flash floods accompanying tropical cyclones to likely affected PDMA's and DDMA's and other relevant national stakeholders • Furnish early warning of unusual / anticipated precipitation patterns to relevant DDMA's and PDMA's in the flash flood prone and slide prone earthquake affected regions.
WAPDA	<ul style="list-style-type: none"> • Provide early warning of flood and flash flood inflows to PMD as per SOPs and practices in vogue with specific reference to management of reservoirs • Ensure functional efficacy of telemetry system for flood early warning, particularly for major water channels north of Tarbela
PDMA's	<ul style="list-style-type: none"> • Based on input from NDMA, FFD and PMD provide prompt early warning to likely affected DDMA's • Take special measures to disseminate early warning through local media for reaching vulnerable communities

	<ul style="list-style-type: none"> • Task all provincial agencies with a grass root reach like Police Department in dissemination of early warning • PDMA Sindh and Balochistan to take special measures to disseminate tropical cyclone early warning to isolated fishing communities and fishermen at Sea in coordination with MSA and relevant maritime agencies
Provincial Irrigation Department	<ul style="list-style-type: none"> • Carryout detailed inspection of flood protection infrastructure in the province and ensure timely repair of vulnerable points • Provide inputs to FFD and provincial stakeholders on water flows in river and flood channels in the province • Disseminate flood early warning to provincial stakeholders
DDMAs	<ul style="list-style-type: none"> • Disseminate early warning to vulnerable communities through governmental channels : Revenue Department staff, Police Stations with wireless connectivity and other departments working at the grass roots • Disseminate early warning through local social organisations like Mosque Committees and NGOs working with vulnerable communities
SUPARCO	<ul style="list-style-type: none"> • Furnish satellite imagery to facilitate monsoon contingency planning on as and when required basis • Develop GIS data base to facilitate post disaster relief operations by relevant stakeholders
PN and MSA	<ul style="list-style-type: none"> • Provide early warning to PDMA Sindh and Balochistan on tropical cyclone occurrence. . • Facilitate in providing tropical cyclone early warning to vulnerable fishing communities and fishermen at sea

Early Warning – Coordination Responsibilities

NDMA	Issues and coordinates implementation on national early warning for monsoon hazards
PMD	Responsible for tropical cyclone and flash flood early warning
FFC	Responsible for issuing daily flood situation report during monsoon season
FFD	Responsible for riverine floods early warning
PDMA/SDMA	Responsible to early warn provincial and district stakeholders on monsoon emergencies
DDMAs	DCO is responsible to early warn district stakeholders on monsoon emergencies

SAR and Immediate Relief

Objective. Save human lives by undertaking live saving SAR operations and providing relief support with regards to food, shelter, emergency health, field engineering and communication support to restore local communications. .

Preparedness Measures

Responsibility	Measures to be Implemented
NDMA	<ul style="list-style-type: none"> • Update national plan for monsoon emergency response • National coordination for immediate response particularly with the armed forces before onset of the flood / monsoon season • Facilitate in Federal resource mobilisation for immediate response with emphasis on deploying life saving and emergency response assets
Armed Forces	<ul style="list-style-type: none"> • Update response planning in concert with provincial and district stakeholders • Response planning essentially covers SAR, health, shelter, food security and combat engineering response in concert with PDMA's and DDMA's. • Maintain operational readiness of SAR equipment, both provincial assets held with the armed forces and own assets • Deploy SAR assets in vulnerable locations as per local plans • Prepare possible demolition sites in concert with provincial Irrigation and local response authorities
PDMA's	<ul style="list-style-type: none"> • Coordinate emergency response with armed forces as per updated joint plans • Mobilise provincial resources and emergency response stakeholders as per response plans in particular in emergency shelter, health, food security, and potable water supply. • Coordinate emergency response plan with likely affected districts • Preposition resources in the proximity of likely affected districts consistent with provincial plans and resource mobilisation plans
DDMA's	<ul style="list-style-type: none"> • Update district plans and coordinate key action agenda points with the local armed forces authorities for flood / monsoon emergencies • Streamline measures for early warning of vulnerable communities • Undertake coordination and planning for possible evacuation of vulnerable communities to safer locations • Preposition emergency response stores in coordination with armed forces close to the vulnerable locations
City Government Karachi / city governments vulnerable to urban flooding	<ul style="list-style-type: none"> • Mobilise resources and plan emergency response for evacuation of vulnerable population in the event of urban flooding in concert with local armed forces authorities and emergency response services • Mobilise municipal services flood water exodus from vulnerable locations • Prepare evacuation plans in low lying areas and secure spaces for relief camps

SAR and Immediate Relief implementation Responsibilities

NDMA	Undertakes need based coordination with armed forces and other emergency response stakeholders and oversees implementation of immediate response and SAR
PDMA s	Coordinate immediate response for SAR operations with armed forces and other national stakeholders
Armed Forces	<ul style="list-style-type: none"> • Pakistan Army will launch need based SAR operations deploying aerial, riverine or dismounted operations to save human lives. • Pakistan Army will deploy life saving relief operations to cover food, shelter, emergency healthcare, field engineering and communication support. . • Pakistan Air Force will deploy strategic air effort for situation based resource mobilisation in support of national response effort. • Pakistan Army will reinforce local communications and information management capacities. • Armed forces will provide need based helicopters for relief operations
Pakistan Navy	<ul style="list-style-type: none"> • Launch situation based sea and air based SAR and relief operations along coastal regions as per national plan. • Provide need based logistic support along the coastal regions
PAF	Launch strategic airlift support to national disaster response efforts
MSA	<ul style="list-style-type: none"> • Launch relief operations in coastal regions consistent with national response plan. • Provide need based logistic support along the coastal regions
Coast Guards	Launch relief operations in coastal regions consistent with national response plan
Ministry of Interior	Ensure post disaster maintenance of law and order.
DDMA s	Launch immediate response and SAR operations in concert with armed forces
City District Government Karachi	Launch immediate response to urban flooding in concert with armed forces and other relevant stakeholders
PRCS	Launch immediate response and relief operations as per CP in concert with local government
Civil Defence	Reinforce emergency response at the local government level in urban centres

Coordination Responsibilities

National	NDMA
Province / AJK	PDMA / SDMA with local armed forces authorities and emergency response services
District	DCO with local armed forces authorities and emergency response services and volunteer organisations

Shelter / NFI

Strategy – Provide safe and suitable shelter to those rendered homeless.

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Define need assessment for shelters and NFI for monsoon / flood contingency • Undertake resource mobilisation / meet resource shortfall in concert with Cabinet
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	Division / ERC <ul style="list-style-type: none"> • Undertake joint planning with UN agencies / donor agencies for possible joint response consistent with national policy
ERC	<ul style="list-style-type: none"> • Take stock of existing shelter resources and ensure readiness for emergency deployment • Coordinate shelter stocks readiness / availability held by Armed forces Depots through NDMA . • Raise shortfalls in shelter needs through market purchase
PDMA	<ul style="list-style-type: none"> • Ensure readiness of shelter stocks for monsoon / flood emergencies • Undertake resource mobilisation through provincial resources to make up need in shortfalls • Procure low cost non-tent solutions for shelter to meet emergency shelter needs • Deploy stocks in proximity with vulnerable districts to facilitate surge
DDMAs	<ul style="list-style-type: none"> • Maintain stocks of minimum needs to urgent emergency needs • Procure low cost non-tent solutions to meet emergency shelter needs
ERRA	Maintain stocks for emergency shelter to facilitate response in earthquake districts

Response

NDMA	Release tent and NFI stocks as per needs and oversee implementation of national shelter support plan
ERC	Ensure delivery of tent and NFI for deployment
PDMA	Facilitate DDMAs in urgent need assessments and deploy shelter and NFI as per needs. Facilitate need based deployment of shelter needs released by NDMA / ERC
DDMA	Meet shelter needs of the vulnerable population through own / external support
ERRA (for earthquake region)	Release emergency shelter needs on request from DDMAs / PDMA's of earthquake affected districts
PRCS	Launch emergency shelter response in concert with national planning and own contingency planning

Coordination Responsibility

National	NDMA
Province / AJK	PDMA / SDMA
District	DDMA / DCO

Food Security

Objective. Provide food support to the disaster affected population with priority to the vulnerable sections.

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Define national needs for executing food security response to monsoon / floods hazards • Undertake resource mobilisation for meeting shortfall in food security needs • Undertake joint planning with UN agencies / donor agencies for possible joint
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	response consistent with national policy
Utility Stores Corporation (USC)	<ul style="list-style-type: none"> • Undertake stock assessments and resource mobilisation for meeting shortfalls on NDMA advice • Preposition emergency stocks close to vulnerable regions / districts identified by NDMA
ERC	Take stock of emergency response / ready to eat meals in warehouse and be prepared to deploy them on NDMA's advise
PDMA's	<ul style="list-style-type: none"> • Undertake resource mobilisation as per emergency response needs for monsoon / floods emergencies • Deploy / preposition food stocks close to vulnerable districts
Provincial Food Departments	<ul style="list-style-type: none"> • Plan for deploying 30% of provincial stocks for disaster response needs. • Coordinate with PDMA for converting emergency wheat stocks in ready to use flour packs

Response and Coordination Responsibilities

NDMA	Responsible to coordinate implementation of national response related to food security
USC	Responsible to coordinate and implement delivery of emergency food support for emergency response
PDMA	Coordinate and implement food security response within the province
DDMA	Meet food needs of the vulnerable population through external support from PDMA and NDMA

Emergency Health Response

Objective. Reduce risk to life and spread of contagious disease

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Facilitate resource mobilisation for the national emergency health plan as per need assessment
Federal MOH	<ul style="list-style-type: none"> • Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency • Resource mobilisation to meet emergency health needs through national agencies and donors • Undertake epidemic and pandemic planning in the context of summer emergencies in concert with national and international agencies
Provincial MOH	<ul style="list-style-type: none"> • Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency • Resource mobilisation to meet emergency health needs through national agencies and donors • Prepare a coordinated provincial plan for health response
PDMA	Reinforce emergency health response of vulnerable districts by mobilising cash Support form province
District health authorities	<ul style="list-style-type: none"> • Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency • Resource mobilisation to meet emergency health needs through national agencies and donors

Response and Coordination Responsibilities

NDMA	<ul style="list-style-type: none"> • Ensure overall coordinated implementation of the health response as part of the national response • Facilitate in emergency resource mobilisation to meet emergency needs of provinces
MOH	Responsible for coordinating implementation of national response
	•
Provincial Health Departments	Responsible for coordinating implementation of the provincial emergency health response
PDMA	<ul style="list-style-type: none"> • Ensure overall coordinated implementation of the health response as part of the national response • Facilitate in emergency resource mobilisation to meet emergency needs
DDMA	Launch emergency health response to meet the needs of the vulnerable population through internal resource mobilisation and external support
PRCS	Launch emergency health response in concert with national planning and own contingency planning

Water and Sanitation

Objective. Ensure early access of vulnerable population to potable water sources by according priority support to the vulnerable segments.

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Determine shortfall in emergency potable water needs for national response • Undertake need based resource mobilisation for response • Undertake joint planning with UN agencies / donor agencies for possible joint response consistent with national policy
USC	Undertake resource mobilisation to meet emergency response needs on NDMA advise
ERC	Take stock of water purification kits and ensure serviceability
PDMA	<ul style="list-style-type: none"> • Determine shortfall in emergency potable water needs for national response • Undertake need based resource mobilisation for response
Provincial PHE Departments	Earmark need based emergency response funds for meeting emergency needs in restoring damaged water supply schemes
District PHE Departments	Earmark need based emergency response funds for meeting emergency needs in restoring damaged water supply schemes
DDMAs	Undertake potable water need assessment and resource mobilisation to meet needs in concert with the province

Response and Coordination Responsibilities

NDMA	Coordinate need based supply of potable water and water purification plants needs
USC	Supply emergency response needs as per national response plan
PDMA	Coordinate need based supply of potable water and water purification plants needs
Provincial PHE Departments	Restore access to potable water sources as per provincial plan of action
District PHE Departments	Restore access to potable water sources as per district I plan of action
DDMA	Provide potable water to meet emergency health needs of vulnerable population
PRCS	Launch WATSAN emergency response plan in disaster affected regions

Restoration of Essential Services

Objective. Ensure early restoration of power and telecommunications in disaster affected regions / districts.

Preparedness Measures

WAPDA	Articulate a national plan to respond to monsoon emergencies and undertake resource mobilisation and pre-positioning consistent with needs
NDMA	Plan and coordinate restoration of essential services as part of the national plan
PDMA	Plan and coordinate restoration of essential services as part of the provincial / State plan
Provincial power companies	<ul style="list-style-type: none"> Plan for monsoon contingency in concert with PDMA Pre-position emergency stocks in the vulnerable districts and reinforce their emergency repair capacity
PTCL	<ul style="list-style-type: none"> Provincial chapters to plan for monsoon / flood emergencies in concert with PDMA Reinforce need based emergency response capacity of vulnerable districts
SCO	<ul style="list-style-type: none"> Plan for monsoon emergencies in concert with SCMA AJK and PDMA NA Reinforce need based emergency response capacity of vulnerable districts of AJK and Northern Areas
PTA	<ul style="list-style-type: none"> Facilitate extension of private sector communication service providers to monsoon hazard disaster vulnerable regions

Coordination and Response

Provincial power companies	Restore electricity supply in disaster hit districts with minimum delay in coordination with other stakeholders
PTCL	Restore severed telephone links in disaster hit districts with minimum delay in coordination with other stakeholders
SCO	Restore severed telephone links in disaster hit districts with minimum delay in coordination with other stakeholders

Restoration of Land Communication Infrastructure

Preparedness Measures

NHA	Based in historical precedence and past experiences plan and mobilise resources for early reopening of monsoon disaster severed Federal road infrastructure
FWO	Be prepared to assist monsoon disaster vulnerable provinces in reopening of critical provincial roads essential for disaster response
NLC	Be prepared to assist monsoon disaster vulnerable provinces in reopening of critical provincial roads essential for disaster response
Provincial Communication Departments	Undertake planning and resource mobilisation for post disaster reopening of critical provincial roads. Preposition heavy plant at vulnerable locations to facilitate early road opening.
DDMAs	Undertake resource mobilisation and preposition available heavy plant at critical locations to facilitate early road opening

Coordination and Response

NDMA	Mobilise national response for early reopening of monsoon disaster severed road communication
NHA	Coordinate and implement employment of resources for early reopening of road

	communication as part of the national monsoon disaster response plan
Provincial Communication Department	Coordinate and implement provincial response for reopening of disaster severed road communication
DDMA	DCOs to coordinate and implement reopening of local roads to facilitate disaster response

National Logistic Support

Objective. Provide logistic support for national post disaster response

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Provide planning inputs to NLC and Pakistan Railway for providing logistic support to national response
Pakistan Air Force	<ul style="list-style-type: none"> • Earmark strategic air assets to facilitate deployment of national logistic effort for monsoon disaster response
Pakistan Army	<ul style="list-style-type: none"> • Be prepared to deploy need based helicopter support to facilitate immediate post disaster relief
Pakistan Navy	<ul style="list-style-type: none"> • Be prepared to deploy naval assets to support post disaster logistic operations in the coastal region
Pakistan Railway	<ul style="list-style-type: none"> • Comprehensively plan for responding to monsoon and floods emergency • Undertake resource mobilisation and emergency planning for response at critical points which are likely to be severed based on historical evidence
NLC	<ul style="list-style-type: none"> • Plan for providing logistic support to national response • Allocate resources for national disaster response plan for monsoon / floods emergency
MSA	<ul style="list-style-type: none"> • Be prepared to deploy maritime assets to support post disaster logistic operations in the coastal region

Coordination and Response

NDMA	Task Pakistan Railways and / or NLC for providing logistic support to floods / monsoon emergency response
JS HQ	Coordinate and implement joint services logistic response in keeping with the national plan
Pakistan Railway	Provide logistic support for national response as per national plan
NLC	Provide logistic support for national response as per national plan

Livelihood Regeneration and Support to the Vulnerable

Objective. Meet the immediate livelihood regeneration needs of the disaster affected population as an empowerment and self enablement measure.

Preparedness Measures

NDMA	<ul style="list-style-type: none"> • Define national policy and implementation plan for disbursing possible cash assistance to the vulnerable as a post disaster relief measures • Undertake joint planning with UN agencies and INOGS for need identification and resource mobilisation for support to the vulnerable consistent with national policy
PDMA	<ul style="list-style-type: none"> • Define provincial policy and implementation plan for disbursing possible cash assistance to the vulnerable as a post disaster relief measures • Undertake joint planning with UN agencies and INOGS for need identification and

	resource mobilisation for support to the vulnerable consistent with national policy and in concert with Social Welfare Department
MINFAL	Facilitate resource mobilisation for provincial agriculture and livestock departments in meeting critical needs of the vulnerable groups
Ministry of Religious Affairs and Zakat	Earmark support from zakaat fund for regeneration of post disaster livelihoods
Pakistan Bait-ul-Mal	Earmark resources for regeneration of post disaster livelihoods
Provincial and District Social Welfare Department	<ul style="list-style-type: none"> • Undertake need assessments of vulnerable groups in concert with PDMA's / DDMA and other relevant stakeholders • Raise additional provincial resources for assisting the vulnerable
Provincial Agriculture and Livestock Departments	<ul style="list-style-type: none"> • Undertake planning for rendering support to the vulnerable in terms of agricultural and livestock inputs. • Undertake resource mobilisation to this end

Coordination and Response

NDMA	<ul style="list-style-type: none"> • Execute post disaster relief cash support programme consistent with government policies • Integrate Pakistan Bait-ul-Mal and Zakaat resources in supporting post disaster livelihoods • Undertake overall coordination for regeneration of post disaster livelihoods
PDMA	<ul style="list-style-type: none"> • Execute post disaster relief cash support programme consistent with government policies • Overall provincial coordination for regeneration of post disaster livelihood support.
Provincial Agriculture and Livestock Departments	Execute agricultural and livestock inputs programmes consistent with need assessments
Provincial and District Social Welfare Department	Support execution of all livelihood support programmes in the province and district in concert with vulnerable communities and intervention agency

Livestock

Objective. Ensure post disaster survival of livestock

Preparedness Measures

MINFAL	Facilitate provincial resource mobilisation for post disaster livestock survival as part of a national disaster response plan
PMDA	Facilitate in provincial resource mobilisation for meeting emergency needs for livestock survival
Provincial	<ul style="list-style-type: none"> • Undertake pre-disaster livestock emergency support need assessments

Livestock Departments	<ul style="list-style-type: none"> • Generate resources to meet emergency medicines, operational costs and fodder needs for emergency response
District Livestock Department	<ul style="list-style-type: none"> • Undertake pre-disaster livestock emergency support need assessments • Generate resources to meet emergency medicines, operational costs and fodder needs for emergency response

Coordination and Response

MINFAL	MINFAL to coordinate resource mobilisation
Province and districts	Livestock departments are responsible for need assessments and response
PDMA/ DDMA	Support livestock response through emergency resource mobilisation

Health Response to Monsoon Emergencies³⁵

Preparedness activities

In order to reduce the affects of flood it is mandatory to start preparedness activities as early as beginning of 1st week of May 2008 and complete them by end of May 2008. These preparedness activities include but not limited to the following;

Coordination

The success of any response lies in the better coordination of activities. Both inter and intra sector coordination needs to be well planned. One focal person at Federal, Provincial and each of the Districts should be nominated to initiate these coordination activities from May 2008. The coordination should not be limited to only conducting meetings and collecting information but it should initiate joint preparedness and response plans with health sector stake holders such as UN agencies, INGOs and local NGOs. Every district should have information about all organization delivering health services to population. The focal person should also coordinate with program managers of all provincial/federal health programs such as LHW, Malaria control etc. for there involvement in the response phase.

The district level information should be collected and compiled at the Provincial/Federal level.

Stock piling

The increased demand of medicines and supplies during the post flood scenario can only be efficiently dealt with by having enough stock piling to respond to the health needs of affected population. The stock piling of medicines and supplies should be done through decentralization. The local stocks should be built and placed at locations which are easily accessible and can facilitate timely delivery to the affected population.

The stock piling should be based on the local endemic disease such as acute diarrhea Malaria, Dengue, acute respiratory track infection, Anti snake venom, Anti rabies vaccine, measles and other vaccines.

All provincial heath departments should complete their stock piling of medicines and supplies by end of May 2008 and compile detailed reports.

Disease surveillance

Active disease surveillance is very important for timely alerts and response to any emerging epidemic conditions. The success of disease surveillance lies in the availability of trained staff and district level ability to respond to the emerging outbreaks. In order to implement active disease surveillance in the districts it's essential to have fully trained district level surveillance staff by end of May 2008.

The availability of the trained staff needs to be supplemented by the availability of outbreak specific response medicines and supplies such as specific vaccines, etc.

Human resource data base

Timely availability of human resources is very crucial for the success of any response plan. The provincial health department should prepare a data base of trained human resources for readily deployment in the affected districts. The arrangements should be completed in all respects in terms of logistic supplies for the teams. All deployed teams should be self sustainable to avoid additional logistic load on the host district in emergency phase.

EPI coverage

EPI program is responsible for providing vaccination services for vaccine preventable diseases such measles etc. They program should specially focus the flood prone districts for 100% vaccine coverage.

³⁵ Input furnished by WHO

They should also prepare plans with stock piling of vaccinations to conducted mass vaccination campaigns in it is required.

Response activities

PHC service delivery and Referral

Human resource data will facilitate deployment of health care service providers and stock piling of medicines and supplies will facilitate timely delivery. In the absences of infrastructure the PHC services will be provided through mobile out reach services. Static medical post will also be developed at IDP camps. The PHC services will also ensure referral of complicated cases to appropriate level of care.

Disease Surveillance and case Management

Active disease surveillance should be part of regular health services but unfortunately it's still not being implemented in all high risk districts. Immediately after floods the disease early warning system would be enhanced to track increased health threats and data collection should start from all static, mobile and out reach medical services. The data should be analyzed at district level and all trends in diseases closely monitored and any threat be immediately responded.

Immunization

Due inadequate vaccination coverage the IDPs (6 months and 15 years) in flood affected areas are vulnerable to measles. In order to avoid any outbreak measles vaccinations may be required for those between these ages. Vitamin A supplementation will also be needed for the under fives. Other vaccinations may also be required such as polio, tetanus, and meningitis.

Vector control

Malaria, dengue, and other vector borne disease are endemic in many areas of Pakistan. Active control of the vector borne disease should be initiated immediately followed by floods. Activities might include distribution of insecticide-treated nets (ITNs), insecticide spray and the destruction of vector breeding would be needed for vector control.

Health education and hygiene promotion

In order to minimize the disease out break in the affected areas, health education and hygiene promotion campaign should start immediately.

Monitoring

To ensure quality and equitable distribution of health services monitoring plays vital role. Continuous monitoring of all intervention should be conducted by health partners facilitated by the Federal/Provincial/District health authorities.

Requirements

In order to calculate and address potential flood-induced needs Federal/Provincial/district health authorities should be requested to immediately provide information as per the following table.

Health Requirements to cover monsoon floods

Item	Total Current stocks	Total requirement ³⁶	Gaps ³⁷
Essential drugs List in broad categories, e.g. antibiotics, anti diarrhea Anti snake venom etc.			
Supplies Cover all supplies required e.g. Disposable syringes, spray equipment etc.			
Vaccines Measles, tetanus etc.			
Health care providers (Doctors, paramedics, etc.)			

³⁶ To cover the monsoon season and provide services in case of floods

³⁷ Total stock less total requirement

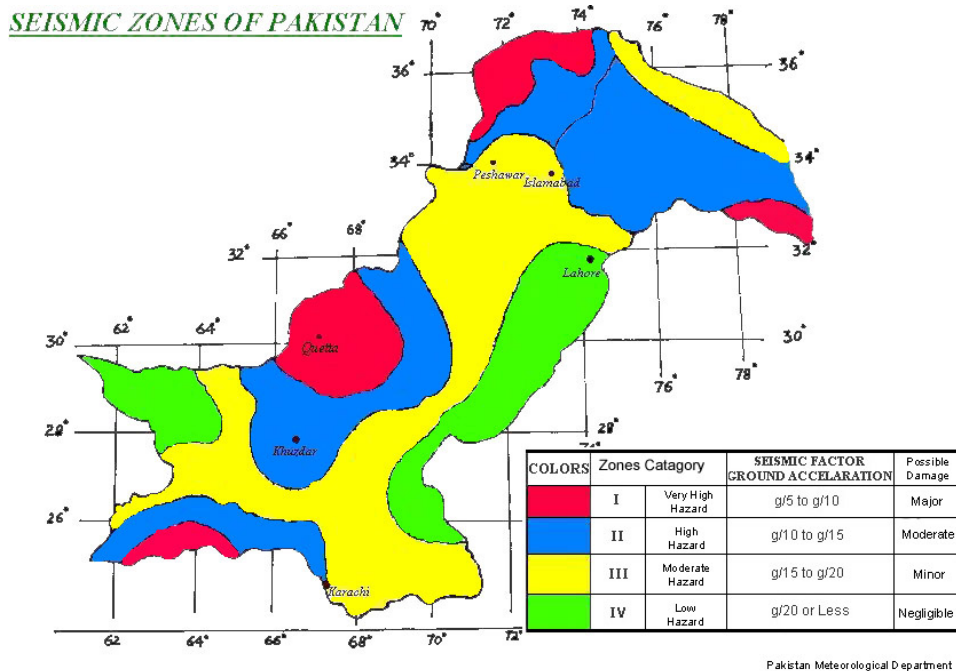
Disaster Risks in Pakistan*

1.1 Hazards

Pakistan's exposure to natural hazards and disasters could be ranked between moderate to severe. Natural hazards including avalanches, cyclones and storms, droughts, earthquakes, epidemics, floods, glacial lake outbursts, landslides, pest attacks, river erosion and tsunami pose risks to Pakistani society. A variety of human-induced hazards also threaten the society, economy and environment. They include industrial, transport, oil spills, urban and forest fires, civil conflicts and internal displacements of communities. High priority hazards in terms of their frequency and scale of impact are:- earthquakes, droughts, flooding, Wind Storms and Landslides that have caused widespread damage and losses in the past. Given below is an overview of the key hazards that threaten Pakistan.

Earthquakes

The Indo-Australian plate upon which Pakistan, India and Nepal lie, is continuously moving northward and sub-ducting under the Eurasian plate, thus triggering earthquakes in the process and forming Himalayan mountains. Within the Suleiman, Hindu Kush and Karakoram mountain ranges, the Northern Areas and Chitral district in NWFP, Kashmir including Muzaffarabad, and Quetta, Chaman, Sibi, Zhob, Khuzdar, Dalbandin, the Makran coast including Gwadar and Pasni in Balochistan are located in high or very high risk areas. Cities of Islamabad, Karachi and Peshawar are located on the edges of high risk areas. Four major earthquakes have hit Pakistan in 20th Century including: 1935 Quetta earthquake, 1945 Makran coast earthquake, 1976 Northern Areas and the 2005

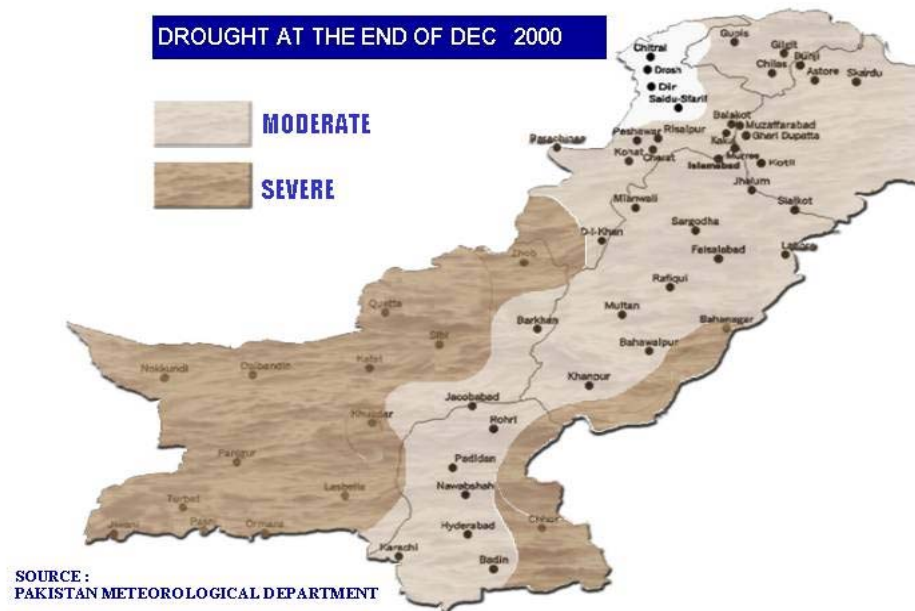


Kashmir/NWFP quake. Seismologists like Dr. Roger Bilham and associates believe that one or more great earthquakes may be overdue in a large fraction of the Himalayas. They also don't rule out the chances of ruptures in the range of 7.5 Mw. to 8 magnitude in Balochistan area.

Droughts

* National Disaster Risk Management Framework Pakistan, March 2007, pp 3-7

The incidence of drought is becoming increasingly common in Pakistan with substantial consequences upon sustainable development in sectors of food security, livestock, agriculture, water resources, environment and hydro-electricity. Low rainfall and extreme variations in temperature characterize the climate in Pakistan. About 60 percent of the total land area is classified as arid, which annually receives less than 200 mm rainfall. The main arid rangelands include Cholistan, D. G. Khan, D.I. Khan, Kohistan, Tharparkar and Western Balochistan⁵. Average annual precipitation in Balochistan and Sindh provinces is about 160mm as compared with 400 mm in Punjab province and about 630mm in NWFP province. Rainfall variability during different seasons is also considerably high. Climate in lower southern half of the country is arid and hyper-arid. Some areas remain drastically dry in each region and are always vulnerable to drought with a small negative deviation from low mean rainfall. Certain areas experience two-three drought years in every decade.

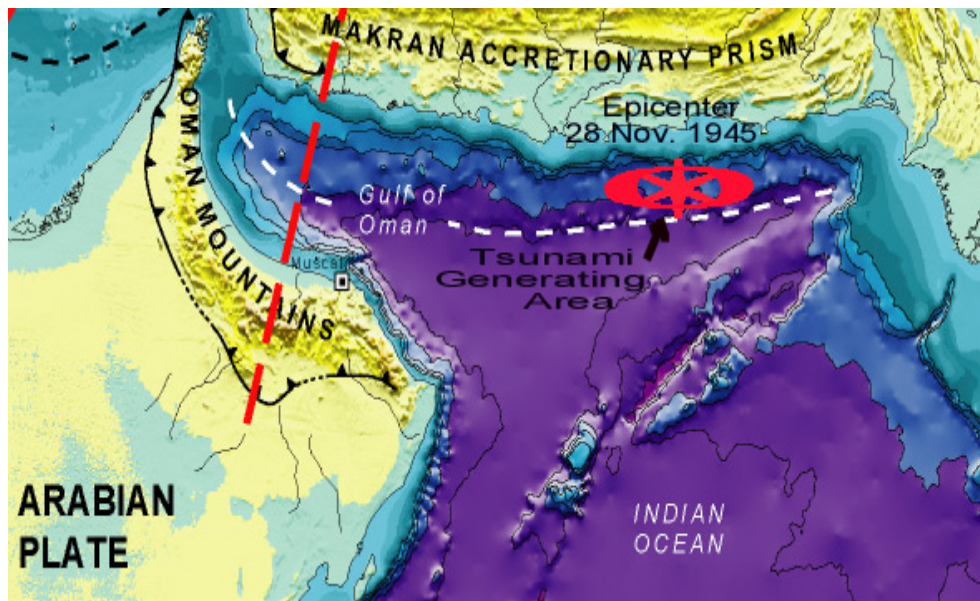


Floods

Fifty six (56%) percent of the Indus river basin lies in Pakistan and covers approximately 70 % of the country's area (IUCN, 2005). Generally major floods in the Indus basin occur in late summer (July-September) when South Asian region is subjected to heavy monsoon rains. In upper to mid reaches of the Basin, generally tributaries like Jhelum and Chennab are mostly the cause of flooding. Major flooding is mainly associated with the monsoon low depression that develops in the Bay of Bengal and move across India in west/northwesterly direction to enter Pakistan. River floods particularly hit Punjab and Sindh while hill torrents tend to affect the hilly areas of NWFP, Balochistan and northern areas. Districts of Charsadda, Mardan, Nowshera and Peshawar in NWFP are exposed to risks from flooding in the river Kabul. Flash floods also hit hilly and mountain areas of Punjab, which may cause landslides and road erosion. Cloud Burst Flash Floods (CBFF) could also occur over Lahore (as it happened in 1996), Rawalpindi, Islamabad and Jhelum. Floods in Pakistan can also occur due to dam bursts; e.g. the floods in Pasni due to Shadi Kot dam burst in February 2005. In recent years, vulnerabilities of large cities to flooding have increased. Cities like Karachi, Lahore and Rawalpindi have experienced flooding due to inability of sewerage system to cope with heavy rains. Fourteen major floods that have hit the country since 1947 caused economic losses and damages worth USD 6 billion.

Landslides

The regions of Kashmir, Northern Areas and parts of the NWFP province are particularly vulnerable to landslide hazard. Aside from the young geology and fragile soil type of mountain ranges, accelerated deforestation is a major cause behind increased incidences of landslides. Small scale isolated landslide hazards happen frequently in the above mentioned regions. Frequency of landslides may increase in future since the forest cover is shrinking by 3.1% (7000-9000 ha taken away annually).



Tsunami

Pakistan also has a history of tsunami disasters. A big tsunami was experienced on 28 November 1945, due to an earthquake of magnitude 8.3, offshore Makran Coast⁹. The tsunami produced sea waves of 12-15 meters height that killed at least 4000 people in Pasni and adjoining areas. Karachi, about 450 kms from the epicenter, experienced 6 feet high sea waves which affected harbour facilities. The fact that cities like Karachi lie close to potential epicentres for large submarine earthquakes, demands attention for enhancement of local capacities for disaster risk reduction, early warning and response in order to reduce losses from tsunami events.

Cyclones/storms

Coastal belt of Pakistan (especially in Sindh) is highly vulnerable to cyclones and associated storm surges. Fourteen cyclones were recorded between 1971 and 2001. Cyclones can cause large scale damage to coastal areas of Sindh and Balochistan. The cyclone of 1999 in Thatta and Badin districts wiped out 73 settlements and killed 168 people and 11,000 cattle. Nearly 0.6 million people were affected. It destroyed 1800 small and big boats and partially damaged 642 boats, causing a loss of Rs. 380 million. Losses to infrastructure were estimated at Rs. 750 million. Climate change may increase the frequency and intensity of storms and could cause changes in their tracks. Although the frequency of cyclones along Pakistani coast is low, yet they cause considerable damage, when they occur.

Glacial lake outburst flood (GLOF)

Another likely scenario that can come into play is the burst of glacial lakes in the upstream of Indus basin due to heat waves, a phenomenon termed as Glacial Lake Outburst Flood (GLOF). A recent study found that, of the 2420 glacial lakes in the Indus basin, 52 are potentially dangerous and could result in GLOF with serious damages to life and property. The study has also indicated that global warming can increase the potential of GLOF in future.

Avalanches

The Kashmir region and northern areas in Pakistan experience avalanches on a regular seasonal basis. Local people in the hazardous region and tourists are vulnerable to this hazard. A study conducted by WAPDA in 1985-89 under the Snow and Ice Hydrology Project, identified the potential avalanche paths.

Transport and industrial accidents

Transport accidents are a common phenomenon in Pakistan. Particularly the train system is notorious for collisions. Plane crashes and road accidents are not uncommon events either. Ports in Karachi and Gwadar are also at risk from marine accidents too. In August 2003 the oil wreckage of Tasman Spirit, a Greek oil ship caused colossal environmental losses and health hazards for businesses, port workers and adjacent communities at Karachi. About 28,000 ton oil spilled all over the harbour area, which affected marine life in a major way.

The growing industrialization particularly within urban settlements in cities like Faisalabad, Gujranwala, Karachi, Hyderabad, Quetta, Lahore, Sialkot, Peshawar and elsewhere can be a source of major industrial and chemical disasters. The neighboring India suffered from Bhopal Gas leakage in 1985, in which 5000 people were killed and enormous health problems were experienced by citizens of Bhopal.

Urban and forest fires

With growing urbanization and industrialization in the country, risks of urban fires are on the rise. CNG gas stations are installed in all urban areas and the gas is also sold at small stores for household use. Sale of petroleum products within residential areas is also common in cities. These practices pose major fire risk in urban areas, while urban services are generally poorly equipped to fight these risks. The northern regions of Pakistan and AJK are prone to forest fires.

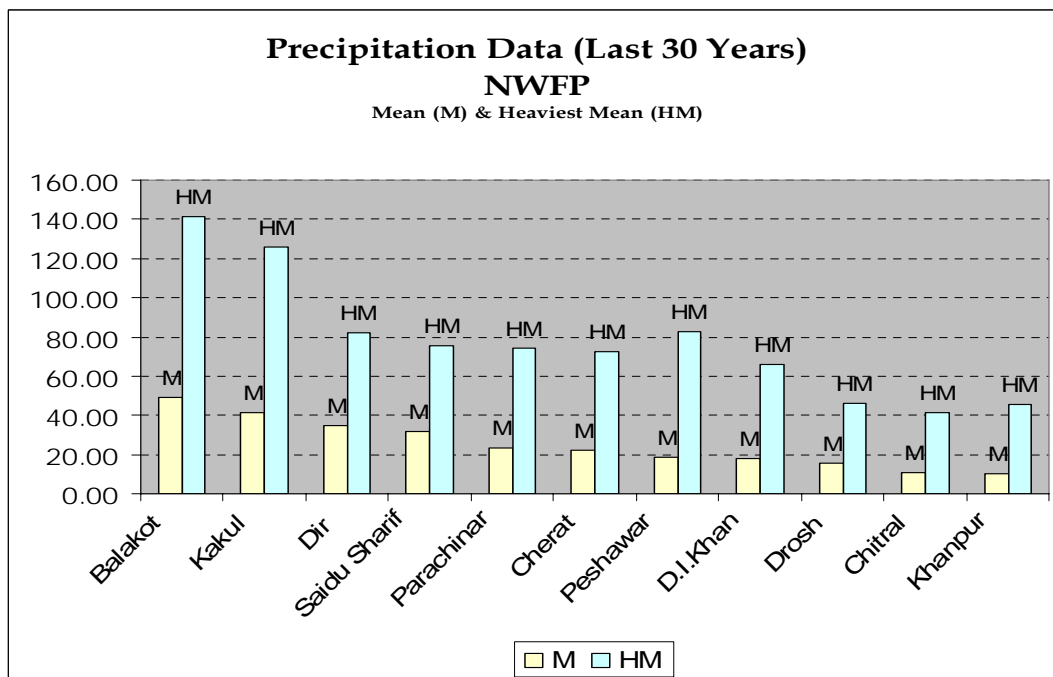
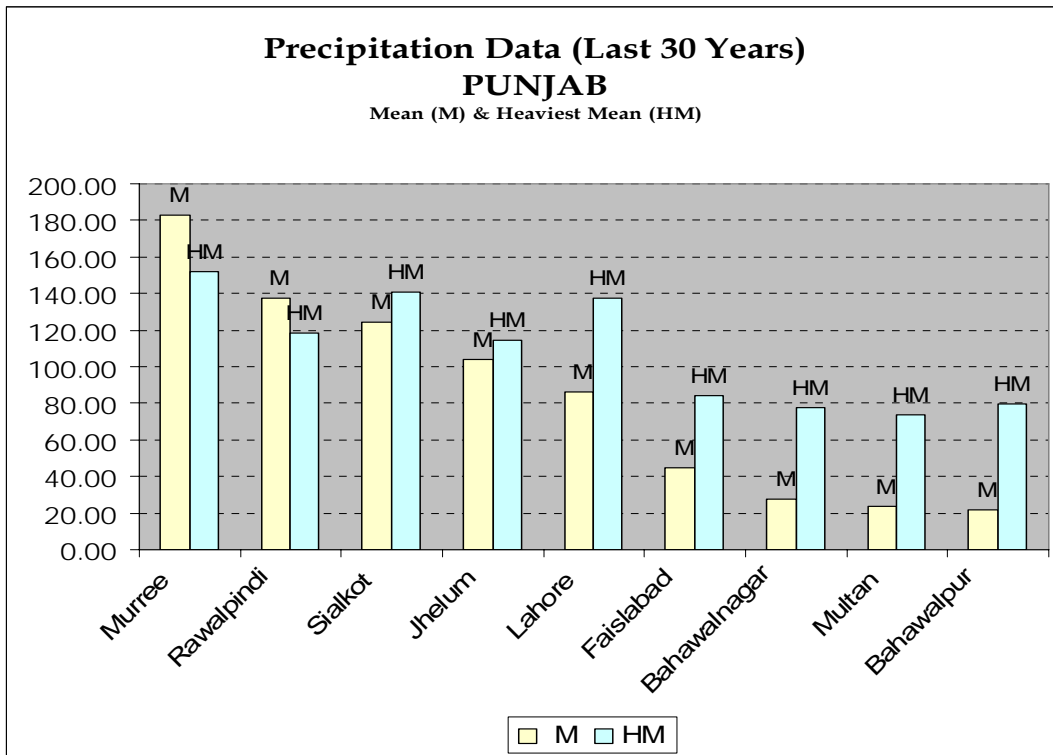
Civil conflicts

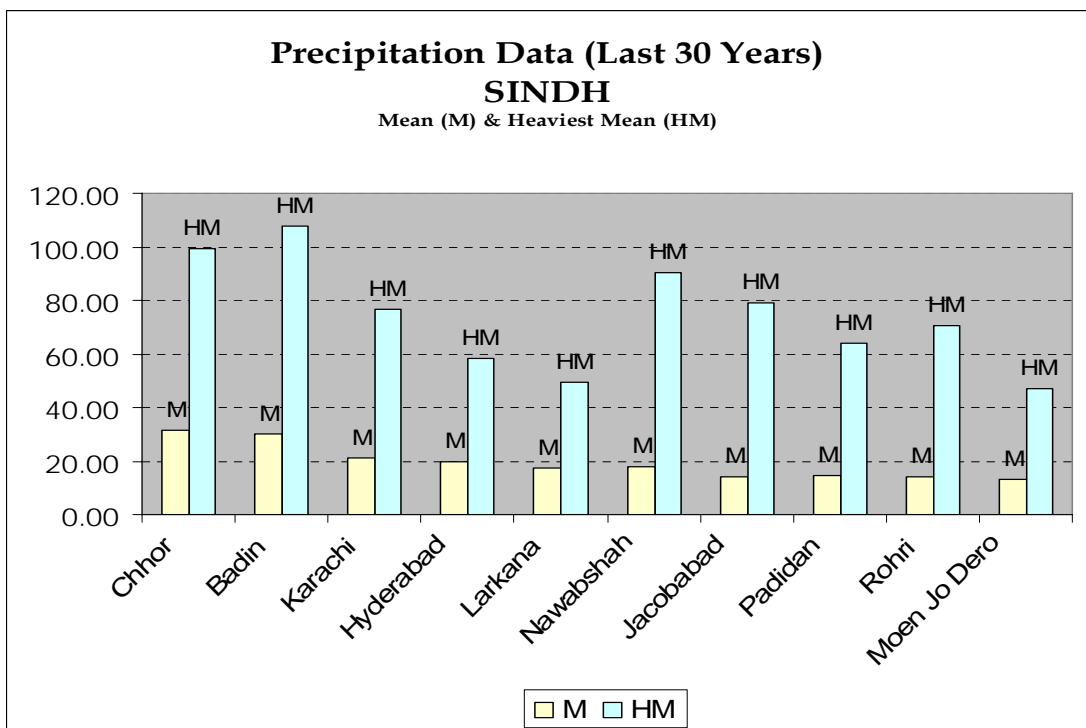
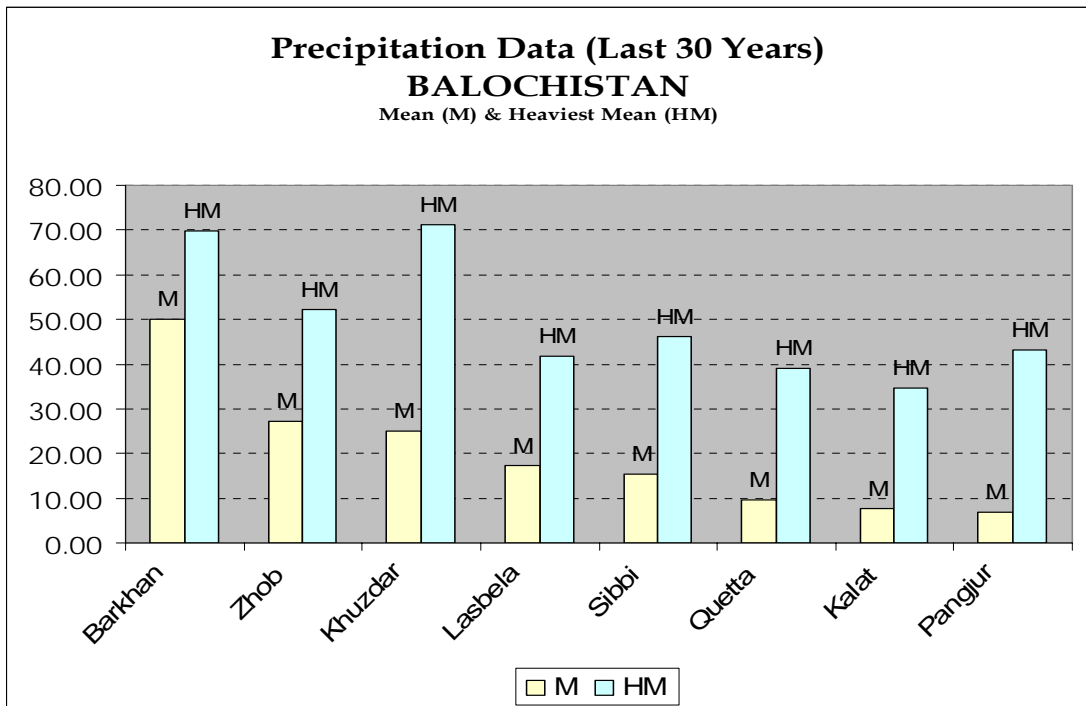
Pakistan is ethnically, linguistically, religiously and culturally a diverse society. This diversity has some times led towards civil conflicts amongst various social groups and has impacted most upon women, children and minorities. For example, Pakistan suffered sectarian conflicts during the 1980s and 1990s. These conflicts caused loss of life and damage to property, while creating insecurity for various social groups in the affected areas. The hosting of about 6 million Afghan refugees also damaged the social fabric of Pakistan.

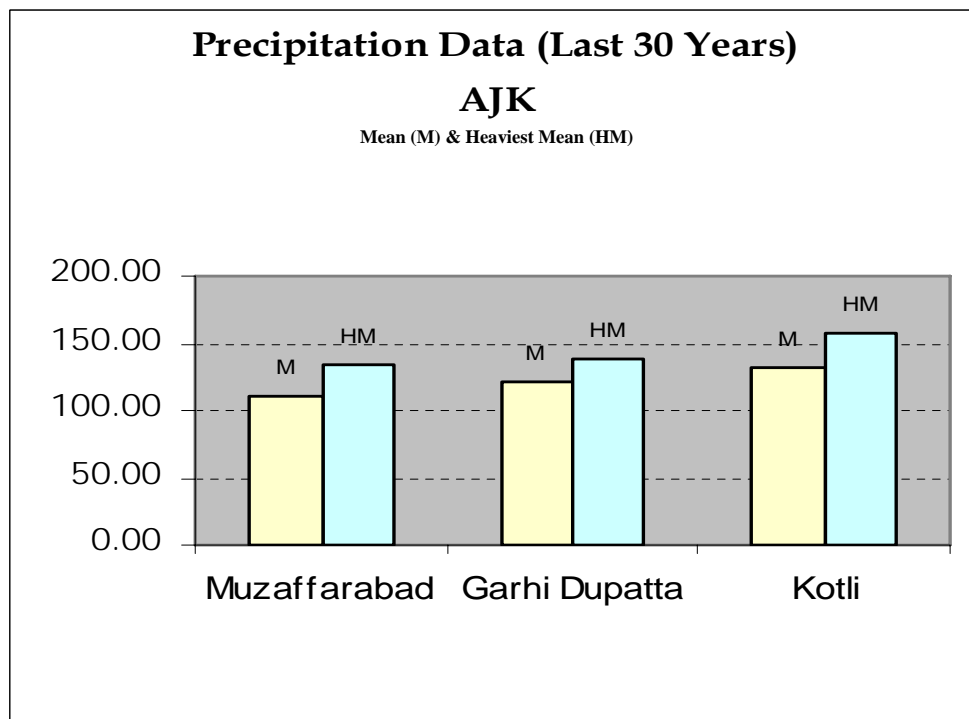
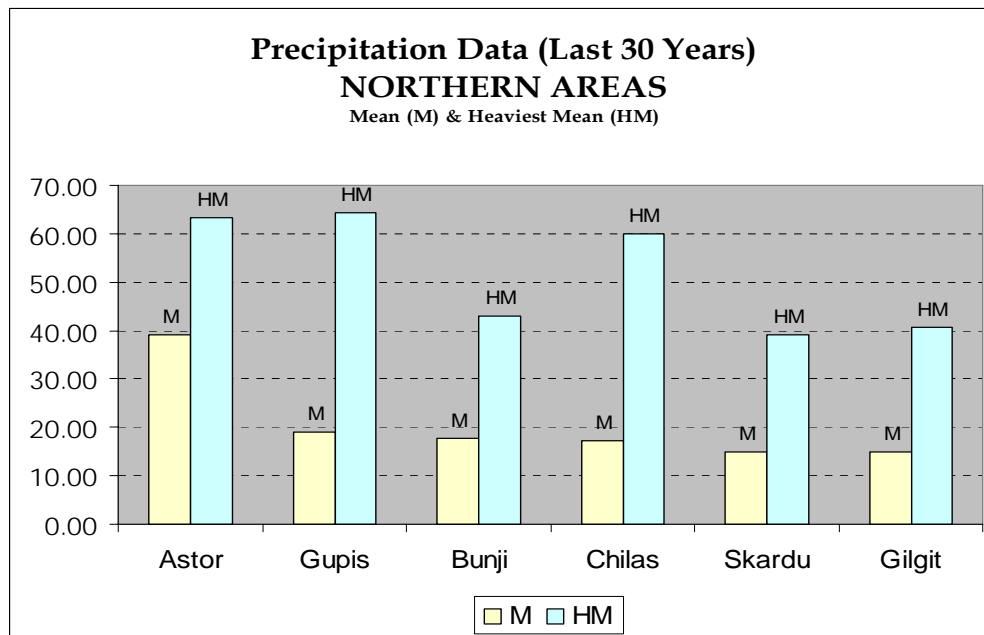
Flood Classification of Rivers (in Lakh Cusecs)

River	Site of Gauge (D/S)	Design Capacity	Flood Classification				
			Low	Med	High	Very High	Exceptionally High
Indus	Tarbela	15.0	2.5	3.75	5.0	6.5	8.0
	Kalabagh	9.5	2.5	3.75	5.0	6.5	8.0
	Chashma	9.5	2.5	3.75	5.0	6.5	8.0
	Taunsa	11.0	2.5	3.75	5.0	6.5	8.0
	Guddu	12.0	2.0	3.5	5.0	7.0	9.0
	Sukkur	15.	2.0	3.5	5.0	7.0	9.0
	Kotri	8.75	2.0	3.0	4.5	6.5	8.0
Kabul	Warsak	5.4	0.30	0.45	1.0	2.0	4.0
	Nowshehra		0.45	0.47	1.0	2.0	4.0
Jhelum	Kohala		1.0	1.5	2.0	3.0	4.0
	Mangla	10.6	0.75	1.1	1.5	2.25	3.0
	Rasul	8.5	0.75	1.1	1.5	2.25	3.0
Chenab	Marala	11.0	1.0	1.5	2.0	4.0	6.0
	Khanki	8.0	1.0	1.5	2.0	4.0	6.0
	Qadirabad	8.07	1.0	1.5	2.0	4.0	6.0
	Trimmu	6.45	1.5	2.0	3.0	4.5	6.0
	Panjnad	7.0	1.5	2.0	3.0	4.5	6.0
Ravi	Jassar	2.75	0.5	0.75	1.0	1.5	2.0
	Shahdara	2.5	0.4	0.65	0.9	1.35	1.8
	Balloki	2.25	0.4	0.65	0.9	1.35	1.8
	Sidhnai	1.5	0.3	0.46	0.6	0.9	1.3
Sutlej	Sulemanki	3.25	0.5	0.8	1.2	1.75	2.25
	Islam	3.0	0.5	0.8	1.2	1.75	2.25

Provincial Summer Precipitation Profile







ANNEX D

FLOOD PROTECTION AND MITIGATION WORKS

(Rs in Million)

Sr.No	Name of Schemes	Estimated Cost	Approval Status
	Federal Flood Commission		
	Capacity building Strengthening Monitoring Capability of Federal Flood commission	22.373	Approved by DDWP on 22-11-2007
	Pakistan Meteorological Department		
	Weather Surveillance Radar's Improvement at Islamabad (Funded through Minister's Quota)	20.00	Cleared by S.C. on Dec. 18, 2007 and Approved by DDWP on Feb. 28, 2008
	PUNJAB Allocation Rs 688.500 + 95.00 (minister quota) 783.5 million		
1	Protecting towns, villages and infrastructure from erosive action of river Indus in District Bhakkar	439.747	Cleared by S.C. on May 16, 2007 and approved by CDWP on July 26, 2007
2	Constructing J-Head Spur No.1 of Pir Adil Minor	97.147	Cleared by S.C. on Jan. 03, 2008 and approved by CDWP on March 01, 2008
3	Constructing J-Head Spur RD 170 – 180 of link No.1	53.114	Cleared by S.C. on Jan. 03, 2008 and approved by CDWP on March 01, 2008
4	Protecting measures to save Smoka village and irrigation infrastructure opposite RD 200+000 Minchin Bund	48.560	Cleared by S.C. on January 03, 2008 and approved by CDWP on March 01, 2008
5	Stone pitching on loop bund river side (Dallas Canal Division)	38.99	Cleared by S.C. on Jan. 03, 2008 and approved by DDWP on Feb. 28, 2008
6	Protecting colony protection bund and adjoining abadies by constructing J-Head Spur at RD 10-11 of colony protection bund of Marala Barrage	90.442	Cleared by S.C. on January 03, 2008 and approved by CDWP on March 01, 2008
7	Strengthening and rehabilitation of damaged spur/ X-spurs with nose pitching along Chenab flood bund and Shujabad Branch	48.660	Cleared by S.C. on January 03, 2008 and approved by CDWP on March 01, 2008
8	Strengthening and rehabilitation of Dhundu, Baloch Wah and Gujju Hatta flood bund	42.200	Cleared by S.C. on January 03, 2008 and approved by CDWP on March 01, 2008
	Sub-Total (Punjab)	858.860	
1	Construction of Dohlak Flood Protection Bund and Drain in the vicinity of International Boundary on left side of river Tawi (Funded through Minister's Quota)	32.180	Cleared by S.C. on October 30, 2007 and approved by DDWP on Nov. 22, 2007
2	PC-I for Construction of Sewaraj Flood Protection Bund and Drain in the vicinity of International Boundary on left side of river Tawi (Funded through Minister's Quota)	19.130	Cleared by S.C. on October 30, 2007 and approved by DDWP on Nov. 22, 2007
3	PC-I for Construction of Marchola Flood Protection Bund and Drain in the vicinity of International Boundary on left side of river Tawi (Funded through Minister's Quota)	36.443	Cleared by S.C. on October 30, 2007 and approved by DDWP on Nov. 22, 2007
	Sub-Total	87.753	
	SINDH Allocation Rs 474.300 + 15.19 million (Minister's quota) =489.49 million		
1	Raising/strengthening, providing stone pitching along F.P	E/Cost 1515.249	Cleared by S.C. on October 30,

	bund RD 169 to 263.5 & RD 502 to 120 (Funded through Minister's Quota of Rs 15.19 million)	Re-Cost 492.236	2007 and approved by CDWP on March 01, 2008
2	Raising/strengthening, providing stone pitching along Suprio bund RD 0 to 95	253.181	Cleared by S.C. on October 30, 2007 and approved by CDWP on January 12, 2008.
	Sub-Total	745.417	
1	Constructing stone apron & stone pitching along Bakhri loop bund mile 0/3 to 1/6	101.752	Cleared by S.C. on January 03, 2008 and approved by CDWP on March 01, 2008
2	Recoupment of T-head spur at S.M. Bund mile 135/7+500 to 136/0+200	16.178	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
3	Providing stone pitching with apron along S.H Bund from mile 0/3 to 1/6	34.640	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
4	Constructing stone pitching with Toe wall along M.S. Bund mile 18/0 to 22/0	38.074	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
	Sub-Total	190.644	
	NWFP Allocation Rs 168.300 + 34.810 million (Minister's Quota) = 203.11million		
1	Construction of flood protection structures at critical locations on different rivers and local khwars/nullahs in Swat, Buner, Shangla, Battagram, Mansehra, Abbottabad & Haripur District	29.00	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
2	Construction of flood protection structures at critical locations on different rivers and local nullahs in District Charsadda, Mardan & Swabi	26.47	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
3	Construction of flood protection works at vulnerable locations along different river & local nullahs in District Dir (Lower/Upper) Chitral	22.00	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
4	Construction of flood protection works for the protection of various abadies and other infrastructure at critical locations in Peshawar, Kohat, Karak & Hangu Districts	23.00	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
5	Construction of flood protection works for the village abadies and agricultural lands from floods in Jambi/Marghuzar Khwars, District Swat	2.00	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
6	Construction of flood protection scheme at critical location along different rivers/Nullahs in District D.I.Khan & Tank	27.306	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
7	Protection scheme at critical location along different rivers/nullahs in District Lakki Marwat & Bannu	24.103	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
8	Construction of flood protection works for the protection of village abadies and other infrastructure at critical locations in District Nowshera	26.00	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
9	Construction of three Nos. Spurs on Kurram River near Pinjama in district Lakki Marwat (Funded through Minister's Quota)	34.80	Cleared by S.C. on January 03, 2008 and approved by DDWP on Feb. 28, 2008
	Sub-Total	214.679	
	Balochistan Allocation Rs 122.400 million		
1	Construction of Flood Protection Bund Sami District Kech	11.647	Cleared by S.C. December 18, 2007 and approved by DDWP on Feb. 28, 2008

2	Umbrella PC-I/Estimate for 04 Nos Flood Protection schemes in Quetta, Chagai & Nushki Districts	6.50	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
3	Umbrella PC-I/Estimate for 02 Nos Flood Protection schemes in Pishin & Killa Abdullah Districts	3.40	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
4	Umbrella PC-I/Estimate for 07 Nos Flood Protection schemes in Sherani & Zhob Districts	9.60	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
5	Umbrella PC-I/Estimate for 04 Nos Flood Protection schemes in Musa Khel & Loralai Districts	8.20	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
6	Umbrella PC-I/Estimate for Flood Protection scheme of Killi Dad Mohammad Zarkoon Uryani (Harini) area District Kohlu	2.90	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
7	Umbrella PC-I/Estimate for 09 Nos Flood Protection schemes in Killa Saifullah District	22.20	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
8	Umbrella PC-I/Estimate for 05 Nos Flood Protection schemes in Sibi, Harnai & Ziarat Districts	7.30	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
9	Umbrella PC-I/Estimate for 02 Nos Flood Protection Schemes in Kulachi village and Mushkaf town District Bolan	5.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
10	Umbrella PC-I/Estimate for construction of 3 Nos flood protection bunds in District Kharan	7.50	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
11	Construction of flood protection bund along Ayoub Dhora/River at Hub District Lasbela	3.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
12	Construction of protection bund for Moosani village Bela, District Lasbela	4.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
13	Umbrella PC-I/Estimate for Flood Protection Bunds for villages and agriculture lands/orchards in District Kalat/Washuk	16.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
14	Umbrella PC-I/Estimate for construction of 3 Nos Flood Protection Bunds for villages and agricultural lands/orchard in District Khuzdar	8.20	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
15	Umbrella PC-I/Estimate for construction of flood protection bunds for villages and agricultural lands orchards in District Awaran	3.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
16	Construction of 04 Nos. flood protection schemes in Districts Kech, Panjgur	10.50	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
17	Construction of remaining portion flood protection bund Jhal Magsi town in District Jhal Magsi	2.85	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb. 28, 2008
	Sub-Total	131.797	
	FATA Allocation Rs 45.900 million		

1	Flood protection scheme for protection of Behran Kach Teran on right side of Wana Algad Tehsil Wana South Waziristan Agency	3.10	Cleared by S.C. on December 18, 2007 and submitted for approval of DDWP on Feb. 28, 2008
2	Flood protection scheme for protection of abadies and agricultural land on right side of Woucha Dhana Algad in Shah Alam area, Tehsil Birmal, South Waziristan Agency	2.999	Cleared by S.C. on December 18, 2007 and submitted for approval of DDWP on Feb. 28, 2008
3	Flood protection scheme for village abadies & culturable land in Kajori Bara Tehsil Khyber Agency	6.00	Cleared by S.C. on December 18, 2007 and submitted for approval of DDWP on Feb. 28, 2008
4	Flood protection scheme for protection of land of Anayat Khan Kach at Hamzoni in Miranshah Tehsil N.W. Agency	4.00	Cleared by S.C. on January 03, 2008 and submitted for approval of DDWP on Feb. 28, 2008
5	Flood protection & reclamation of land & village abadies for Ozee villages in Upper Kurram Agency	4.266	Cleared by S.C. on January 03, 2008 and submitted for approval of DDWP on Feb. 28, 2008
6	Flood protection scheme for the village settlement abadies in Jamal-u-Din Kach Pir Tani area F.R. Tank	2.296	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb 28, 2008
7	Flood protection scheme for protection of culturalable land & village abadies of Razi Khan Hach and Lal Gul Hussan Khel near Morrgha village Sherani area F.R D.I. KHAN	4.704	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb 28, 2008
8	Flood protection scheme of Bimber Nazar Khel Tangari and Tormandi in Sarwakai Tehsil S.W. Agency	4.449	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb 28, 2008
9	Flood protection scheme for Tochi River for protection of village abadies and culturable land of Ziraki area in Mirali Tehsil N.W. Agency	4.00	Cleared by S.C. on January 28, 2008 and approved by DDWP on Feb 28, 2008
	Sub-Total	35.814	
	AJ&K Allocation Rs 15.300 million		
	Schemes not received		
	Northern Areas Allocation Rs 15.300 + 15.00 (Minister's Quota) = 30.300 million		
1	Construction of flood protective bund at Gahkuch Silpi, Sandi, Sultanabad, Yasin and Ghizer District	14.540	Approved/Ongoing
2	Construction of flood protective bund at Thalay Nallah Ghanch	5.326	Approved/Ongoing
3	Construction of food protective bund at Salling District Ghanche	20.00	Approved/Ongoing
4	Construction of flood protective bund at Ghursey District Ghanche	4.983	Approved/Ongoing
5	Construction of protective bund at Usmanabad Basin Gilgit	7.135	Approved/Ongoing
6	Construction of protective bund at Surmo District Ghanche	3.939	Approved/Ongoing
7	Flood Protective and River Training Works for Darel/Tangir Valley	30.900	Approved/Ongoing
	Sub-Total (Northern Areas)	76.823	
	I.C.T. Allocation Rs 3.500 million		
	Schemes not received		

Districts Vulnerable to Monsoon / Flood Hazards

NWFP

Districts / Agencies	Hazards
Charsadda	Flash Floods, Riverine flood
Nowshera	Riverine Floods
DI Khan	Riverine and Flash floods
Peshawar	Riverine and Flash floods
Mansehra	Flash floods, sliding, cloud burst
Mardan	Flash floods
Swat	Flash floods, cloud bursts
Lower & Upper Dir	Flash floods, cloud bursts
Shangla	Flash floods
Buner	Flash floods and cloud bursts
Chitral	Flash floods, sliding, GLOF
Kohistan	Flash floods, sliding
Malakand Agency	Flash floods
Kurram Agency	Flash floods

AJK

Districts	Hazards
Neelum	Flash floods, slides
Muzaffarabad	Riverine floods, flash floods, slides
Bagh	Flash flooding, slides
Poonch	Flash floods. slides
Bhimber	Flash floods

Baluchistan

District	Hazards
Kech	Tropical Cyclone, Flash floods
Gwador	Tropical Cyclone, Flash floods
Jhal Magsi	Flash floods
Kharan	Flash floods
Bolan	Flash floods
Khuzdar	Flash floods
Lasbela	Tropical Cyclone, Flash floods
Sibi	Flash floods
Jaffarabad	Flash floods
Dalbadin	Flash floods

Punjab

District	Hazards
Sialkot	Riverine floods (Chenab), flash floods
Wazirabad	Riverine floods (Chenab), flash floods
Muzzafargrah	Riverine floods (Indus)
Rajanpur	Riverine floods (Indus), flash floods
Dera Ghazi Khan	Riverine floods (Indus), flash floods
Jhang	Riverine floods (Jhelum and Chenab)
Narowal	Riverine floods (Chenab), flash floods
Mandi Bahauddin	Riverine floods (Jhelum)
Jhelum	Riverine floods (Jhelum)
Sheihkupura	Riverine floods (Ravi), flash floods
Layyah	Riverine floods (Indus)
Gujranwala	Riverine floods (Chenab)
Khushab	Riverine floods (Jhelum), flash floods
Mianwali	Riverine floods (Indus)
Sargodha	Riverine floods (Jhelum)
Bahawalnagar	Riverine floods (Sutlej)
Gujrat	Flash floods
Rawalpindi	Flash floods

Sindh

District	Hazards
Karachi	Urban flooding, man made hazard intensify impact
Badin	Tropical Cyclone, precipitation based flooding, sea intrusion
Thatta	Tropical Cyclone, precipitation based flooding, sea intrusion
Dadu	Riverine floods, Flash Floods
Kambar - Shahdadkot	Riverine floods, Flash Floods
Larkana	Riverine Flood, Flash Floods
Khairpur Moran	Riverine floods
Naushero Feroz	Riverine floods
Nawab Shah	Riverine floods
Sanghar	Riverine floods, precipitation based flooding
Hyderabad	Riverine flooding, urban flooding

Social Indicators of Vulnerable Districts

NWFP									
District	Tehsils	UCs	Population (NIPS 04 estimate)	Pop Density (per sq.kms)	Persons Per HH	% of Pop having one room	% of HHs having electricity	Literacy	
								Overall %	Female %
Charsadda	3	49	1,179,000	1026.5	8	31.2	905	31.1	14.1
Peshawar	1	92	23,328,000	1606.3	8.5	24.1	95	41.8	25.9
D.I.Khan	4	47	983,000	116.4	7.5	28.6	73.1	31.3	17
Swat	2	65	1,450,000	235.6	8.8	22.4	67.8	28.7	13.4
Mardan	2	74	1,684,000	894.7	8.4	27.6	83.5	36.3	18.4
Nowshera	1	47	1,008,000	500	7.7	31	90.5	42.5	22.7
Lower Dir	6	34	828,000	453.3	9.3	18.7	72	29.2	12.3
Upper Dir	5	31	664,000	156	8	25.5	38.5	21.2	6.1
Shangla	2	24	501,000	274	8.1	31	15.2	14.7	3.7
Chitral	2	24	368,000	21.5	7.9	18.4	29.4	40.3	22.1
Buner	1	27	584,000	271	9	30	51.1	22.6	7.7
Mansehra	2	58	1,330,000	252	6.7	34.4	49.1	36.3	22.7
Kohistan	3	38	454,000	63.1	6.4	49	2.9	11.1	2.9
Punjab									
District	Tehsils	UCs	Population (NIPS 04 estimate)	Pop Density (per sq.kms)	Persons Per HH	% of Pop having one room	% of HHs having electricity	Literacy	
								Overall %	Female %
Sialkot	4	122	3,091,000	903	7.3	21.6	94.6	59	51.1
Muzaffargarh	4	93	2,992,000	319.5	7.3	46.2	51.7	28.4	14.8
Rajanpur	3	44	1,253,000	89.6	7.3	53.7	40.4	20.7	11.3
Dera Ghazi Khan	3	59	1,865,000	137.8	7.8	38.9	56	30.6	18.1
Jhang	3	128	3,217,000	321.8	6.5	32.6	48.9	37.1	21.4
Narowal	2	74	1,436,000	541.3	7.4	22.5	85	52.7	39.8
M.B.Din	3	65	1,317,000	434.2	6.7	26.2	79.2	47.2	35.6
Jhelum	3	53	1,064,000	261.2	6.1	17.4	83.1	68.9	50.5
Shiekhupura	4	97	3,769,000	557.2	7.3	33.7	82.2	43.8	33.3
Layyah	3	44	1,272,000	178.2	7.3	31.6	46.6	38.7	23.4
Gujranwala	4	152	3,860,000	939	7.5	24.4	93.3	56.3	48.5
Khushab	2	51	1,028,000	139.1	6.2	23	58.1	40.5	21.8
Mianwali	3	56	1,199,000	180.9	7.1	22.3	65.4	42.8	22.1
Sargodha	6	161	3,026,000	455.4	6.4	34.1	71.6	46.3	32.7
Bahawalnagar	5	118	2,340,000	232.2	6.7	36.1	53	35.1	23.8
Gujrat	5	118	2,325,000	641.6	6.6	18.1	92.4	62.2	51.6
Rawalpindi	6	170	3,838,000	636.5	6.4	17.3	91	70.4	59.2
Sindh									
District	Tehsils	UCs	Population (NIPS 04 estimate)	Pop Density (per sq.kms)	Persons Per HH	% of Pop having one room	% of HHs having electricity	Literacy	
								Overall %	Female %

			estimate)	sq.kms)		one room	electricity		%
Karachi	5	178	18,000,000	4,115	6.5	31.6	93.925	67.575	62.4
Badin	5	49	1,302,000	168.9	5.3	81.8	35.1	24.6	12.9
Thatta	7	55	1,276,000	64.1	5.1	78.1	25.9	22.1	11.4
Dadu	7	80	1,936,000	88.6	5.5	73.3	70.9	35.6	21.7
Larkana (incl. Kamber)	7	80	2,209,000	259.6	5.9	68.5	84	35	20.5
Khairpur	7	76	1,773,000	97.2	6	66.9	65.9	35.5	19.8
Nausherofero z	4	51	1,247,000	369.2	5.8	75.2	69.3	39.1	22.6
Nawabshah	3	51	1,228,000	238	6	71.3	75.5	34.1	19.6
Sanghar	6	59	1,666,000	135.4	6.4	69.2	52	30.9	17.5
Hyderabad	4	61	3,315,000	523.9	6	66	73.6	44.3	35
Baluchistan									
District	Tehsils	UCs	Population (NIPS 04 estimate)	Pop Density (per sq.kms)	Persons Per HH	% of Pop having one room	% of HHs having electricity	Literacy	
								Overall %	Female %
Kech	1	38	478,000	18.3	5.1	77.9	38.1	27.5	16.3
Gwadar	1	13	215,000	14.7	5.5	80.8	34.8	25.5	13.8
Jhal Maghsi			127,000	30.4	6.8	56.5	32	12.3	6
Kharan	4	16	239,000	4.3	5.8	75.2	20.1	15.1	5.7
Bolan	6		333,000	38.4	7.3	33.2	49.8	15.7	6.9
Khuzdar	5	36	483,000	11.8	5.4	48.8	32.7	17.5	8.4
Lasbela	9	21	362,000	20.6	6.2	72	28.9	22.3	10.5
Sibi	8	28	209,000	23.1	6.9	45.4	54	25.5	13.6
Jaffarabad	4		501,000	177	7.1	60.7	64.7	18.5	8.6
AJK									
District	Tehsils	UCs	Population (NIPS 04 estimate)	Pop Density (per sq.kms)	Electricity Connections				
Muzaffarabad	2	60	8333,000	136	70,364				
Neelum	2	12	159,000		5,679				
Bagh	3	38	425,000	311	40,840				

Provincial Resource Mapping

NWFP

Provincial Relief Commissionerate

Following relief items are available at stock.

- | | | |
|----|--------------|----------------------|
| 1. | Boats | 32 + 10 = 42 |
| 2. | Tents | 1932 No. |
| 3. | Blankets | 3028 No. |
| 4. | Rice | 795 bags (39750 kgs) |
| 5. | Tea | 495 kgs |
| 6. | Salt | 12 kgs |
| 7. | Bed (Chapoy) | 7 No. |

Wheat Stock Position in NWFP

S/No.	Station	Stock Position (Tons)
1	Peshawar	37
2	Nowshera	733
3	Charsadda	16
4	Azakhel	574
5	Mardan	5861
6	Kohat	564
7	Hangu	21
8	Bannu	6068
9	S. Naurang/Lakki	3934
10	DI Khan	5370
11	Wana	29
12	Haripur	169
13	Hacellian/Abbottabad	4468
14	Mansehra	2546
15	Kohistan	58
16	Battagram	25
17	Dargai	684
18	Dir	13144
19	Swat	1745
	Total	46046

AJK

S/No.	Item	Quantity
1	Tents	1685
2	Blankets	4,468
3	LPG Cylinders	1,891
4	Cooking Stoves	720
5	Tea kg	1369
	Total	

Source: Camp Management Organization

Flour Stock Position

S/No.	District	Quantity (MT)
1	Muzaffarabad	1450
2	Neelum	1478
3	Bagh	2310
4	Poonch	334
5	Sudnoti	1629
	Total	8201

Source: Food Department AJ&K

Resources Available with Relief & Rehabilitation Department

S/No.	Item	Quantity
1	Tents	282
2	Blankets	120
3	Quilts	20
4	CGI Sheets	97
5	Ceiling sheets	90

Source: Relief & Rehabilitation Deptt

Punjab

Following is available with district authorities:-

S/No.	Item	Quantity
1	Tents	4,000
2	Boats	850
3	Woolen shawls	2,000
4	Search lights	243
5	Base sets	69

Source: Relief & Crisis Management Deptt

Balochistan

Resources available with Relief Commissionerate

S/No.	Item	Quantity
1	Sugar	3,010 (50 kg)
2	Ghee	12,000 (1 KG)
3	Blankets	8,000
4	Pulses (Dall)	1,400 (50 kg)
5	Rice	2,674 (50 kg)
6	Milk Powder	5,000 pouches each 400 kg)
7	Tea	1,564 cottons (15 kg each)
8	Tents	6,000
9	Food packets	10,000
10	Latrine slabs	1,000
11	Water purifying tablets	Nil
12	Dates	100 cottons

Source: Relief Commissioner

Sindh

Following is available with relief department:-

S/No.	Item	Quantity
1	Tents	5,000
2	Fibre Glass Boats with Engines	160
3	Life jackets	1,172
4	Rescue kit	2

Source: Relief Department

Annexure H

Resource Persons

Name	Sector
Federal	
Dr. <i>Qamar-uz-Zaman Chaudhry</i>	DG PMD
Mr. Hazrat Mir	<i>Chief Meteorologist FFD</i>
Mr. Shaukat Ali Awan	<i>Ex-Chief Meteorologist FFD</i>
Mr. Ahmad Kamal	Director FFC
Dr. Rakhshan Roohi	PARC
Dr. Mateen Shaheen	WHO
Ms. Shabana	CWS
NWFP	
1. Mr. Mohammed Wasil Sethi	Irrigation
2. Mr. Khalid Khattak	Irrigation
3. Mr. Malik Ayaz Wazir	Livestock
4. Mr. Hameedullah Shah	Distt Govt
5. Mr. Imtiaz Ahmad	Meteorological
6. Mr. Abdul Kamal	Distt. Administration
7. Mr. Mubasher Hussain Shah	DCO Mardan
8. Mr. Kamran Rehman Khan	DCO Chitral
9. Mr. Zakamullah Khattak	Home
10. Dr. Isaaq Mohmand	GTZ
11. Mr. Syed Wadood Shah	Food
12. Mr. Zahid Abbas	Irrigation
13. Mr. Hazrat Nabi	Relief
14. Mr. Akbar Khan	DCO Charsadda
15. Mr. Mohammad Naeem	Food
16. Mr. Hussain Zada Khan	Relief
17. Mr. Akram Shah	Health
18. Mr. Mohammad Karim Khan	Irrigation
19. Mr. Sher Zada Khan	Agriculture
20. Mr. Mohammad Anwar	Distt. Administration
21. Mr. Adnan Zafar Khan	Distt. Administration
AJK	
1. Mr. Sarfaraz Ahmad Abbasi	Deputy director
2. Mr. Syed Wajid Ali Shah	Food
3. Mr. Ansar Yaqub	Distt. Administration
4. Mr. Mushtaq Ahmed	Electricity
5. Mr. Syed I. Kazmi	SDMA
6. Lt. Col. Shafqat	SCO
7. Capt. Zahid	SCO
8. Mr. Shahid Malik	CMO
9. Mirza Ajaz Hussain	PHEC
10. Mr. Imtiaz Ahmed	Distt. Administration
11. Mr. Samiuddin Gilani	Welfare
12. Dr. Muhammad Qurban	Health
13. Mr. Manzoor Ahmed	Health
14. Mr. Basharat Hussain	Irrigation
15. Mr. Sardar Ahsan Ul Haq Khan	Central Design Office

16. Mr. Muhammad Imran

Central Design Office

Baluchistan

1. Mr. Ghulam Usman Babai
2. Mr. Mumtaz Khan
3. Mr. Alam Zeb
4. Mr. Hamid Mushtaq
5. Mr. Abdul Rauf Baloch
6. Mr. Taj Muhammad
7. Dr. Mahmood Paracha
8. Mr. Neimat Ullah Buzdar
9. Mr. Javaid Baloch
10. Mr. Abdul Waheed Siddiqui
11. Mr. Hussain Ullah
12. Mr. Akbar Ali Khan

Irrigation
Irrigation
Meteorological
NHA
QESCO (WAPDA)
QESCO (WAPDA)
Health
Food
S.W.D
S.W.D
UNORC
Communication & Works

Sindh

1. Dr. Baz Muhammad Jonejo
2. Mr. Muhammad Alamgir
3. Mr. Ghulam Mohammad
4. Dr. Iqbal Saeed Khan
5. Mr. Muhammad Sabir Siddiqui
6. Mr. Muhammad Sharif
7. Mr. Syed Munawar Hussain
8. Mr. Nazir Ahmed Soomro
9. Mr. Muhammad Tauseef Alam
10. Lt. Col. Mumtaz Ul Haq

Agriculture
W&S Deptt
Livestock & Fisheries
Health
HESCO (WAPDA)
Irrigation
Irrigation
PHEP
Meteorological
Engrs 5 corps

Punjab

1. Mr. Najam Islam
2. Mr. Ghulam Sarwar
3. Mr. Mohammad Ibrahim
4. Mr. Ch. Abdul Ghafoor
5. Mr. Nadeem Ahmed Abro
6. Dr. Shahid H. Bokhari
7. Mr. Jafar Kabir Ansari
8. Dr. M. Hanif Khan
9. Brig. Syed Ghazanfar Ali
10. Mr. Muhammad Azam
11. Mr. Mian M. Akram

WAPDA
Agriculture
Telecommunication
WAPDA
Food
Livestock
Irrigation
LUDP
Relief & Crisis Management Dept
Relief & Crisis Management Dept
Relief & Crisis Management Dept

Emergency Response Standards

Shelter/NFI / infrastructure standards

- IDPs living in camp-like situation have temporary shelter in accordance with UNHCR Emergency / Sphere standards

(Total population of 45,000 persons sheltered in approximately 25-30 different sites).

Provide:

- One tent or 1 pieces of plastic sheeting (4 x 5 meters) per family (estimated family size 5 persons per family – to be confirmed)
 - 45 m³ per person of land – space to be negotiated with civil authorities
 - 3.5 m³ of shelter space per person
 - Firebreak of 50 m wide for every 300 m of built up area
 - Road and walkways = 20 – 25 % of site
- IDPs living in a camp-like situation have access to essential domestic items (NFIs) and cook their own meals
 - Bathing soap = 250 grams per person per month
 - Washing soap = 200 grams per person per month
 - Kitchen set = 1 per tent
 - Blankets = 1 - 2 per person
 - Sleeping mats = 1 per person
 - Jerry cans = 1 per person
 - Clothing = one full set of clothing appropriate to culture, climate and gender.
 - Sanitary materials for women and girls
 - IDPs have essential financial support need to secure and maintain private accommodation
 - 3 months of rental grants/subsidies, followed by loans or revolving funds (integrated with job/work opportunities programmes)
 - distribution of basic household items/domestic items (targeting slum areas where IDPs have settled)
 - Advocate with landowners/civil authorities for right of IDPs to remain on occupied land pending voluntary return
 - Mediate with landlords to ensure fair rents and tenant rights for IDPs pending voluntary return
 - Urban dwelling IDPs have access to necessary and adequate urban infrastructure (water, sanitation, electricity)

Food Security Standards

- Sustain those cut off from their livelihoods by displacement.
- Assist those in need in headquarter districts.
- Maintain and improve the nutritional status of malnourished children and pregnant and lactating women.
- Assess local food stock
- Coordinate local efforts in containing food security issues

Health

National response standards ascertained from sphere standards by Church World Services.

WATSAN
Food Items Specification

S.no	Item description	Specification
01	4x4 meter family canvas tent	01
02	Ground sheet	01
03	Plastic sheet	01
04	Single blanket	02
05	Double blanket	04

Non Winterized Tents

S.NO	Item description	Specification
01	Wheat Flour	80kg
02	Oil Tin	10kg
03	Pulses	7kg
04	Sugar	7kg
05	Tea Leaves	1kg
06	Rice	40kg
07	Salt	1packet
08	Match Box	1 box
09	Safe Guard Soap	4pcs
10	Milk Powder	2kg

Hygiene Kits Specification:

S.no	Item description	Specification
1	Laundry Soap - 101 Brands / Kursi Mark	04

2	Soap - Safe Guard	04
3	Baby Lotion - 100 ml	01
4	Nail Clipper	01
5	Hand Towel - Medium Size	01
6	Bath Towel - Large Size	01
7	Dettol Liquid - Small Bottle (100ml)	01
8	Mosquito Net 80" x 60" as Approved	02
9	Miswak (7 Sticks)	01
10	Dandasa bunch - 1/4 kg bunch	01
11	Comb Wide 8 inches	01
12	Comb Lice	01
13	Canvas bag for Sanitary towels/Underwear	01
14	Feminine Sanitary towels - Flannel	06
15	Feminine Underwear's	06
16	Mug	01
17	Lota	01
18	Canvas bag for Kit – Printed	01
19	Jerry Cans 20 Liter	02

Survival needs: water intake (drinking & food)	2.5-3 litres per day	Depends on the climate and individual physiology
Basic hygiene practices	2-6 litres per day	Depends on the social and cultural norms
Basic cooking needs	3-6 litres per day	Depends on food type, social as well as cultural norms
Total basic water needs	7.5-15 litres per day	

- All people have access to health services that are prioritised to address the main cause of excess mortality and morbidity
- People have access to information and services that are designed to prevent communicable diseases that contribute most significantly to excess morbidity and mortality
- All children aged 6 months to 15 years have immunity against measles
- People have access to effective diagnosis and treatment for those infectious diseases that contribute most significantly to preventable excess morbidity and mortality
- Measures are taken to prepare for and respond to outbreaks of infectious diseases
- Outbreaks of communicable diseases are detected, investigated and controlled in a timely and effective manner
- People have access to the minimum package of services to prevent transmission of HIV / AIDS
- People have access to appropriate services for the treatment of injuries
- People have access to the I Service Package (MISP) to respond to their reproductive health needs

- People have access to social and mental health services to reduce mental health morbidity, disability and social problems
- For population in which chronic diseases are responsible for a large proportion of mortality, people have access to essential therapies to prevent death (*The Sphere Project – Humanitarian Charter and Minimum Standards in Disaster Response*)
- National training needs of health sector staff identified and acted upon (e.g. IMCI) and specialised training needs supported
- Excess mortality and morbidity due to RH problems is prevented
- RH clinical protocols and National Medical Standard for RH Services are used by all level of service providers for quality of care.
- All people have safe and equitable access to a sufficient quantity (7.5-15 liters per minute for 250 people) of water for drinking, cooking and personal and domestic hygiene. Public water points are sufficiently close to households (less than 50 ltrs) to enable use of the minimum water requirement.
- Water is palatable, and of sufficient quality to be drunk and used for personal and domestic hygiene without causing significant risk to health.
- People have adequate facilities and supplies to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene, and to ensure that drinking water remains safe until it is consumed.
- People have adequate numbers of toilets (one seat for 20 people), sufficiently close to their dwellings, to allow them rapid, safe and acceptable access at all times of the day and night.
- Toilets are sited, designed constructed and maintained in such a way as to be comfortable, hygienic and safe to use.
- All disaster-affected people have the knowledge and the means to protect themselves from disease and nuisance vectors that are likely to represent a significant risk to health or well-being.
- The numbers of disease vectors that pose a risk to people's health and nuisance vectors that pose a risk to people's well-being are kept to an acceptable level.
- Chemical vector control measures are carried out in a manner that ensures that staff, the people affected and the local environment are adequately protected, and avoids creating resistance to the substances used.
- People have an environment that is acceptable uncontaminated by solid waste, including medical waste, and have the means to dispose of their domestic waste conveniently and effectively.
- People have an environment in which the health and other risks posed by water erosion and standing water, including storm water, floodwater, domestic wastewater and wastewater from medical facilities, are minimised.

Camp Management

- Establish a camp coordination and management committee comprising of different sectors and IDP representatives
- Identify and acquire adequate land for camps
- Allocation of land in line with basic standards with consideration given to gender issues and marginalized groups in the community.
- Land allocation in line with existing community structure and traditional ties
- Support and enhance the ability of IDPs to provide for themselves
- Ensure that initiatives are provided on equal basis for IDPs and host communities.
- Ensure community command structure has link to overall management structure
- Establish management structure based on existing PDC/ DDC structure.

Livelihood

- IDPs have additional life and job skills training need to secure employment

- Give priority to IDPs in all existing vocational training/work programmes sponsored by UN agencies
- Provide information to IDPs on life and job skill training opportunities/programmes available (*see education sector as well*)
- IDPs in urban areas have employment needed to generate income and remain or become self-sufficient
 - Give IDPs priority for employment in emergency infrastructure support and urban works projects (road, water, sanitation)
 - Employ skilled IDPs as teachers in existing schools or as trained personnel in community health and welfare centres to increase capacity to meet to increase needs related to IDP presence in the community
 - Employ IDPs in community health and welfare centres targeting IDPs
- Separated children have other opportunities for survival than wage labour

A key strategy for rapid detection and containment of any disease is the adoption of proper disease surveillance and monitoring of those diseases and conditions that can lead to an outbreak. Adoption of proper Hygiene and cleanliness awareness as well as important behavioural changes practiced by the community, in addition to proper cases management by health staff can prevent and limit the extents of outbreak of epidemic diseases.