# MONSOON CONTINGENCY PLAN


## APRIL 2008

## NATIONAL DISASTER MANAGEMENT AUTHORITY

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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 |
| NCMC | 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 | Standing 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 |
| WMD | World Metrological Department |
| WATSAN | Water & Sanitation |

## EXECUTIVE SUMMARY

1. NDMA continues to emphasise upon the contingency planning process as a preparedness measure for response to natural hazards. Following contingency planning for winter hazards, this exercise focuses on planning for the monsoon hazards 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.

2. 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 more frequent riverine floods phenomenon.

3. Riverine floods over the Indus Basin have cost more than $ 5 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 create a flood 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 wake of tropical cyclones. Flood forecasting system, however, needs substantial up-gradation 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.

4. 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. Districts in Punjab adjoining Chenab, Jhelum and Indus rivers in the south tend to be more vulnerable. In Sindh, districts along Indus in the north and coastal 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 AJ&K and Northern Areas are vulnerable to flash flooding, land slides and GLOF at alpine altitudes. Historical record of hazard

occurrences and their impacts are not generally well kept except for in Punjab and Sindh provinces. Estimates of humanitarian impact, elsewhere, were formed on stakeholders' consensus.

5. Provinces reflect diverse capacities to respond based on respective 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. In responding to a major monsoon disaster provincial inadequacy in search and rescue capacity and in providing immediate relief are made up by resources deployment of 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 has been identifies in most of the provinces. Sectors that need to be supported substantially by both provincial resource mobilization and through federal support are livelihood regeneration, livestock security, restoration of road access and potable water supply, supporting camp management, restoration of essential services like electricity, communication and education.

6. 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.

7. 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 resource mapping.

**General**

1. 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 south-western coastal plains reveal a significant seismic vulnerability. River plains are prone to flooding causing huge socio-economic losses, 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 un-preparedness for these hazards has caused significant losses. 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.

**Aim**

2. To formulate plan for management of monsoon related emergencies (May – October) including hazard mapping, vulnerability assessment, resource mapping and tasking for ensuring initiation of requisite mitigation measures and a coordinated response in the event of monsoon related disasters.

**Objectives**

3. While encouraging stakeholders participation, following objectives have been kept in focus:-

   a. Analysis of potential hazards with regards to their possible humanitarian impact and consequences.

   b. Provision of a common strategic planning framework for all stakeholders with clear objectives, roles and responsibilities.

   c. Requisite preparedness measures for a coordinated response while addressing vulnerable communities concerns.

   d. **Operational Objectives**

      (1) CP outcomes should reinforce response to monsoon related disasters and emergencies.

      (2) Address health, epidemic and pandemic instigated emergencies.

      (3) Identify anticipated summer monsoon instigated environmental disasters along with response measures.

      (4) Define essential coordination measures for instituting coherence in multiple stakeholders based response.

**Scope**

4. Stakeholders' mobilization and participation through Monsoon CP exercise.

5. Review existing plans, historical records spanning floods, cyclone occurrence and precipitation for hazard assessment.

6. Determine disaster scenarios and corresponding humanitarian caseloads.

7. Resource Mapping for response and identify deficiencies.

8. Define sectoral response strategies, plans and coordination measures

**Coordination and Management Structure**

9. 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 PDMAs with regards to post disaster assessments and execution of response.

10. 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.

11. PDMAs coordinate preparedness and response to disasters horizontally with line departments and key ministries and vertically with NDMA and DDMAs. Similar processes are followed at the district tier by DDMAs. 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.

12. DDMAs 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. PDMAs 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.

**Hazard Context Analysis**

13. In the context of hazard analysis, review of major hazards (likely to occur during monsoon) has been carried out in succeeding paragraphs, covering following aspects:-

a. Riverine floods

b. Flash floods

c. Tropical cyclones

d. Heavy precipitation

e. Urban flooding

f. Environmental hazards like sliding

g. Glacial Lake Outburst Flood (GLOF)

h. Sea water intrusion (refer to Sindh hazard mapping)

14. **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. Since creation of Pakistan, floods along the Indus Basin have wrecked economic damage worth US $ 5 billion approximately and about 6,000 lives have been lost. These 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. Enhancing regional warming is causing increasing glacial lake melts which tend to supplement the traditional flooding activity.

15. **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. Precipitation combines with glacier melts and flash flooding / hill torrents to cause floods. Another critical input is the water release from Tarbela and Mangla Dams when at optimum levels. 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.

16. **The Five Rivers**

a. 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. These river systems are not covered by the flood monitoring mechanism and, 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.

b. 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

Marala 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.

c. India has water rights over Ravi and Sutlej and retains 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 heavy floods. With much population pressure located within and along flood plains even low to medium floods can engender humanitarian emergency.

d. Issues associated with riverine flooding are summarised as:-

(1) In terms of impact, riverine floods are more pronounced in causing socio-economic losses

(2) Late receipt of early warning for floods in upper Indus

(3) Less early warning available for Chenab floods in the catchment area

(4) Just 40 minutes early warning available for water inflows in Mangla Dam, due to its very close location to catchment areas

(5) Occurrence of combination of flash and riverine floods along Chenab close to the catchment area

(6) Greater flood impact as a consequence of synergised water flows from Indus tributaries and from dam / reservoir releases

(7) Confluence of western and eastern weather systems (from Bay of Bengal) leads to heavy flooding as was the case in 1992.

(8) Population intrusion in flood plains complicates response

17. **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. Areas that are vulnerable to flash flooding are as follows:-

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

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

c. **AJK**. Muzzafarabad, Neelum, Bagh, Kotli and Bhimber districts.

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

e. **Balochistan**. Sibi, Jhal Magsi, Bolan, Kech, Gwador, Kharan, Kalat, Khuzdar and Lasbela disitrcts.

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

18. Issues associated with flash flooding are summarised as follows:-

a. Wide vulnerability imprint, spanning all regions / provinces of the country

b. Flash floods tend to occur more in recent years owing to changing weather patterns

c. Near absence of early warning cover to warn vulnerable communities

d. Being a sudden onset hazard, flash floods pose a grave threat to lives besides accentuating socio-economic poverty.

19. **Tropical Cyclone**

a. Over the past years cyclones tend to recur frequently though most do not seriously impact 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 Yemyn 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 Yemyn caused 142 deaths in Karachi and widespread damage to infrastructure.

b. 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.

c. Issues with Tropical Cyclones Response are as follows:-

(1) Cyclones tend to occur in May and June and in September and October, before or in the aftermath of flood season.

(2) There are serious gaps in disseminating early warning to vulnerable communities

(3) Negligible early warning is available for accompanying flash floods

(4) Widespread damage and loss of life occurs due to high winds preceding cyclones

(5) There is near absence of cyclone impact mitigation works along the vulnerable regions

(6) There is a need to streamline cyclone response plans which normally involve multiple agencies.

20. **Urban Flooding**

a. 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 2002.

Similarly, Lahore and many other cities of Punjab and even NWFP face such problems in the event of medium to heavy rains.

b. Issues with urban flooding response are:-

(1) Ill conceived urban planning

(2) Poor flood water drainage works which includes infrastructure and pumping facilities.

(3) Near absence of flood water protection works likes dykes

(4) Sub-standard emergency response services which includes search and rescue capacity. Immediate reliance on armed forces occurs in a serious situation.

21. **Precipitation**

a. PMD maintains precipitation record 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

b. **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.

22. **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.

**Flood Management**

23. **Federal Flood Commission**. Following floods of 1977, 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. 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 Annex B.

| **Province** | **PSDP Allocation** | **% of overall Allocation** | **Amount released by Min of Water and Power** |
|---|---|---|---|
| Punjab | 688. 50 Million Rs | 45% | 344.25 |
| Sindh | 474.300 | 31% | 237.150 |
| NWFP | 168.300 | 11% | 84.150 |
| Balochistan | 122.400 | 8% | 61.200 |
| FATA | 45.900 | 1% | 22.950 |
| AJK | 15.300 | 1% | 7.650 |
| Northern Areas | 15.300 | 3% | 7.650 |
| Floods works to be carried out by Fede Min of Water and Power | 180.000 | | 90.00 |
| Islamabad Capital Territory | 3,500 | | 0.00 |
| Federal Flood Commission | 85.500 | | 0.00 |
| Flood Protection Scheme2 | 1.00 | | 0.00 |
| Total | 1800.00 Million Rs | | 855.00 (47.5%) |

24. **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. Federal Flood Division (FFD) which is part of PMD, under takes dissemination of flood early 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. Flood forecasting occurs through a four fold input system which includes:-

a. Network of weather radars

b. Telemetric system which sends real time inputs on water flows

c. Satellite coverage which includes both indigenous capacity and through WMD network

d. Ground observation through PMD ground station deployed across the country

25. 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.

26. 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.

27. 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.

28. FFD 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.

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

a. Revenue Department down to 'patwaris', who work in group of 3-4 villages.

b. Police wireless network deployed in police stations across the district.

c. Through the Forestry Department in forested districts

d. Through mosque committees and other grass root organizations

30. **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. PDMAs pivot provincial coordination for flood preparedness which includes inputs form 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.

31. **Agencies Working for Flood and Cyclone Impact Control and Response**. Their summarised roles are reproduced below:-

a. **NDMA**. Responsible for comprehensive national response to the floods cum monsoons hazards in DRM, preparedness and response context.

b. **FFC**. Responsible for flood mitigation and response.

c. **PMD**. Provides early warning to all stakeholders for floods and cyclones.

d. **WAPDA**. Regulates flood water outflow from reservoirs and monitors water flow in catchments areas.

e. **Pakistan Armed Forces**. Flood response in aid of provincial authorities and coordination role.

f. **ERC**. Provide support to reinforce flood response.

g. **PDMA**. Responsible for entire spectrum of disaster management, response in particular with regards to monsoon hazards.

h. **FFD**. Early warning for riverine floods.

i. **NCMC**. Reinforces Ministry of Interior based emergency response if required.

j. **Civil Defence**. Reinforces flood response at the local level.

k. **Provincial Agriculture Department**. Responsible for flood mitigation works in the province and flood water monitoring.

l. **Provincial Health, Livestock, C&W, PHE, Food Deptts**. Provides preparedness and response support in respective area of work.

m. **PARC**. Works in glacial outburst monitoring with ICIMOD.

32. **Summary of Vulnerable Districts Province Wise**. Annex C.

33. **Flood Preparedness**. Some of such issues which require urgent attention are;-

a. Improvement of flood warning system against flash floods and cyclones and along River Tawi. (DRM)

b. Improvement in flood mitigation works over river Kabul and Swat; (DRM)

c. Deployment of dewatering equipment in urban areas in the event of heavy rains (response)

d. Defining extent of floods plains and checking of encroachment (DRM)

e. Induction of new flood equipment including for night rescue by provinces (Response)

f. Chart change of course in River Ravi (DRM)

g. Improvement of flood early warning along River Tawi (DRM)

h. Repair of flood protection bunds, FP Bund along Indus in Sindh in particular. (DRM)

i. Streamlining SOPs for operation of breaching sections along protection bunds. (Response)

j. Construction of additional spillway and breaching section on Mirani Dam in Balochistan (DRM)

k. Improvement in drainage in Pat Feeder Canal (DRM)

34. **Conclusions on Flood Management in Pakistan**

a. Flood management spans disaster prevention risk reduction and response.

b. However, in response governmental biases have been identified in safeguarding affected regions.

c. Despite putting in place an effective early earning warning system, gaps exist in terms of warning communities and vulnerable segments in the context of flash flood in particular.

d. 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.

e. PDMAs and other critical provincial / disaster response departments remain under resourced which impacts upon their efficacy during response.

f. PMD has installed a series of Doppler radars around the flood catchment region in lower Indian Held Kashmir which allows quantified precipitation forecasting to facilitate flood early warning.

g. Being a relatively new institution PDMAs have yet to assume their centrality in coordination of disaster response.

h. Finally, armed forces play a major role in both monitoring national preparations with regards to monsoon floods and in response, in particular.

35. **Summary of Hazard Risk Analysis**

| Hazard | Shortfall in Preparedness | Probability of Occurrence | Risk Factor |
|---|---|---|---|
| Riverine Floods | • Quality of mitigation / prevention works<br>• Physical vulnerability viz flood path<br>• Availability of response stores<br>• Capacity building for response<br>• Availability of essential relief stores<br>• Mental awareness / preparedness for disaster response<br>• 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 | • Very poor quality / non-existent mitigation works<br>• Physical vulnerability viz flood path<br>• Non existent local disaster response capacity<br>• Poor awareness and capacity building for response<br>• 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 | • Non- existent cyclone impact mitigation works<br>• Poor quality of early warning to isolated communities<br>• Non existent local impact mitigation / respon capacities<br>• Poor local capacity building for response<br>• Poor awareness level | Relatively high possibility of occu Likely priority regions are:-<br>• Along Sindh coast<br>• Along Sindh and<br>• Balochistan coast | Very high |
| Urban Flooding | • Ill conceived urban planning<br>• Weak infrastructural capacity to absorb<br>• Excessive rain water<br>• Weak emergency response services | Karachi<br>Hyderabad<br>Rawalpindi<br>Lahore<br>Smaller cities of lower Sind | Very high |
| Sliding Activity | No effective DRM strategy put in place to Check sliding, mudslide and other rain Instigated environmental damage | Vulnerability is severe in earthquake zone districts of Mansehra and Battagram in NWFP and in Muzaffarabad and Bagh in AJK | Very high |
| 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 | • Semi-mountainous regions of:-<br>• NWFP,<br>• AJK,<br>• northern Punjab<br>• Mountainous regions of Balochistan<br>• Urban flooding | Determined on short term forecasts |

**Determination of Scenarios**

36. **Scenario A**. (Moderate) 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.

a. **Triggers**

(1) Dissemination of relevant levels of flood early warning by FFD Lahore

(2) Dissemination of relevant level of flood alert issued by FFD

(3) PMD issues cyclone warning, alert and updates

(4) NDMA issues national early warning.

(5) DDMAs / local authorities determine that the disaster is beyond their capacity to manage and that it requires a higher level of response.

(6) PDMA may also determine that disaster requires Federal intervention.

(7) NDMA to identify operationalization of Scenario A based on inputs by relevant stakeholders and mounts need based Federal response.

b. **Response Level**. Local response by affected DDMAs and PDMAs 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.

c. **End State**

(1) Termination of hazards perceived under Scenario A as identified by PMD, FFC and NDMA.

(2) Evidence based termination of relief support to the vulnerable or seriously affected population by NDMA.

(3) Possibility of early recovery launch.

37. **Scenario B**. (Worst Case ) 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 costal region and massive inland flash flooding. (*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 Yemyn in 2007 pre-cyclone precipitation and winds impacted the city in which 142 died besides causing serious damage to infrastructure)*

a. **Triggers**

(1) Dissemination of flood early warning and cyclone alert by FFD and PMD

(2) Situation updates disseminated by FFD and PMD

(3) National early warning issued by NDMA

(4) Seriously affected DDMAs determine provincial support for response.

(5) Seriously affected PDMAs determine need based Federal support for response.

(6) NDMA to identify operationalization of Scenario B and launches Federal response.

b. **Response Level**. Local response by affected DDMAs and PDMAs 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 polices.

c. **End State**

(1) Termination of hazards perceived under Scenario B as identified by PMD, FFC and NDMA.

(2) Evidence based termination of relief support to the vulnerable or seriously affected population by NDMA.

(3) Early recovery launched / planned.

38. **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. (*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)*

a. Triggers and End State are similar to Scenario B.

b. **Response Level**. Local response by affected DDMAs and PDMAs 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 polices.

**Planning Assumptions**

39. **Planning Assumptions for Determining Relief Caseloads**

a. 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 Yemyn.

b. Riverine Floods Punjab case load has been determined on flood damage records 1992 (Scenario B) and 1988 (Scenario A) floods.

c. Riverine floods Sind case load has been ascertained from floods cum heavy rains damage records of 1994 (Scenario B) and from 1992 (Scenario A)

d. Sindh cyclone figures have been determined from record of Yemyn, 2007 (Scenario B) and of 1999 Cyclone (Scenario A).

e. Relief caseloads of Balochistan have been determined from record of Cyclone Yemyn 2007 (Scenario B) and of Mekran Cyclone 1997(Scenario A).

f. 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.

g. In case of ambiguity in determining the basis for calculation relief case loads have been kept on a higher scale.

40. **Scenario B (Planning Assumptions).** The response will be based on the most dangerous scenario and it will cater for Scenarios A and C.

a. **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** |

b. 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.

c. 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.

d. 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.

e. 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.

f. 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.

g. 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.

h. 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

41. **Scenario A (Planning Assumptions)**

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** |

b. Assumptions applicable to Scenario B also apply to Scenario A.

42. **Likely Pattern of Occurrence of Monsoon Emergency**

a. Dissemination of relevant levels of flood early warning by FFD Lahore

b. Relevant level of flood alert issued by FFD

c. PMD issues cyclone warning, alert and updates

d. DDMAs / local authorities determine that the disaster is beyond their capacity to manage and that it requires a higher level of response.

e. PDMA also determine that disaster requires Federal intervention.

f. NDMA to identify operationalization of relevant scenario based on inputs by relevant stakeholders and mounts Federal response.

g. Flood and cyclone warning alerts and updates issued by PDMA and enforcement of provincial / affected district flood response plans

h. Early warning disseminated to likely affected communities with regards to flood and flash floods.

i. Relocation of vulnerable communities to safer locations as per local plans

j. Sharing of information with UN agencies / international community on likely flood occurrence and national response plans.

k. Note. Many of these actions occur concurrently.

**Health Assessment for Monsoons Emergencies**

43. 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 roods /infrastructure decrease access to health services and increase the challenges for timely and effective delivery of preventive, promotive and curative health services. For a successful response health authorities need to plan based on the prevailing disease situation in the districts/province.

**Provincial Hazard Risk Analysis and Resource Mapping**

44. **NWFP**

a. (Map at Annex P) 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.

b. 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.

(1) **Charsadda**

(a) **Riverine Floods**

i. Experiences flooding from River Kabul. In 2006, 15,300 families were displaced owing to sudden onset floods in the River. Remains vulnerable.

ii. 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

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

(2) **Peshawar**

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

(b) **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.

(3) **DI Khan**

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

(b) **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'.

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

(5) **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.

(6) **Nowshera**. Is excessively vulnerable to Riverine floods in River Kabul. In 2006 20,000 families were temporarily displaced due to floods in the River

(7) **Mansehra**

(a) 100 families were affected by flash floods in Kunhar and Siran rivers in 2001.

(b) 75 families were affected and 5 died owing to sudden change in the course of Kunhar River in 2006.

(c) Intense sliding activity has been experienced in both summers and winter in the earthquake affected regions of Mansehra and adjoining Battagaram districts

(d) 30 died due to cloud burst in Dadar in 2001

(8) **Lower Dir**. It is vulnerable to flooding along River Swat and its tributaries.

(9) **Upper Dir**

(a) **Flash Floods**. Vulnerable to flash flooding among distributaries of Swat River

(b) **Cloud Bursts**. 28 deaths occurred in village Ushairay Dara owing to cloud burst in 2007.

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

(11) **Chitral**. It is vulnerable to flash floods in Chitral River, more so in the Darosh region.

(12) **Buner**. 30 persons died due to cloud burst in 2001 in village Ghwar Durra.

(13) **Kohistan**

(a) **Flash floods**. Being a mountainous district it is vulnerable to flash floods to local nullahs that constitute tributaries of Indus.

(b) **Cloud Burst**. 22 died in 2007.

c. **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:-

(1) Desilting of Warsak Dam is critical as overflows can cause serious damage in regions including parts of Peshawar district

(2) DI Khan along River Indus

(3) Nowshera along river Kabul

(4) Charsadda along River Kabul

(5) Peshawar along River Kabul

(6) Mardan along Kalpani Nullah

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

(1) Along Swat River

(2) In Mansehra along Kunhar River

(3) In Malakand Agency along Swat River

(4) Lower and Upper Dir along Swat River

(5) Lakki Marwat along Kurram River

(6) Jhok ladhu domwstreram of DI Khan along Indus

e. **Resources for Flood Response**. Resources for flood and larger provincial response to monsoon emergency / disaster situation are given Annex D. 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:-

(1) Shelter

(2) Emergency health

(3) Potable water

(4) Nutrition support for vulnerable

(5) Regeneration of livelihoods

f. Provincial resource persons are reflected in Annex E,

45. **Azad Jammu and Kashmir (AJ&K)** (Map at Annex P).

a. 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/ Chenab and remain vulnerable to excessive / abrupt flooding even after moderate to heavy precipitation. Districts Muzaffarabad, Bagh and partly Poonch & Neelum have experienced excessive top soil and surface degradation as a consequence of October 05 earthquake and are prone to sliding activity.

b. AJ&K is extremely vulnerable to flash floods that occur without warning. 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. Early reopening of roads to restore accessibility remains critical for response.

c. 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. Vulnerable districts are described below: -

(1) **Muzaffarabad**

(a) **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.

(b) **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.

(c) **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 Hatttian 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.

(2) **Neelum District**

(a) **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.

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

(3) **Bagh District**

(a) **Flash Flooding**. Mal Nullah poses hazard to Bagh City after excessive rains.

(b) **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.

(4) **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.

(5) 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.

d. **Likely Humanitarian Impact**

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

e. **Response to Disasters**

(1) **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.

(2) **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.

(3) **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.

(4) **Emergency Response Stores**. Annex D.

(5) **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.

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

(7) In case of a major disaster external support will be required in following sectors;-

(a) Emergency shelter

(b) Emergency health

(c) Access to potable water

(d) Nutrition

(e) Regeneration of livelihood

46. **Punjab** (Map at Annex R)

a. 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 October.

b. 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.

c. 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.

d. 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.

e. **Past Flood Damages**

(1) **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:-

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

(b) Population Affected. 4121,010 (4.12 million)

(c) Villages affected. 7,435

(d) Dead 435

(e) Area affected 5,788,330 acres

(f) Crops affected 2,843,497 acres

(g) Houses damaged 270,653

(h) Cattle heads lost 73,751

(i) Required massive rescue and relief support

(2) **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:-

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

(b) Population Affected. 2,881,300 (2.8 million)

(c) Villages affected 4,035

(d) Dead. 234

(e) Area affected (acres) 3,462,534 acres (3.4 million)

(f) Cropped area affected. 1,293,398 acres (1.2 million)

(g) Houses destroyed. 361,854

(h) Houses damaged. 176,528

(i) Cattle heads lost. 29,865

(j) Required selective SAR and relief support

(3) **Floods of 2006**. These fall in the normal floods category requiring at best local relief support. Summary of losses are:-

(a) Population affected. 301,437 (0.3 million)

(b) Villages affected. 1,383

(c) Deaths 137

(d) Area affected 897,246 acres (0.8 million)

| | | |
|---|---|---|
| (e) | Cropped area affected | 203,937 (0.2 million) |
| (f) | Houses completely damaged | 3,254 |
| (g) | House partially damaged | 7,357 |
| (h) | Cattle head lost | 141 |

f. **Likely Humanitarian Impact**

| **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<br>Total HHs | - 30,000<br>- 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 |

g. **Summary of Flood Mitigation Works**. Annex B.

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

(1) Post preceding year's flood conference at Engineer's Directorate, GHQ to identify shortfalls and determine important pre-flood actions.

(2) Pre Flood NDMA conference to review preparations for flood season with reference to shortfalls

(3) Coordination conference with local Army authorities

(4) Coordination with FFC to take stock of national preparedness for floods

(5) Flood instructions issued by PDMA

(6) Flood coordination with provincial departments and agencies and DCOs of affected districts

(7) Updating of provincial coordinated flood preparedness and response plans

(8) Distribution of key flood response equipment to response agencies, boats, OBMs etc in coordination with Army.

(9) Visit by DG PDMA and other key stakeholders to all vulnerable sites

(10) Joint Army and civil authorities' inspection of breaching sites and flood protection bunds.

(11) Coordination with donor agencies

i. **Preparedness Measures during Floods**

(1) Need based meeting of Provincial Flood Review Committee

(2) Monitor dissemination of early warning to vulnerable districts.

(3) Setting up of need based relief camps where health, shelter and livestock disease control measures are enforced

(4) Mobilize situation based provincial response

j. **Punjab Departmental Response Plans**

(1) **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.

(2) **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

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

(4) **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.

(5) **Social Welfare Department**. Mobilizes volunteers and the social sector for flood response in vulnerable districts. Similarly it mobilizes relief goods and streamlines local action plans for their dissemination.

(6) **Food Department**. Ensures that sufficient need based stocks of food are made available.

(7) **WAPDA.** Mobilizes resources and pre-places them in critical locations for speedy restoration of power losses.

(8) **PRCS and Civil Defence**. Both mobilize response at provincial and local levels consistent with their respective flood plans.

47. **Balochistan** (Map at Annex S)

a. Cyclone Yemyn 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 Gwador 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.

b. 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.

c. 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 Yemyn 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.

d. 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.

e. 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.

f. 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.

g. **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 |

h. **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.

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

| | | |
|---|---|---|
| (1) | Affected Population. | 1,742,911 |
| (2) | Died | 215 |
| (3) | Area affected | 347,190 acres ? |
| (4) | Completely damaged houses | 40,048 households |
| (5) | Partially damaged houses | 100,000 |
| (6) | Villages damaged / destroyed | 5,000 |

j. **Flash Floods**. Flash floods bearing major seasonal rivers are:-

| | | |
|---|---|---|
| (1) | Nihang River | Kech |
| (2) | Kech River | Kech |
| (3) | Pralli | Lasbela |
| (4) | Urnach | Khuzdar |
| (5) | Talli, Moollah, Bolan, Sukleji | Katchi plains. Traverse Sibi, Bolan and Jhal Magsi districts |
| (6) | Zhob | Zhob |

k. **Mekran Cyclone of 1997**

(1) 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.

(2) 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.

(3) This example highlights the possibility of much cooperation between Iran and Pakistan in disaster response in Mekran and in the costal regions.

l. **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<br>HHs | - 75,000<br>- 12,500 |

m. **Sectoral Capacities for Disaster Response**

(1) **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 Yemyn 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 Yemyn) 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. Yemyn 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.

(2) **PDMA**. Relief Stores Annex D.

(3) **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 Yemny response.

(4) **Livestock**. In mounting the response to Cyclone Yemyn 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.

(5) **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 Yemyn. 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.

(6) **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 plains to replicate the vulnerability assessment exercise before the flood season or to share their inputs with other provincial response agencies.

(7) **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 Yemyn.

(8) **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.

48. **Sindh** (Map at Annex T)

a. 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.

b. 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.

c. Cyclone Yemyn 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.

d. 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.

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

f. 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 disasters.

g. 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 |

h. **Historical Precedence of Riverine Floods and Impact**

(1) **Floods and Rains of 1994**

| | | |
|---|---|---|
| (a) | Population affected | 690,035 |
| (b) | Lives lost | 218 |
| (c) | Villages Affected | 7,900 |
| (d) | Area affected | 3,743,978 acres |
| (e) | Cropped area affected | 2,744,750 acres |
| (f) | Houses fully / partially damaged | 511,940 |
| (g) | Cattle head perished | 6,090 |
| (h) | Seriously Affected districts | Thatta, Dadu, Kambar, Nawabshah, Nausheroferoz |

(2) **Floods of 1992**

| | | |
|---|---|---|
| (a) | Population affected | 210,948 |
| (b) | Lives lost | 232 |
| (c) | Area affected | 9,617,845 acres |
| (d) | Cropped area affected | 3,844,983 acres |
| (e) | Houses fully / partially destroyed | 578,321 |
| (f) | Cattle head perished | 67,104 |
| (g) | Seriously affected districts | Hyderabad, Dadu, Sanghar, Larkana |

(3) **Floods of 1995**

| | | |
|---|---|---|
| (a) | Population Affected | 5,04,455 |
| (b) | Lives lost | 114 |
| (c) | Area affected | 745,850 acres |
| (d) | Cropped area affected | 105,725 acres |
| (e) | Houses partially / fully damaged | 21,289 |
| (f) | Cattle head perished | 1,397 |

| | | | |
|---|---|---|---|
| | (g) | Seriously affected districts | Dadu, Larkana and Khairpur |

i. **Historical Precedence of Cyclone / Flash Floods Impact**

(1) **Cyclone Yemyin -2007**

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

(2) **Cyclone in Thatta and Badin in 1999**

| | | |
|---|---|---|
| (a) | Population affected | 597,482 |
| (b) | Died | 202 |
| (c) | Area affected | 1,453,279 acres |
| (d) | Cropped area affected | 400,977 acres |
| (e) | Houses fully / partially damaged | 138,719 |
| (f) | Cattle head perished | 29,606 |
| (g) | Seriously affected districts | Thatta and Badin |

j. **Heavy Precipitation in Lower Sindh in October 2006**

| | | |
|---|---|---|
| (1) | Population affected | 1,570,881 (1.5 million) |
| (2) | Dead | 162 |
| (3) | Cropped area affected | 109,559 acres |
| (4) | Houses destroyed / damaged | 13,546 |
| (5) | Seriously affected districts | Hyderabad, Mirpurkhas and Sanghar |

k. **Sea Intrusion in Thatta and Badin Disitrcts**

| | | |
|---|---|---|
| (1) | Thatta | 11,40,556 acres |
| (2) | Badin | 79,804 acres |
| (3) | Note. 59,000 acres is canal fed land | |

l. **Likely Humanitarian Caseload**

| **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 – Yemyn 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 |

m. **Flood Management in the Province**

(1) **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 Yemyn indicated that both the provincial and district governments took appropriate measures to warn and relocate vulnerable population.

(2) **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.

(3) **Flood Mitigation Efforts**

(a) Vulnerable points in the province are:-

i. Remodelling FP Bund to flood resistant specifications

ii. Addressing Guddu Barrage left bank silting

iii. Repair of Indus – Ghauspur – Kashmore – Kandhkot Bund

iv. Repair of some flood protection bunds in Larkana districts

v. Ongoing flood mitigation and protection works are reflected in Annex B.

(b) **Sectoral Response for Rural Sindh**

i. 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.

ii. 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.

iii. 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.

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

v. Relief stores with PDMA. Annex D.

(4) **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 Yemyn in 2007.

**Provincial Resource Mapping and Determination of External Support for Disaster Response** (Needs based on worst case scenario B) Refer to Annex D for details, summary is given below:-

49. **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

50. **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** |

51. **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

52. **Federal Agencies Inputs for Monsoon Contingency Planning**

| Agency | Responsibility/ Sectors | Contributions To Monsoon Disaster Situations |
|---|---|---|
| NDMA | Coordinated implementation on of national monsoon hazards disaster preparedness and response measures | • Provides national early warning of monsoon disasters.<br>• Monitor national preparedness for monsoon emergencies<br>• Facilitate resource mobilisation for national response based on historical precedence<br>• Facilitate PDMAs / DDMAs response to monsoon emergencies / disaster situations<br>• 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 | • Responsible for national flood preparedness<br>• Undertakes national coordination to this effect<br>• Allocates resources to FFC for flood prevention and mitigation works |
| FFC | Executive national agency for flood impact mitigation , preparedness and management of national response | • Preparation of flood protection plans for the country<br>• Monitors execution of flood protection plans in the country<br>• Approves flood control and mitigation schemes for the country<br>• Defines policy and supervises reservoir control in floods<br>• Plan flood early warning up-gradation in concert with PMD<br>• Plan repairs to damages to flood protection infrastructure<br>• Monitor flood protection works<br>• Issue updates on flood situation in relevant flood categories |

| | | |
|---|---|---|
| PMD | Tropical Cyclone and precipitation early warning and situation monitoring | • Provides early warning and updates on tropical cyclones<br>• Provides weather forecasts and updates especially in flash flood prone regions.<br>• Provide empirical data on precipitation to allow for provincial comparative monitoring of precipitation patterns |
| FFD | Flood situation early warning and monitoring | • Monitors precipitation patterns in the flood catchment regions<br>• Issues flood early warning and situation updates to all national stakeholders on daily basis.<br>• Monitors the overall flood situation for updating preparatory and response measures in concert with other stakeholders<br>• Works as the national nerve centre for flood monitoring and early warning |
| WAPDA | Flood monitoring and reservoir control | • Monitor flood inflows through telemetric system and other resources and provide real time information to FFD<br>• Execute reservoir control in the context of flood management in concert wit FFC and other key stakeholders<br>• Facilitate / support regional electricity supply companies in early restoration of electricity in disaster response |
| MOH | Emergency health and epidemic and pandemic control | • Monitor overall national preparedness for monsoon emergencies and response from health perspective<br>• Mobilise resources to meet shortfall in provincial resources with regards critical life saving medicines<br>• Undertake measures to improve upon national health monitoring during the monsoon season<br>• Monitor the national emergency response and facilitate making up of shortfall in resources<br>• Direct and facilitate epidemic and pandemic control measures. |
| Pakistan Army | Immediate Relief<br><br>Tactical air Support | • Launch SAR and immediate post disaster relief operations<br>• Provide emergency health care, shelter, food support and combat engineer support.<br>• Deploy helicopter support in mountainous regions in support of relief operations<br>• Reinforce capacities of affected DDMAs |
| Pakistan Air Force | Strategic Air support | • Strategic airlift for support national response national response.<br>• Participate in post disaster heli-based SAR and relief operations. |
| Pakistan Navy | SAR and Relief Operations<br><br>Early warning | • Provide post –disaster SAR and relief support to PDMAs Balochistan and Sind along coastal regions<br>• Provide local early warning to PDMA Sindh and Balochistan for costal precipitation related hazards.<br>• Reinforce post-disaster national logistic effort along the coastal regions. |
| Ministry of Interior (Crisis Management Cell) | Internal Security | • Maintain law and order in disaster affected areas and uninterrupted prosecution of relief operations |
| National Highway Authority | Infrastructure restoration | • Early restoration of national highways in support of national response plan.<br>• Pre-deployment of heavy plant in critical areas for all hazards emergencies.<br>• 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 | • Maintain stocks of critical post disaster stocks of relief stores consistent with monsoon contingency planning.<br>• Release relief stocks in support of national response plan.<br>• Mobilise need based relief stores from the open market in support of national response plan.<br>• Receive and deploy external donor support for disaster response consistent with national response plan. |
| Utility Stores Corporation | Post disaster food security | • Meet need based post disaster emergency food security needs as per national response plan.<br>• Maintain food stocks to cater for contingency planning relief caseloads for all hazards. |
| National Logistic Cell (NLC) | Strategic post disaster logistic support | • Provide logistic support for post –disaster relief stores in support of national plan.<br>• Undertake logistic tracking to monitor relief supply consistent with the needs. |
| Pakistan Railway (PR) | Restoration of rail infrastructure<br><br>Post disaster logistic support | • Facilitate in transportation of post disaster relief stores as per national response plan<br>• Ensure early restoration of rail traffic in disaster affected regions. |
| SUPARCO | Early Warning | • Furnish satellite based long term weather prediction<br>• Satellite based monitoring to assist post hazard relief operations. |
| Maritime Security Agency | Post disaster Relief Support<br><br>Early warning<br><br>Post disaster logistic support | • Undertake post disaster SAR and relief operations along the coastal regions.<br>• Provide early warning of sea based hazards to PDMAs Sindh Balochistan.<br>• Support national post disaster logistic effort in the coastal regions. |
| Coastal Guards | Post disaster relief operations<br><br>Post disaster logistic support | • Undertake post disaster SAR and relief operations along the coastal regions.<br>• 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 | • Agricultural and rangelands rehabilitation<br>• Reinforce provincial efforts with regards to seeds and fertilizers distribution to the disaster affectees as a livelihood regeneration measures<br>• 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 | • On need basis undertake coordination with Iran and Afghanistan for a possible joint disaster response to monsoon emergencies.<br>• 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 |

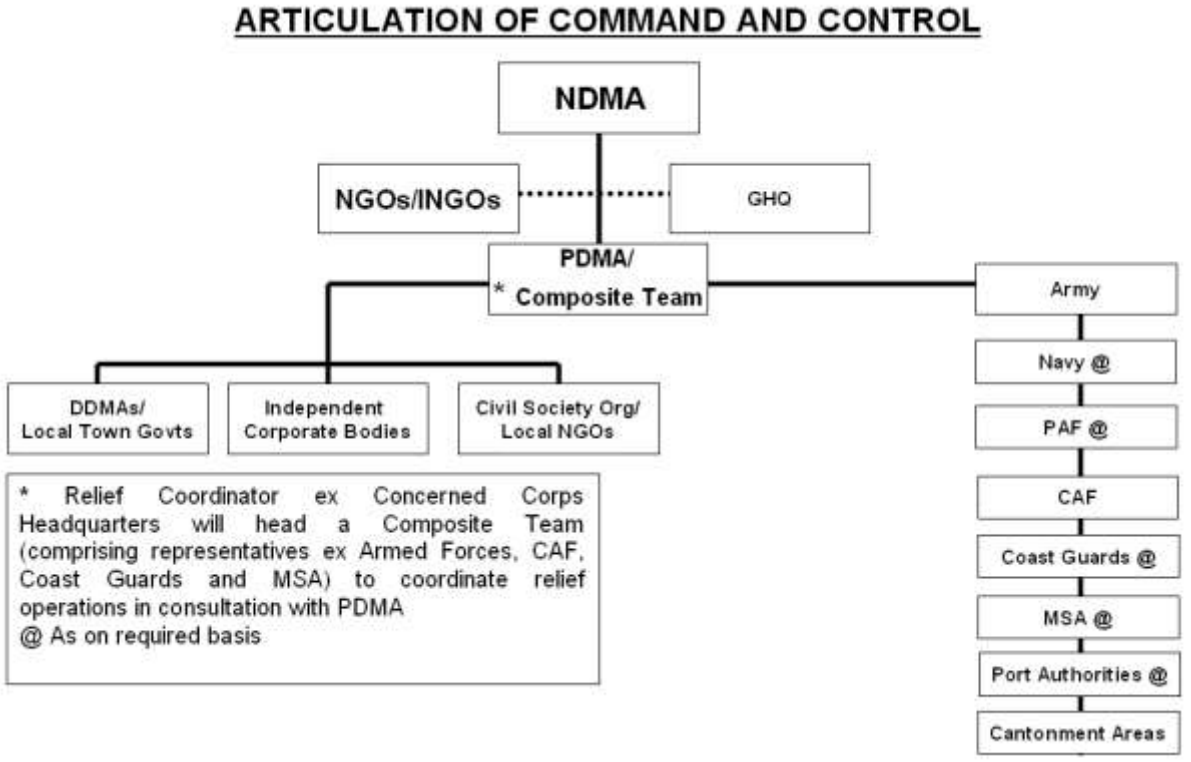
53. **Summary of Federal Agencies Contributions for Monsoon / Floods Emergency / Disaster Situation**

| 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 |

**National Response**

54. **Articulation of Command and Control**. PDMAs in consultation with concerned Corps Headquarters in their respective areas will be responsible for relief operations. Relief Coordinator ex Concerned Corps Headquaters will head a Composite Team (comprising representatives ex Armed Forces, CAF, Coast Guards and MSA) to coordinate relief operations in consultation with PDMA.

a. Diagrammatic layout is as under:-



b. **PDMA**. Lead integrated planning for monsoon disaster response in respective province.

c. **Provincial Government**. Responsible for restoration of essential services and dewatering of worst affected areas & major roads. Necessary coordination in this regard will be made by PDMA.

d. **Local Town Govts / Cantonment Areas / Independent Corporate Bodies**

(1) Will respond to disaster as per their local response plans but under the overall coordination of PDMA.

(2) All stakeholders will identify focal person for response and clear responsibilities (with well defined SOP's) for response both of stakeholders and their key / point persons will be spelled out.

e. **Composite Teams**. Will coordinate rescue and relief operations by the armed forces in consultation with PDMA.

55. **Sectoral Strategies and Plans**

a. **Aim**

(1) Provide guidance for sectoral strategies

(2) To lay down preparedness parameters of key national and provincial stakeholders for floods and monsoon emergencies

(3) Define coordination guidelines for national response

(4) Define roles and responsibilities for national response

b. **Proposed Response Standards**. Annex J

c. **Alert Levels**

(1) Alert Level 1 – Identifies materialisation of Scenario A

(2) Alert Level 2 - Identifies materialisation of Scenario B.

(3) Alerts to be activated by NDMA

d. **Sectors Response**

(1) **Early Warning**

(a) **Objective**. Provide early warning to vulnerable communities and all national stakeholders for disaster response.

(b) **Coordination Responsibility**

i. **NDMA**. Issues and coordinates implementation on national early warning for monsoon hazards

ii. **PMD**. Responsible for tropical cyclone and flash flood early warning

iii. **FFD**. Responsible for riverine floods early warning

iv. **PDMAs/ SDMA**. Responsible to early warn provincial and district stakeholders on monsoon emergencies

v. **DDMAs**. DCO is responsible to early warn district stakeholders on monsoon emergencies

(2) **Preparedness and Response Measures**

(a) **NDMA**. Responsible for national monsoon emergency early warning for flood, cyclones and other hazards to key national and provincial stakeholders

(b) **FFC**

i. Make up for resource shortfall in upkeep of national floods / cyclone early warning capability

ii. Monitor efficient functioning of national early warning system

(c) **FFD**

i. Ensure apt preparedness of early warning infrastructure and weather radars prior to onset of the monsoon season

ii. Monitor precipitation patterns in flash flood prone regions and provide early warning to relevant PDMAs and DDMAs and other national stakeholders

iii. Provide timely early warning of concerned national stakeholders of likely flood incidence

(d) **PMD**

i. Ensure apt preparedness of early warning infrastructure and weather radars prior to onset of the monsoon season

ii. Provide early warning of tropical cyclone incidence and furnish updates through monitoring

iii. Furnish early warning of high winds and flash floods accompanying tropical cyclones to likely affected PDMAs and DDMAs and other relevant national stakeholders

iv. Furnish early warning of unusual / anticipated precipitation patterns to relevant DDMAs and PDMAs in the flash flood prone and slide prone earthquake affected regions.

(e) **WAPDA**

i. 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

ii. Ensure functional efficacy of telemetry system for flood early warning, particularly for major water channels north of Tarbela

(f) **PDMAs**

i. Based on input from NDMA, FFD and PMD provide prompt early warning to likely affected DDMAs

ii. Take special measures to disseminate early warning through local media for reaching vulnerable communities

iii. Task all provincial agencies with a grass root reach like Police Department in dissemination of early warning

iv. 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

(g) **Provincial Irrigation Department**

i. Carryout detailed inspection of flood protection infrastructure in the province and ensure timely repair of vulnerable points

ii. Provide inputs to FFD and provincial stakeholders on water flows in river and flood channels in the province

iii. Disseminate flood early warning to provincial stakeholders

(h) **DDMAs**

i. 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

ii. Disseminate early warning through local social organisations like Mosque Committees and NGOs working with vulnerable communities

(i) **SUPARCO**

i. Furnish satellite imagery to facilitate monsoon contingency planning on as and when required basis

ii. Develop GIS data base to facilitate post disaster relief operations by relevant stakeholders

(j) **PN and MSA**

i. Provide early warning to PDMAs Sindh and Balochistan on tropical cyclone occurrence. .

ii. Facilitate in providing tropical cyclone early warning to vulnerable fishing communities and fishermen at sea

e. **SAR and Immediate Relief**

(1) **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.

(2) **Coordination Responsibilities**

(a) **National**. NDMA

(b) **Province / AJK**. PDMA / SDMA with local armed forces authorities and emergency response services s

(c) **District**. DCO with local armed forces authorities and emergency response services and volunteer organisations

(3) **Preparedness Measures**

(a) **NDMA**

i. Update national plan for monsoon emergency response

ii. National coordination for immediate response particularly with the armed forces before onset of the flood / monsoon season

iii. Facilitate in Federal resource mobilisation for immediate response with emphasis on deploying life saving and emergency response assets

(b) **Armed Forces**

i. Update response planning in concert with provincial and district stakeholders

ii. Response planning essentially covers SAR, health, shelter, food security and combat engineering response in concert with PDMAs and DDMAs.

iii. Maintain operational readiness of SAR equipment, both provincial assets held with the armed forces and own assets

iv. Deploy SAR assets in vulnerable locations as per local plans

v. Prepare possible demolition sites in concert with provincial Irrigation and local response authorities

(c) **PDMAs**

i. Coordinate emergency response with armed forces as per updated joint plans

ii. Mobilise provincial resources and emergency response stakeholders as per response plans in particular in emergency shelter, health, food security, and potable water supply.

iii. Coordinate emergency response plan with likely affected districts

iv. Preposition resources in the proximity of likely affected districts consistent with provincial plans and resource mobilisation plans

(d) **DDMAs**

i. Update district plans and coordinate key action agenda points with the local armed forces authorities for flood / monsoon emergencies

ii. Streamline measures for early warning of vulnerable communities

iii. Undertake coordination and planning for possible evacuation of vulnerable communities to safer locations

iv. Preposition emergency response stores in coordination with armed forces close to the vulnerable locations

(e) **City Government Karachi / City governments vulnerable to urban flooding**

i. 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

ii. Mobilise municipal services flood water exodus from vulnerable locations

iii. Prepare evacuation plans in low lying areas and secure spaces for relief camps

(4) **Immediate Relief implementation Responsibilities**

(a) **NDMA**. Undertakes need based coordination with armed forces and other emergency response stakeholders and oversees implementation of immediate response and SAR

(b) **PDMAs**. Coordinate immediate response for SAR operations with armed forces and other national stakeholders

(c) **Armed Forces**

i. Pakistan Army will launch need based SAR operations deploying aerial, riverine or dismounted operations to save human lives.

ii. Pakistan Army will deploy life saving relief operations to cover food, shelter, emergency healthcare, field engineering and communication support.

iii. Pakistan Air Force will deploy strategic air effort for situation based resource mobilisation in support of national response effort.

iv. Pakistan Army will reinforce local communications and information management capacities.

v. Armed forces will provide need based helicopters for relief operations

(d) **Pakistan Navy**

i. Launch situation based sea and air based SAR and relief operations along coastal regions as per national plan.

ii. Provide need based logistic support along the coastal regions

(e) **PAF**. Launch strategic airlift support to national disaster response efforts

(f) **MSA**

i. Launch relief operations in coastal regions consistent with national response plan.

ii. Provide need based logistic support along the coastal regions

(g) **Coast Guards**. Launch relief operations in coastal regions consistent with national response plan.

(h) **Ministry of Interior**. Ensure post disaster maintenance of law and order.

(i) **DDMAs**. Launch immediate response and SAR operations in concert with armed forces.

(j) **City District Government Karachi**. Launch immediate response to urban flooding in concert with armed forces and other relevant stakeholders.

(k) **PRCS**. Launch immediate response and relief operations as per CP in concert with local government.

(l) **Civil Defence**. Reinforce emergency response at the local government level in urban centres.

f. **Shelter / NFI**

(1) **Strategy**. Provide safe and suitable shelter to those rendered homeless.

(2) **Coordination Responsibility**

(a) **National**. NDMA

(b) **Province / AJK**. PDMA / SDMA

(c) **District**. DDMA / DCO

(3) **Preparedness Measures**

(a) **NDMA**

i. Define need assessment for shelters and NFI for monsoon / flood contingency

ii. Undertake resource mobilisation / meet resource shortfall in concert with Cabinet Division / ERC

iii. Undertake joint planning with UN agencies / donor agencies for possible joint response consistent with national policy

(b) **ERC**

i. Take stock of existing shelter resources and ensure readiness for emergency deployment

ii. Coordinate shelter stocks readiness / availability held by Armed forces Depots through NDMA.

iii. Raise shortfalls in shelter needs through market purchase

(c) **PDMA**

i. Ensure readiness of shelter stocks for monsoon / flood emergencies

ii. Undertake resource mobilisation through provincial resources to make up need in shortfalls

iii. Procure low cost non-tent solutions for shelter to meet emergency shelter needs

iv. Deploy stocks in proximity with vulnerable districts to facilitate surge

(d) **DDMAs**

i. Maintain stocks of minimum needs to urgent emergency needs

ii. Procure low cost non-tent solutions to meet emergency shelter needs

(e) **ERRA**. Maintain stocks for emergency shelter to facilitate response in earthquake districts

(4) **Response**

(a) **NDMA**. Release tent and NFI stocks as per needs and oversee implementation of national shelter support plan

(b) **ERC**. Ensure delivery of tent and NFI for deployment

(c) **PDMA**

i. Facilitate DDMAs in urgent need assessments and deploy shelter and NFI as per needs.

ii. Facilitate need based deployment of shelter needs released by NDMA / ERC

(d) **DDMA**. Meet shelter needs of the vulnerable population through own / external support

(e) **ERRA** (for earthquake region). Release emergency shelter needs on request from DDMAs / PDMAs of earthquake affected districts

(f) **PRCS**. Launch emergency shelter response in concert with national planning and own contingency planning

g. **Food Security**

(1) **Objective**. Provide food support to the disaster affected population with priority to the vulnerable sections.

(2) **Preparedness Measures**

(a) **NDMA**

i. Define national needs for executing food security response to monsoon / floods hazards

ii. Undertake resource mobilisation for meeting shortfall in food security needs

iii. Undertake joint planning with UN agencies / donor agencies for possible joint response consistent with national policy

(b) **Utility Stores Corporation (USC)**

i. Undertake stock assessments and resource mobilisation for meeting shortfalls on NDMA advice

ii. Preposition emergency stocks close to vulnerable regions / districts identified by NDMA

(c) **ERC**. Take stock of emergency response / ready to eat meals in warehouse and be prepared to deploy them on NDMA's advise

(d) **PDMAs**

i. Undertake resource mobilisation as per emergency response needs for monsoon / floods emergencies

ii. Deploy / preposition food stocks close to vulnerable districts

(e) **Provincial Food Departments**

i. Plan for deploying 30% of provincial stocks for disaster response needs.

ii. Coordinate with PDMA for converting emergency wheat stocks in ready to use flour packs

(3) **Response and Coordination Responsibilities**

(a) **NDMA**. Responsible to coordinate implementation of national response related to food security

(b) **USC**. Responsible to coordinate and implement delivery of emergency food support for emergency response

(c) **PDMA**. Coordinate and implement food security response within the province

(d) **DDMA**. Meet food needs of the vulnerable population through external support from PDMA and NDMA

h. **Emergency Health Response**

(1) **Objective**. Reduce risk to life and spread of contagious disease

(2) **Preparedness Measures**

(a) **NDMA**. Facilitate resource mobilisation for the national emergency health plan as per need assessment

(b) **Federal MOH**

i. Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency

ii. Resource mobilisation to meet emergency health needs through national agencies and donors

iii. Undertake epidemic and pandemic planning in the context of summer emergencies in concert with national and international agencies

(c) **Provincial MOH**

i. Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency

ii. Resource mobilisation to meet emergency health needs through national agencies and donors

iii. Prepare a coordinated provincial plan for health response

(d) **PDMA**. Reinforce emergency health response of vulnerable districts by mobilising cash Support form province

(e) District health authorities

i. Undertake need assessment to ascertain shortfalls in meeting emergency health needs for monsoon / health emergency

ii. Resource mobilisation to meet emergency health needs through national agencies and donors

(3) **Response and Coordination Responsibilities**

(a) **NDMA**

i. Ensure overall coordinated implementation of the health response as part of the national response

ii. Facilitate in emergency resource mobilisation to meet emergency needs of provinces

(b) **MOH**. Responsible for coordinating implementation of national response

(c) **Provincial Health Departments**. Responsible for coordinating implementation of the provincial emergency health response

(d) **PDMA**

i. Ensure overall coordinated implementation of the health response as part of the national response

ii. Facilitate in emergency resource mobilisation to meet emergency needs

(e) **DDMA**. Launch emergency health response to meet the needs of the vulnerable population through internal resource mobilisation and external support

(f) **PRCS**. Launch emergency health response in concert with national planning and own contingency planning

i. **Water and Sanitation**

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

(2) **Preparedness Measures**

(a) **NDMA**

i. Determine shortfall in emergency potable water needs for national response

ii. Undertake need based resource mobilisation for response

iii. Undertake joint planning with UN agencies / donor agencies for possible joint response consistent with national policy

(b) **USC**. Undertake resource mobilisation to meet emergency response needs on NDMA advise

(c) **ERC**. Take stock of water purification kits and ensure serviceability

(d) **PDMA**

i. Determine shortfall in emergency potable water needs for national response

ii. Undertake need based resource mobilisation for response

(e) **Provincial PHE Departments**. Earmark need based emergency response funds for meeting emergency needs in restoring damaged water supply schemes

(f) **District PHE Departments**. Earmark need based emergency response funds for meeting emergency needs in restoring damaged water supply schemes

(g) **DDMAs**. Undertake potable water need assessment and resource mobilisation to meet needs in concert with the province

(3) **Response and Coordination Responsibilities**

(a) **NDMA**. Coordinate need based supply of potable water and water purification plants needs

(b) **USC**. Supply emergency response needs as per national response plan

(c) **PDMA**. Coordinate need based supply of potable water and water purification plants needs

(d) **Provincial PHE Departments**. Restore access to potable water sources as per provincial plan of action

(e) **District PHE Departments**. Restore access to potable water sources as per district l plan of action

(f) **DDMA**. Provide potable water to meet emergency health needs of vulnerable population

(g) **PRCS**. Launch WATSAN emergency response plan in disaster affected regions

j. **Restoration of Essential Services**

(1) **Objective**. Ensure early restoration of power and telecommunications in disaster affected regions / districts.

(2) **Preparedness Measures**

(a) **NDMA**. Plan and coordinate restoration of essential services as part of the national plan

(b) **WAPDA**. Articulate a national plan to respond to monsoon emergencies and undertake resource mobilisation and pre-positioning consistent with needs

(c) **PDMAs**. Plan and coordinate restoration of essential services as part of the provincial / State plan

(d) **Provincial Power Companies**

i. Plan for monsoon contingency in concert with PDMA

ii. Pre-position emergency stocks in the vulnerable districts and reinforce their emergency repair capacity

(e) **PTCL**

i. Provincial chapters to plan for monsoon / flood emergencies in concert with PDMAs

ii. Reinforce need based emergency response capacity of vulnerable districts

(f) **SCO**

i. Plan for monsoon emergencies in concert with SCMA AJK and PDMA NA

ii. Reinforce need based emergency response capacity of vulnerable districts of AJK and Northern Areas

(g) **PTA**. Facilitate extension of private sector communication service providers to monsoon hazard disaster vulnerable regions

(3) **Coordination and Response**

(a) **Provincial Power Companies**. Restore electricity supply in disaster hit districts with minimum delay in coordination with other stakeholders

(b) **PTCL**. Restore severed telephone links in disaster hit districts with minimum delay in coordination with other stakeholders

(c) **SCO**. Restore severed telephone links in disaster hit districts with minimum delay in coordination with other stakeholders

k. **Restoration of Land Communication Infrastructure**

(1) Preparedness Measures

(a) **NHA**. Based in historical precedence and past experiences plan and mobilise resources for early reopening of monsoon disaster severed Federal road infrastructure

(b) **FWO**. Be prepared to assist monsoon disaster vulnerable provinces in reopening of critical provincial roads essential for disaster response

(c) **NLC**. Be prepared to assist monsoon disaster vulnerable provinces in reopening of critical provincial roads essential for disaster response

(d) **Provincial Communication Departments**

i. Undertake planning and resource mobilisation for post disaster reopening of critical provincial roads.

ii. Preposition heavy plant at vulnerable locations to facilitate early road opening.

(e) **DDMAs**. Undertake resource mobilisation and preposition available heavy plant at critical locations to facilitate early road opening

(2) **Coordination and Response**

(a) **NDMA**. Mobilise national response for early reopening of monsoon disaster severed road communication

(b) **NHA**. Coordinate and implement employment of resources for early reopening of road communication as part of the national monsoon disaster response plan

(c) **Provincial Communication Department**. Coordinate and implement provincial response for reopening of disaster severed road communication

(d) **DDMA**. DCOs to coordinate and implement reopening of local roads to facilitate disaster response

l. **National Logistic Support**

(1) **Objective**. Provide logistic support for national post disaster response

(2) **Preparedness Measures**

(a) **NDMA**. Provide planning inputs to NLC and Pakistan Railway for providing logistic support to national response

(b) **Pakistan Air Force**. Earmark strategic air assets to facilitate deployment of national logistic effort for monsoon disaster response

(c) **Pakistan Army**. Be prepared to deploy need based helicopter support to facilitate immediate post disaster relief

(d) **Pakistan Navy**. Be prepared to deploy naval assets to support post disaster logistic operations in the coastal region

(e) **Pakistan Railway**

i. Comprehensively plan for responding to monsoon and floods emergency

ii. Undertake resource mobilisation and emergency planning for response at critical points which are likely to be severed based on historical evidence

(f) **NLC**

i. Plan for providing logistic support to national response

ii. Allocate resources for national disaster response plan for monsoon / floods emergency

(g) **MSA**. Be prepared to deploy maritime assets to support post disaster logistic operations in the coastal region

(3) **Coordination and Response**

(a) **NDMA**. Task Pakistan Railways and / or NLC for providing logistic support to floods / monsoon emergency response

(b) **JS HQ**. Coordinate and implement joint services logistic response in keeping with the national plan

(c) **Pakistan Railway**. Provide logistic support for national response as per national plan

(d) **NLC**. Provide logistic support for national response as per national plan

m. **Livelihood Regeneration and Support to the Vulnerable**

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

(2) **Preparedness Measures**

(a) **NDMA**

i. Define national policy and implementation plan for disbursing possible cash assistance to the vulnerable as a post disaster relief measures

ii. Undertake joint planning with UN agencies and INOGS for need identification and resource mobilisation for support to the vulnerable consistent with national policy

(b) **PDMAs**

i. Define provincial policy and implementation plan for disbursing possible cash assistance to the vulnerable as a post disaster relief measures

ii. 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

(c) **MINFAL**. Facilitate resource mobilisation for provincial agriculture and livestock departments in meeting critical needs of the vulnerable groups

(d) **Ministry of Religious Affairs and Zakat**. Earmark support from zakaat fund for regeneration of post disaster livelihoods

(e) **Pakistan Bait-ul-Mal**. Earmark resources for regeneration of post disaster livelihoods

(f) **Provincial and District Social Welfare Department**

i. Undertake need assessments of vulnerable groups in concert with PDMAs / DDMA and other relevant stakeholders

ii. Raise additional provincial resources for assisting the vulnerable

(g) **Provincial Agriculture and Livestock Departments**

i. Undertake planning for rendering support to the vulnerable in terms of agricultural and livestock inputs.

ii. Undertake resource mobilisation to this end

(3) **Coordination and Response**

(a) **NDMA**

i. Execute post disaster relief cash support programme consistent with government policies

ii. Integrate Pakistan Bait-ul-Mal and Zakaat resources in supporting post disaster livelihoods

iii. Undertake overall coordination for regeneration of post disaster livelihoods

(b) **PDMA**

i. Execute post disaster relief cash support programme consistent with government policies

ii. Overall provincial coordination for regeneration of post disaster livelihood support.

(c) **Provincial Agriculture and Livestock Departments**. Execute agricultural and livestock inputs programmes consistent with need assessments

(d) **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

n. **Livestock**

(1) **Objective**. Ensure post disaster survival of livestock

(2) **Preparedness Measures**

(a) **MINFAL**. Facilitate provincial resource mobilisation for post disaster livestock survival as part of a national disaster response plan

(b) **PMDA**. Facilitate in provincial resource mobilisation for meeting emergency needs for livestock survival

(c) **Provincial Livestock Departments**

i. Undertake pre-disaster livestock emergency support need assessments

ii. Generate resources to meet emergency medicines, operational costs and fodder needs for emergency response

(d) **District Livestock Department**

i. Undertake pre-disaster livestock emergency support need assessments

ii. Generate resources to meet emergency medicines, operational costs and fodder needs for emergency response

(3) **Coordination and Response**

(a) **MINFAL**. MINFAL to coordinate resource mobilisation

(b) **Province and districts Livestock departments**. Responsible for need assessments and response

(c) **PDMA/ DDMA**. Support livestock response through emergency resource mobilisation

56. **Health Response to Monsoon Emergencies**

a. **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;

b. **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.

c. **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.

d. **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.

e. **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.

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

g. **Response Activities**

(1) 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.

(2) **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.

(3) **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.

(4) **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.

(5) **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.

(6) **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.

h. **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.

**Annex A**

## 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 |

**Annex B**

**FLOOD PROTECTION AND MITIGATION WORKS**

| Serial | Province | No of Schemes | Budget (Rs. Million) |
|---|---|---|---|
| 1 | **Punjab (**Major schemes)<br>i. Construction of J-Head spur No. 1 of Pir Adil Minor Rs. 97.147 m<br>II. Constructing J-Head Spur RS-180 of link No.1 Rs. 53.114 m<br>iii. Protecting measures to save Smoka village and irrigation infrastructure opposite RD 200+000 Minchin Rs. 48.560 m<br>iv. Stone pitching on loop bund river side (Dallas canal Division) 38.990 m | 10 | 508.84 |
| 2 | **Sindh (**Major Schemes)<br>i. Raising/strengthening, providing stone pitching along F.P bund RD 169 to 263.5 & RD 502 to 120 Rs. 1515.242 m<br>ii. Raising / strengthening providing stone pitching Suprio bund RD to 95<br>iii. Constructing stone apron & stone pitching along Bakhri lop bund mile 0/3 to 1/6 Rs. 253.181 m<br>iv. Recoupment200 Rs. 16.178 m of T-head spur at S.M. Bund mile 135/7 + 500 t 136/0+ | 6 | 1959.067 |
| 3 | **NWFP (**Major Schemes)<br>i. Construction of flood protection structures at critical locations on different rivers and local khwars / nullah in Swat, Buner, Shangla, Battagram, Mansehra, Abbottabad and Haripur Distts Rs. 29.00 m<br>ii. Construction of flood protection structures at critical locations on different rivers and local nullah IN district Charsadda, Mardan and Swabi Rs. 26.47 m<br>iii. Construction of flood protection works at vulnerable locations along different river and local nullahs in district Dir (Lower/Upper) Chitral Rs. 22.00 m<br>iv. Construction and protection works for the protection of various abadies and other infrastructure at critical locations in Peshawar, Kohat, Karak and Hangu Districts Rs. 23.00 m | 9 | 214.679 |
| 4 | **Balochistan (**Major Schemes)<br>i. Construction of 04 nos. flood protection schemes in Quetta, Chagai and Noshki Districts Rs. 6.50 m<br>ii. Construction of 02 nos. flood protection schemes in Pishin & Killa Abdullah districts Rs. 3.40 m<br>iii. Construction of 07 nos. flood protection schemes in Sherani and Zhob Districts Rs. 9.60 m<br>iv. Construction of 04 nos. flood protection schemes in Musa Khel and Loralai Districts Rs. 8.20 m | 17 | 137.87 |
| 5 | **FATA (**Major Schemes)<br>i. Flood protection scheme for Behran Kach Teran on right side of Wana Algad Tehsil Birmal, South Waziristan Agency Rs. 3.10 m<br>ii. Flood protection scheme for abadies and agricultural land on right side of Woucha Dhana Algad in Shah Alam area, Tehsil Birmai, South Waziristan Agency Rs. 2.999 m<br>iii. Flood protection scheme for village abadies and cultivable land in Kajori Bara Tehsil of Khyber Agency Rs. 6.00 m<br>iv. Flood protection scheme for protection of land of Anayat Khan Kach at Hamzoni in Miranshah Tehsil N.W. Agency Rs. 4.00 m | 13 | 48.214 |
| 6 | **Northern Areas (**Major Schemes)<br>i. Construction of flood protective bund at Gahkuch Silpi, Sandi, Sultanabad, Yasin and Ghizar Districts Rs. 14.540 m<br>ii. Construction of flood protective bund at Thalay Nallah Ghanch<br>iii. Construction of flood protective bund at Ghowar and Koro District Ghanche Rs. 10.00 m<br>iv. Construction of flood protective bund at Salling District Ghanche Rs. 20.00 m | 8 | 96.634 |
| 7 | **ICT** | - | Not submitted |
| 8 | **AJK** | - | Not submitted |
| | **Total** | **63** | **2,965.304** |

**Annex C**

## DISTRICTS VULNERABLE TO MONSOON / FLOOD HAZARDS

| Districts / Agencies | Hazards |
|---|---|
| **NWFP** | |
| 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 |
| **AJ&K** | |
| Neelum | Flash floods, slides |
| Muzaffarabad | Riverine floods, flash floods, slides |
| Bagh | Flash flooding, slides |
| Poonch | Flash floods. Slides |
| Bhimber | Flash floods |
| **BALOCHISTAN** | |
| 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** | |
| 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** | |
| 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 |

**Annex D**

## PROVINCIAL RESOURCE MAPPING AND DETERMINATION OF EXTERNAL SUPPORT FOR DISASTER RESPONSE

(NEEDS BASED ON WORST CASE SCENARIO B)

**NWFP**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial [1] Resource Mobilization | Likely [2] Federal / External Support |
|---|---|---|---|---|---|
| **SAR and Emergency Relief Support** | Armed forces and possibly FC NWFP will be employed in SAR and immediate response in support of affected DDMAs. | | | | |
| **Shelter** | -Tents- 1.5 / family<br>-Blankets- 6 / family<br>-Stove / cooking utensils set – 1 / family<br>- Mosquito net for 50% relief caseload | - Tents **1,932***<br>-Blankets **3,028*** | - Tents - **13,500**<br>- Blankets - **54,000**<br>- Stove/ cooking utensils set - **9,000**<br>- Mosquito net -**27,000** | -Tents **4,627**<br>-Blankets **20,833**<br>-Stove/ cooking utensils **3,600**<br>- Mosquito net **10,800** | -Tents **6,941**<br>-Blankets **30,584**<br>-Stove / cooking utensils **5,400**<br>- Mosquito net **16,200** |
| **Food Security** | - 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)<br>- 13,813.8 ton wheat is kept reserve for serious food insecurity | - Wheat 13,813 tons<br>- Rice 795 bags<br>- Tea 495 kgs | Mixed food **360** MT | Mixed food **144 MT** | Mixed food **216 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 and epidemic control measures relevant to flood hazards.<br>• ERRA will supplement emergency health response in earthquake hit districts | | | | |
| **Access to Potable Water** | - Drinking water – 2 ltrs / person / day (15 days)<br>- Water purification tablets – 50 tablets / family for 15 days | | Emergency response<br>- drinking water– **1,620,000** ltrs<br>-Water purification tablets – **450,000**<br>-Restoration of local water supply<br>-Organizing local water tankering services by local administration | -Drinking water **648,000** ltrs<br>-Water purification tablets **180,000** | - Drinking water **972,000** ltrs<br>-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** | • Need based provincial inputs will be required for providing agriculture and livestock inputs for restoring livelihoods<br>• 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. | | | | |

[1] Calculated at 40% of total need and less *

[2] Calculated at 60% of total need and les *

**Punjab**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial [3] Resource Mobilization | Likely [4] Federal/ External Support |
|---|---|---|---|---|---|
| **SAR and Emergency Response** | Affected DDMAs 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<br>- Blankets- 6 / family<br>-Stove / cooking utensils set – 1 / family<br>- Mosquito net for 75% relief caseload | Tents **4,000*** | - Tents - **141,432**<br>- Blankets – **565,728**<br>- Stove/ cooking utensils set - **94,288**<br>-Mosquito net -**424,296** | -Tents- **82,459**<br>-Blankets **339,436**<br>-Stove / cooking utensils set **56,572**<br>- Mosquito net **254,577** | -Tents – **54,973**<br>-Blankets **226,292**<br>-Stove cooking utensils set **37,716**<br>-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 )<br>-Water purification tablets – 50 tablets / family for 15 days | | Emergency response<br>-Drinking water – **16,971,930** ltrs<br>-Water purification tablets – **4,714,400**<br>- Restoration of local water supply<br>-Organizing local water tankering services by local administration | -Drinking water **10,183,158** ltrs<br>-Water purification tablets **2,828,640** | -Drinking water **6,788,772** ltrs<br>-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** | • PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs<br>• 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. | | | | |

[3] Calculated at 60% of total need and les*
[4] Calculated at 40% of total need and less*

**Sindh**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial Resource Mobilization [5] | Likely Federal/External Support [6] |
|---|---|---|---|---|---|
| **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 DDMAs | | | | |
| **Shelter** | -Tents- 1.5 / family<br>- Blankets- 6 / family<br>- Stove / cooking utensils set – 1 set / family<br>- Mosquito net for 75% relief caseload | -*Tents 5,000 | - Tents – **57,855**<br>- Blankets – **231,424**<br>- Stove/ cooking utensils set - **38,570**<br>- Mosquito net - **173,568** | - Tents - **21,142**<br>- Blankets - **92,569**<br>- Stove / cooking utensils set - **15,428**<br>-Mosquito net – **69,427** | -Tents - **31,713**<br>-Blankets – **138,855**<br>-Stove / cooking utensils set – **23,142**<br>- 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 )<br>-Water purification tablets - 50 tablets / family for 15 days | | Emergency response<br>- Drinking water – **6,942,720** ltrs<br>- Water purification tablets – **1,928,500**<br>- Restoration of local water supply<br>- Organizing local water tankering services by local administration | -Drinking water **2,777,088** ltrs<br>- Water purification tablets **771,400** | -Drinking water **4,165,632** ltrs<br>-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** | • PDMA and province will be required to undertake resource mobilization for need based post disaster support in agricultural and livestock / poultry inputs<br>• 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 | | | | |

[5] Calculated at 40% of total need and less*
[6] Calculated at 60% of total need and les*

**Balochistan**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial [7] Resource Mobilization | Likely [8] Federal / External Support |
|---|---|---|---|---|---|
| **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<br>- Blankets- 6 / family<br>- Stove / cooking utensils set – 1 set / family<br>- Mosquito net for 75% relief caseload | - Tents 6,000*<br>-Blankets 8,000* | - Tents – **60,000**<br>-Blankets – **240,000**<br>- Stove/ cooking utensils set – **40,000**<br>-Mosquito net – **180,000** | -Tents **16,200**<br>-Blankets **69,600**<br>- Stove / cooking utensils set **12,000**<br>- Mosquito net **54,000** | -Tents **37,800**<br>- Blankets **162,400**<br>-Stove / cooking utensils set **28,000**<br>-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<br>- 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 )<br>-Water purification tablets – 50 tablets / family for 15 days | | Emergency response<br>- Drinking water - **7,200,000** ltrs<br>-Water purification tablets – **2,000,000**<br>- Restoration of local water supply<br>- Organizing local water tankering services by local administration | -Drinking water **2,160,000** ltrs<br>-Water purification tablets **600,000** | -Drinking water **5,040,000** ltrs<br>-Water purification tablets **1400,000** |
| **Livestock** | • Requires internal resource mobilization for meeting emergency medicines, operational expenses and purchase of animal fodder<br>• 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<br>• 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 | | | | |

[7] Calculated at 30% of total need and less*
[8] Calculated at 70% of total need and les*

**AJ&K**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial [9] Resource Mobilization | Likely [10] Federal/External 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<br>- Blankets- 6 / family<br>- Stove / cooking utensils set – 1 set / family<br>- Mosquito net for 50% relief caseload | - * Tents 1,685 (CMO)<br>- * Tents 282 (R&R Dept)<br>- *Blankets 4,468 (CMO)<br>- * Blankets 120 (R&R Dept)<br>- Cooking stoves 720 (CMO)<br>- CGI& Ceiling sheets 187 (R&R Dept) | - Tents – **6,750**<br>- Blankets – **27,000**<br>- Stove/ cooking utensils set – **4,500**<br>- Mosquito net – **13,500** | - Tents **1,434**<br>-Blankets **6,723**<br>- Stoves / cooking utensils sets **1,134**<br>- Mosquito net **4,050** | -Tents **3,349**<br>- Blankets **15,689**<br>- Stoves / cooking utensils sets **2,646**<br>- Mosquito net **9,450** |
| **Food Security** | - 2x20=40 kg mixed food bag / family for 15 days (adapted to regional needs)<br>- 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** | • 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<br>• ERRA will supplement emergency health response in earthquake hit districts | | | | |
| **Access to Potable Water** | - Drinking water- 2 ltrs / person / day (15 days)<br>- Water purification tablets – 50 tablets / family for 15 days | | Emergency response<br>- Drinking water – **810,000** ltrs<br>- Water purification tablets – **225,000**<br>- Restoration of local water supply<br>- Organizing local water tankering services by local administration | -Drinking water **243,000**<br>-Water purification tablets **67,500** | - Drinking water **567,000** ltrs<br>-Water purification tablets **157,500** |
| **Livestock** | Requires internal resource mobilization for meeting emergency medicines, operational expenses and purchase of animal fodder<br>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<br>Federal support will be required. | | | | |
| **Restoration of Land Routes** | Armed forces field engineering assets will be employed to reinforce local capacities to reopen road s severed by disasters | | | | |
| **Restoration of** | Local electricity company has limited resources to restore electricity in the event of a major disaster. Would require external support from WAPDA | | | | |

[9] Calculated at 30% of total need and less *
[10] Calculated at 70% of total need and less*

| | |
|---|---|
| **Electricity** | |

**Northern Areas**

| Sectors | Issues/ Planning Criteria | Resources Available | Needs | Provincial [11] Resource Mobilization | Likely [12] Federal/ External Support |
|---|---|---|---|---|---|
| **SAR and Emergency Response** | | | | | |
| **Shelter** | - Tents- 1.5 / family<br>- Blankets- 6 / family<br>- Stove / cooking utensils set – 1 set / family<br>- Mosquito net for 50% relief caseload | -*Tents 547 | - Tents – **5,250**<br>- Blankets – **21,000**<br>- Stove/ cooking utensils set – **3,500**<br>- Mosquito net – **10,500** | - Tents **1,410**<br>- Blankets **6,300**<br>- Stove / cooking utensils set **1,050**<br>- Mosquito net **3,150** | - Tents **3,293**<br>- Blankets **14,700**<br>- Stove / cooking utensils set **2,450**<br>- 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)<br>- Water purification tablets – 50 tablets / family for 15 days | | Emergency response<br>- Drinking water – **630,000** ltrs<br>- Water purification tablets – **175,000**<br>- Restoration of local water supply<br>- Organizing local water tankering services by local administration | - Drinking water **189,000 ltrs**<br>- water purification tablets **52,500** | Drinking water **441,000** ltrs<br>- water purification tablets **122,500** |

[11] Calculated at 30% of total need and less *
[12] Calculated at 70% of total need and less*

**Annex E**

## Resource Persons

| Name | Sector |
|---|---|
| **Federal** | |
| Dr. Qamar Zaman | DG PMD |
| Mr. Hazrat Mir | Director PMD |
| Mr. Shaukat Ali Awan | DG FFD Lhr |
| Mr. Ahmad Kamal | Director FFC |
| Dr. Rakhshan Roohi | PARC |
| Dr. Mateen Shaheen | WHO |
| Ms. Shabana | CWS |
| **NWFP** | |
| 1. Mr. Mohammmed 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 | Irrigation |
| 2. Mr. Mumtaz Khan | Irrigation |
| 3. Mr. Alam Zeb | Meteorological |
| 4. Mr. Hamid Mushtaq | NHA |
| 5. Mr. Abdul Rauf Baloch | QESCO (WAPDA) |
| 6. Mr. Taj Muhammad | QESCO (WAPDA) |
| 7. Dr. Mahmood Paracha | Health |
| 8. Mr. Neimat Ullah Buzdar | Food |
| 9. Mr. Javaid Baloch | S.W.D |
| 10. Mr. Abdul Waheed Siddiqui | S.W.D |
| 11. Mr. Hussain Ullah | UNORC |
| 12. Mr. Akbar Ali Khan | Communication & Works |

**Sindh**

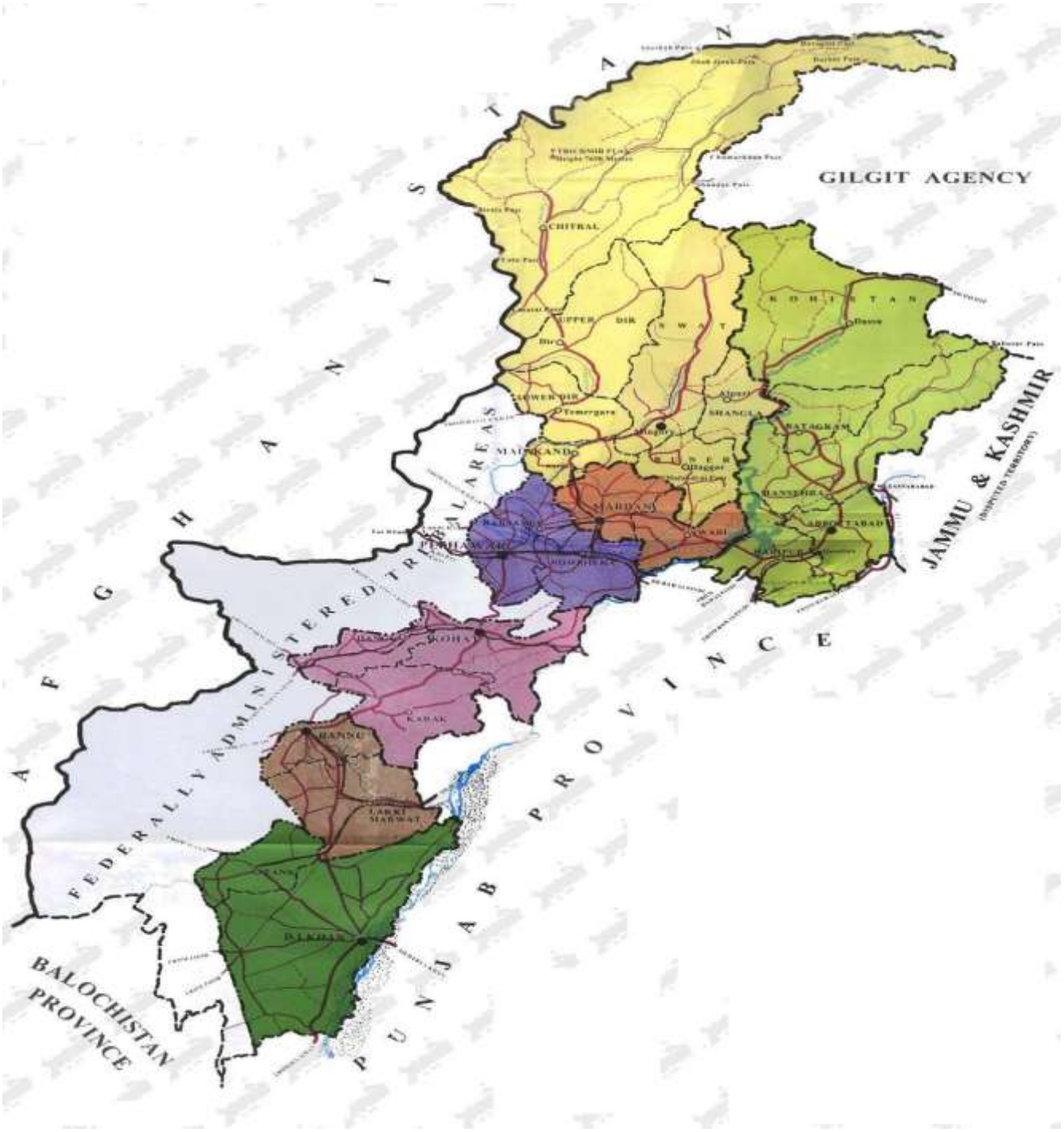
| | |
|---|---|
| 1. Dr. Baz Muhammad Jonejo | Agriculture |
| 2. Mr. Muhammad Alamgir | W&S Deptt |
| 3. Mr. Ghulam Mohammad | Livestock & Fisheries |
| 4. Dr. Iqbal Saeed Khan | Health |
| 5. Mr. Muhammad Sabir Siddiqui | HESCO (WAPDA) |
| 6. Mr. Muhammad Sharif | Irrigation |
| 7. Mr. Syed Munawar Hussain | Irrigation |
| 8. Mr. Nazir Ahmed Soomro | PHEP |
| 9. Mr. Muhammad Tauseef Alam | Meteorological |
| 10. Lt. Col. Mumtaz Ul Haq | Engrs 5 corps |

**Punjab**

| | |
|---|---|
| 1. Mr. Najam Islam | WAPDA |
| 2. Mr. Ghulam Sarwar | Agriculture |
| 3. Mr. Mohammad Ibrahim | Telecommunication |
| 4. Mr. Ch. Abdul Ghafoor | WAPDA |
| 5. Mr. Nadeem Ahmed Abro | Food |
| 6. Dr. Shahid H. Bokhari | Livestock |
| 7. Mr. Jafar Kabir Ansari | Irrigation |
| 8. Dr. M. Hanif Khan | LUDP |
| 9. Brig. Syed Ghazanfar Ali | Relief & Crisis Management Dept |
| 10. Mr. Muhammad Azam | Relief & Crisis Management Dept |
| 11. Mr. Mian M. Akram | Relief & Crisis Management Dept |

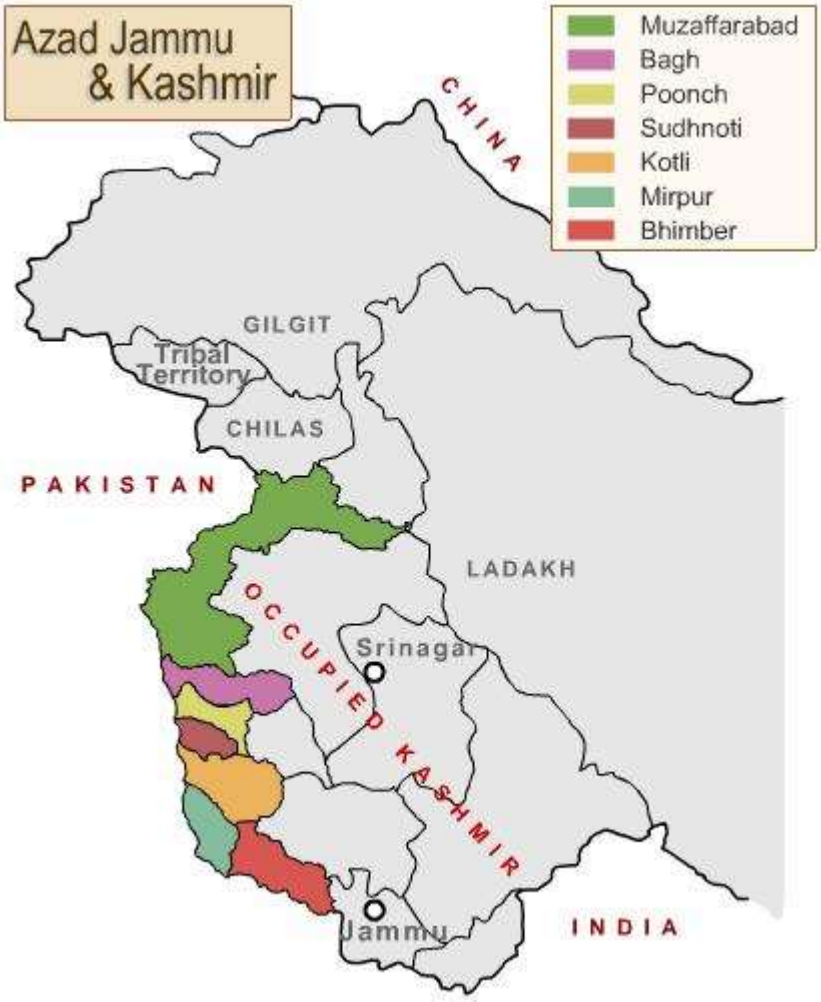
**Annex P**

**NWFP**


AFGHANISTAN
GILGIT AGENCY
CHITRAL
KOHISTAN
UPPER DIR
SWAT
LOWER DIR
SHANGLA
BATAGRAM
MANSEHRA
ABBOTTABAD
HARIPUR
MARDAN
PESHAWAR
KOHAT
KARAK
BANNU
LAKKI MARWAT
D.I.KHAN
FEDERALLY ADMINISTERED TRIBAL AREAS
PUNJAB PROVINCE
BALOCHISTAN PROVINCE
JAMMU & KASHMIR

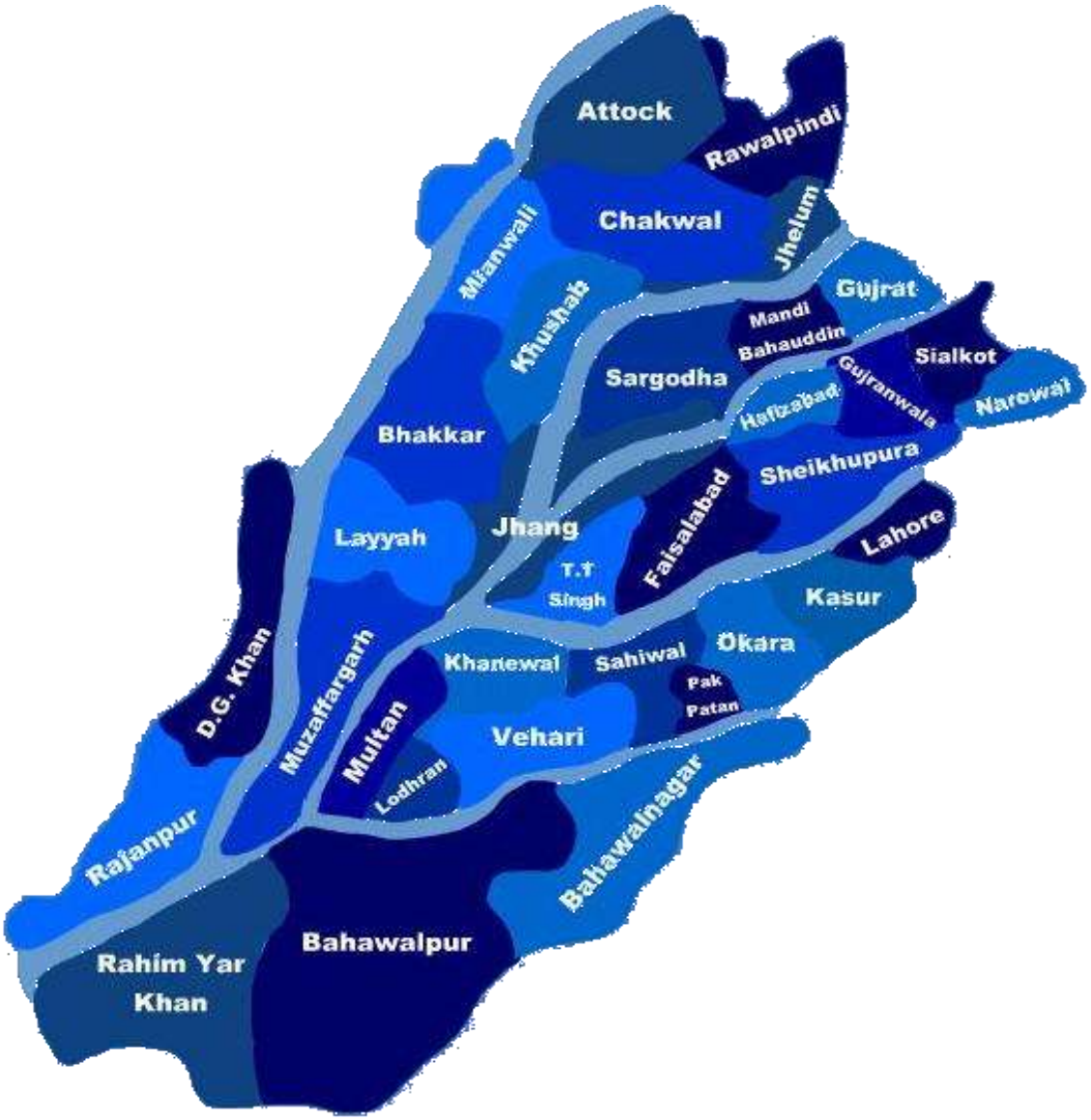
**Annex Q**

**AJ&K**


Azad Jammu & Kashmir
Muzaffarabad
Bagh
Poonch
Sudhnoti
Kotli
Mirpur
Bhimber
CHINA
GILGIT
Tribal Territory
CHILAS
PAKISTAN
LADAKH
OCCUPIED KASHMIR
Srinagar
Jammu
INDIA

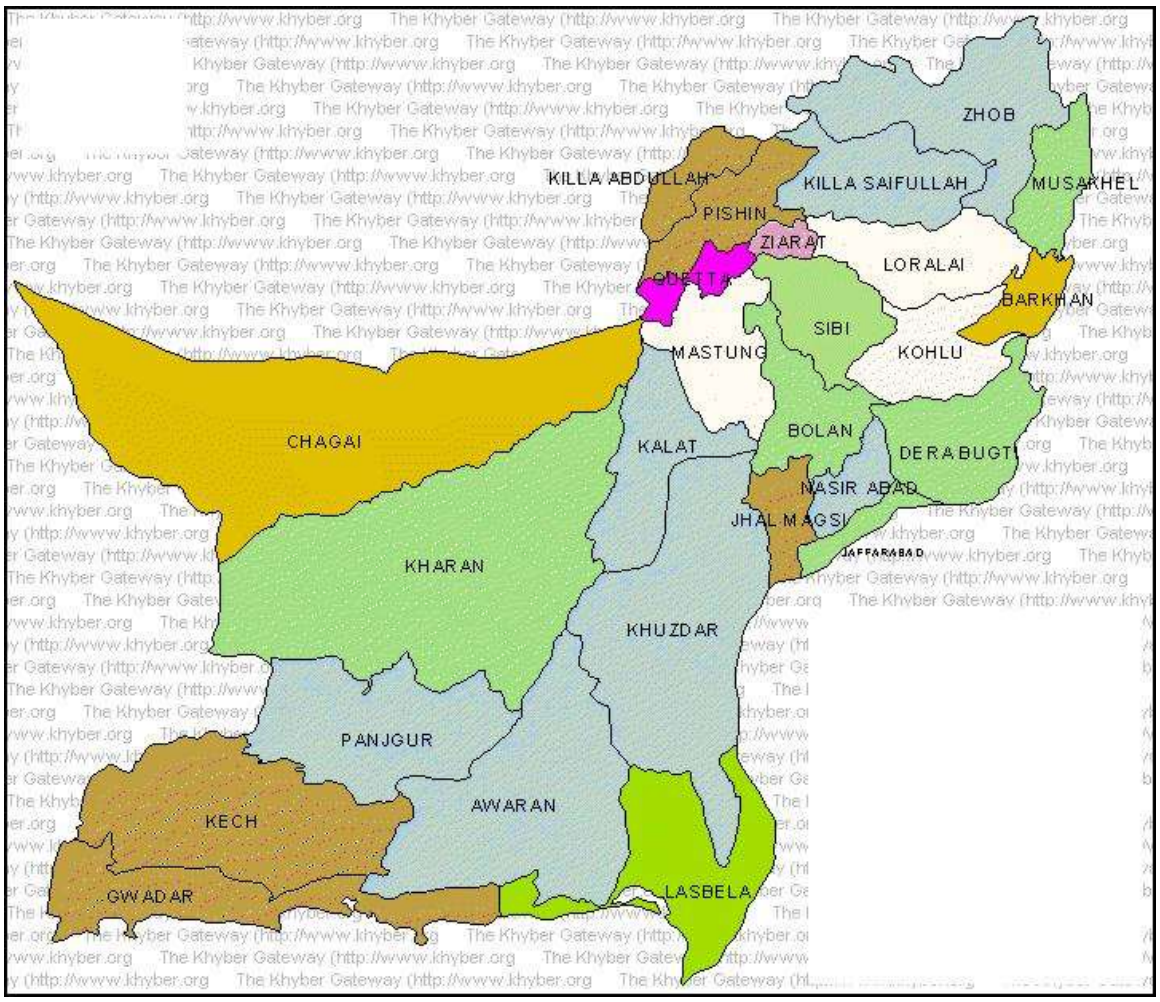
**Annex R**

**PUNJAB**



**Annex S**

## BALOCHISTAN



**Annex T**

**SINDH**