

Monsoon Contingency Planning Update – 14 July 2009

Purpose

This document updates humanitarian emergency response agencies on the monsoon forecasts for 2009 and also sensitises them on the national response mechanisms for early warning and responding to monsoon hazards. It is meant to support humanitarian clusters preparedness for the monsoon hazard.

Sources for information are Dr Qamar Zaman, DG Pakistan Metrological Department (PMD), Mr Hazrat Mir, Director Flood Forecasting Division Lahore and Mr Ghulam Qadir, Chief Meteorologist PMD. Excerpts from NDMA Monsoon Contingency Plan are also included.

In terms of **contents** it includes: (1) Conclusions on flood forecast and management including monsoon vulnerability hazard index; (2) Brief on Floods Hazard, Preparedness and Response (excerpts from NDMA Monsoon Contingency Plan) – page 5; and (3) Monsoon Vulnerability in NWFP - page 10.

Flood Forecast and Management in 2009 – Salient Conclusions

Earlier seasonal forecast for 2009 monsoons was identified at 10% above normal. However, consistent with dry and hot weather trends the forecast has been revised to 10% below normal / normal. Monsoons in 2009 are relatively delayed and first rains are expected from 15 – 16 July onwards. Monsoon season extends till 15 September.

Monsoon rains are likely to impact the southern and northern portions of the country more evenly this year. The traditional pattern though is characterised by monsoon trail emanating from Bay of Bengal and after traversing the Indian land mass it surges upwards to impact the Indus Basin catchment in central and lower Kashmir. In short, traditionally there are more rains in terms of quantum in north-eastern regions of the country.

Pakistan has not experienced major riverine floods over the last decade but their occurrence cannot be ruled out and flood pattern would certainly require monitoring. OCHA is a recipient of FFD daily situation reports and information with respect to flood surge and early warning will be shared with the humanitarian community.

In 2009 tropical storms did not traverse Arabian Sea during May - June though September - October period also reveals cyclone vulnerability.

Flash floods are more likely to occur owing to inconsistent rain pattern that have been experienced over the last couple of years and occurrence of cloud burst phenomenon. Sustained rains of over 50 mm in one region within 24 hours can cause local flooding. Major urban centres are equally vulnerable, Karachi and Hyderabad (Sindh) in particular.

Floods early warning system in Pakistan, which includes Doppler radars, weather forecasting radars and water gauges, is deployed to warn against riverine flooding: along Indus, Jhelum, Chenab, possibly Ravi and Sutlej in the south. Flood Forecasting Division (FFD) Lahore, the nerve centre for floods early warning issues daily updates and early warns of possible flood occurrence. However, the early warning system does not cover areas vulnerable to flash floods.

The only flash floods early warning system (telemetry based) is deployed along Leh Nullah (Margalla Hills overlooking Islamabad constitutes the catchment area) which runs through Rawalpindi and is a source of recurring local floods. There are plans though to install flash floods early warning radars in vulnerable regions across the country; in Cherat (south of Peshawar) in NWFP, Gilgit for Northern Areas and at two locations along the Sindh and Balochistan coastal region.

How does a national agency respond to flood hazards? (1) FFD Lahore issues flood early warning to the likely affected province (s) and districts. (2) Relevant armed forces headquarters are also notified as they are employed in search and rescue and in provision of immediate relief. (3) Within the District DCO early warns vulnerable communities through local administration, employing police communication network, local political and community leaders.

National response to flash floods occurs in a decentralised manner where provinces and vulnerable districts are made responsible for warning vulnerable communities and to set emergency preparedness measures in motion which may include requisitioning services of the military. Therefore, cluster leads and humanitarian agencies that are likely to be employed in monsoon emergency response are advised to plan and coordinate response with the relevant provincial / district disaster response agencies. Key provincial points of contacts are:-

Name & Designation	Telephone (Off)	Telephone (Res)	Cell No.
Mr. Rizwan Ullah Baig DG, PDMA/Relief & Crisis Management Department, Government of Punjab, Lahore.	042-9204403/6 042-9204405 (Fax)	042-9204186	0333-4349411
Mr. Ghulam Ali Shah Pasha Chairman, PDMA/Relief Commissioner/Senior Member Board of Revenues, Sindh, Karachi.	021-9202630 021-9203407(Fax)	021-9202630	0301-8251999
Mr. Azam Khan PRC, DG PDMA/Provincial Relief Commissioner, Board of Revenues NWFP, Peshawar.	091-9212058 091-9212167 (Fax)	-	0300-5862527
Mr. Tahir Munir Minhas DG, PDMA, Balochistan, Quetta.	081-2880245 081-2880189 (Fax)		0300-8111495
Dr. Mahmood-ul-Hassan Raja DG, SDMA, AJ&K, Muzaffarabad	058810-32809 058810-32110 (Fax)	058810-62600 058810-34993	0300-9133458
Mr. Muhammad Abbas Khan DG, /Relief Commissioner/Home Secretary, NAs DMA, Gilgit.	05811-50208 05811-50422(Fax)	05811-50279	0335-5406070 0346-5215111

Assisting Vulnerable Communities

How can a humanitarian organisation help in reducing communities / IDPs vulnerability to flash floods? (1) Get information on local flash and riverine floods trends, routes and map vulnerable communities / IDPs locations. This can be accessed from local administration, communities and even NGOs. (2) Prepare community based system for flash floods early warning involving the local administration and community representatives / elders. (3) Vulnerable communities should preferably be relocated (responsibility of District / local administration) from possible flash flood sites / routes. (4) Vulnerable communities' capacities to confront and survive flash floods should be enhanced by creating relevant capacities. There are numerous community disaster preparedness models that can guide such initiatives. (5) *Community level sensitisation to flood / flash floods hazards* should be prioritised as many casualties and sufferings occur due to lack of awareness of the flash floods threat which occurs infrequently. Flash floods that occurred in the wake of Cyclone Yemyn in 2007 caused most damage and sufferings among poorer communities who over the years tend to live within flash flood routes and were caught off guard.

Finally do visit Pakistan Metereological Department's website, <http://www.pakmet.com.pk/>, for information on monsoon and flood forecasting.

Monsoon Hazards District Vulnerability Index

NWFP

Districts / Agencies	Hazards
Charsadda	Flash Floods, Riverine floods (Kabul)
Nowshera	Riverine Floods (Kabul)
DI Khan	Riverine (Indus), Flash floods
Peshawar	Riverine (Kabul, 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, cloud bursts
Chitral	Flash floods, sliding
Kohistan	Flash floods, sliding
Malakand Agency	Flash floods
Kurram Agency	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)
Sheikhpura	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

Balochistan

District	Hazards
Kech	Tropical Cyclone, Flash floods
Gwador	Tropical Cyclone, Flash floods
Jhal Maghsi	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

Sindh

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

AJK

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

**Brief – Floods Hazard, Preparedness and Response
(Excerpts from NDMA Monsoon Contingency Plan)**

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 1975 floods that government decided to create Federal Flood Commission with a mandate to plan and implement flood prevention, impact mitigation and also create a floods early warning system. An elaborate system of water storage works and flood protection dykes have been created over the years, some protecting vital economic hubs. Work on deploying floods early warning system started in earnest in 1992 and Flood Forecasting Division (FFD), an affiliate body of Pakistan Metrological Department (PMD), forecasts and warns scores of national stakeholders on flood occurrence. The system created for flood management in the country is now being extended to meet other monsoon related hazards.

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

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

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

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

Following removal of life threatening situations and meeting the basic shelter, health and food security needs the focus shifts to restoring livelihoods and bringing normalcy in social services delivery. This is where general inadequacy in both resources and planning is revealed in most of the provinces. Sectors that need to be supported substantially by both provincial resource mobilization and through external support are livelihood regeneration, livestock security, restoration of road access and potable water supply sources, supporting camp management, restoration of essential services like electricity and education.

The health response covers a wide array spanning emergency response, epidemic control, building surveillance and early warning capacity, malaria vector control and EPI coverage. Provinces need to mobilize resources for purchase of post disaster emergency medicines and in building up operational capacity for response. However, Ministry of Health in

coordination with provincial and district health departments must assess critical deficiency in emergency response capacity for addressing shortfalls.

Key Agencies involved in Flood Response

Federal Flood Commission

It took series of devastating floods for the government to finally decide on their proactive management. 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.

Numerous legal instruments cover flood protection in Pakistan which include Punjab Irrigation Act 1873, NWFP Act 1893, Punjab Soil Reclamation Act of 1952, Water Users Association ordinance 1981, Indus River System Act 1992 have been put in place¹.

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. For example such forecasts proved partially incorrect in winters 2007 / 08 as more than predicted rain and snowfall fell in the region including the mountainous areas of Pakistan.

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

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

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

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

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

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

¹ *Indus Water River System, Flooding and Mitigation*, by H. Rehman and A. Kamal, work for the Federal Flood Commission, Ministry of Water and Power

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.

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

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

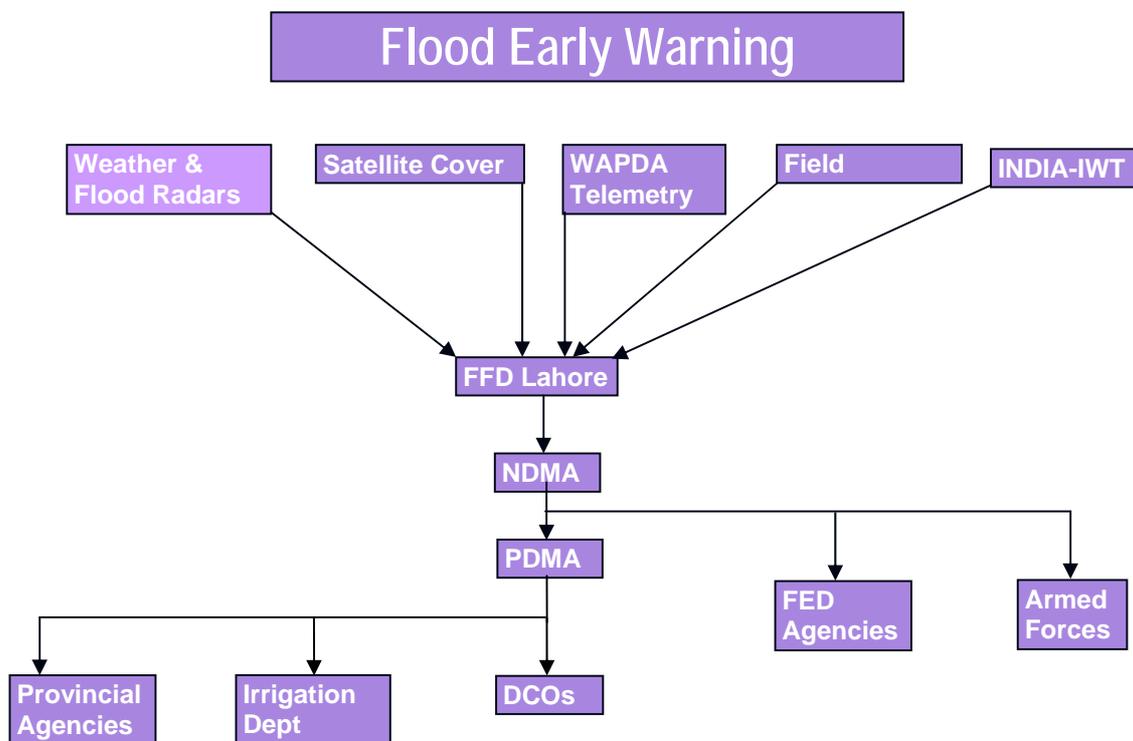


Figure 1– Flood early warning and dissemination

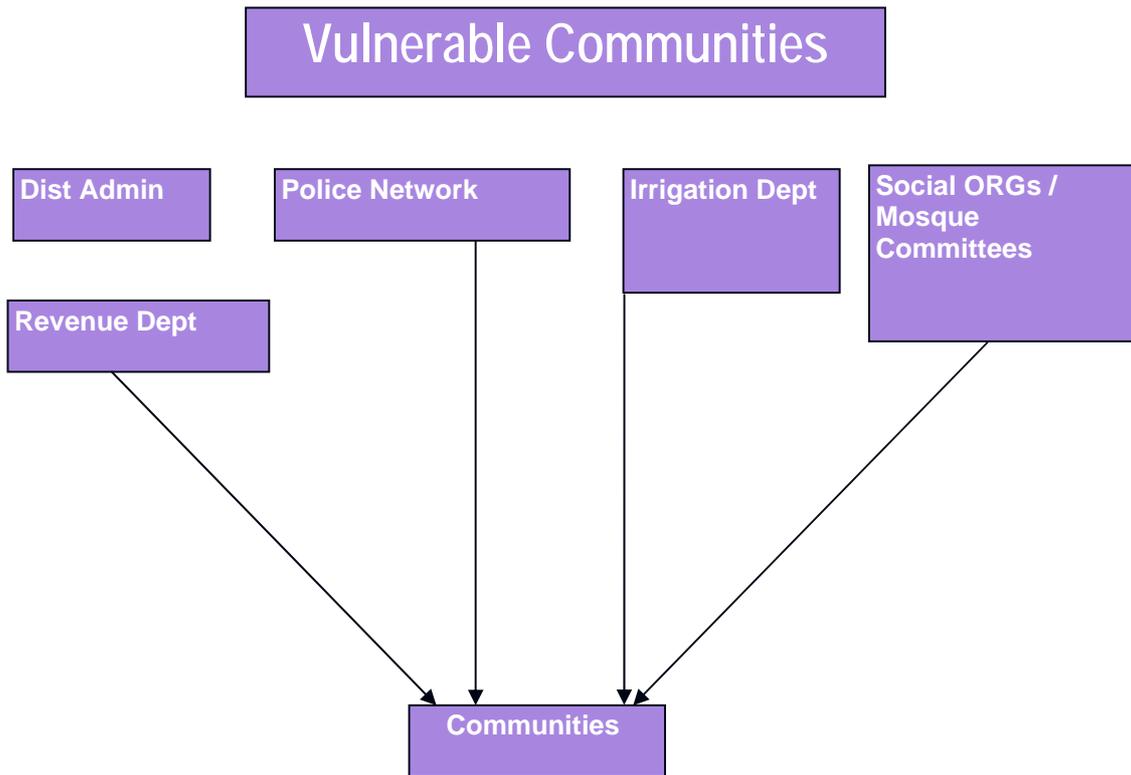


Figure 2- Community level information dissemination
Source: Pakistan Meteorological Department

Coordination for Floods Response

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

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

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

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

Agencies Working for Flood and Cyclone Impact Control and Response

Their summarised roles are reproduced below:-

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

Table 6– Role of Key Stakeholders in Flood Response

Conclusions on Flood Management in Pakistan

- Flood management spans disaster prevention risk reduction and response.
- However, in response governmental biases have been identified in safeguarding affected regions.
- Despite putting in place an effective early warning system, gaps exist in terms of warning communities and vulnerable segments in the context of flash flood in particular.
- Disaster risk reduction considerations are not yet fully factored in the development. Left Bank Outfall Drain (LBOD) case in Sindh is a case in point as the project has over the years engendered more disasters than preventing them.
- PDMA and other critical provincial / disaster response departments remain under resourced which impacts upon their efficacy during response.
- 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.
- Being a relatively new institution PDMA has yet to assume their centrality in coordination of disaster response.
- Finally, armed forces play a major role in both monitoring national preparations with regards to monsoon floods and in response, in particular.

Monsoon Vulnerability in NWFP

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

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

Vulnerable Districts

Charsadda

Riverine Floods

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

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

Peshawar

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

Flash Floods

In 2008 flash floods originating from River Kabul catchment drains impacted upon northern fringes of Peshawar City in Regi area and engendered nearly 25,000 IDPs and affected nearly 100,000. .

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

DI Khan

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

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

Swat

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

Mardan

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

Nowshera

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

Mansehra

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

Lower Dir

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

Upper Dir

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

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

Shangla

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

Chitral

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

Buner

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

Kohistan

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