Appendix 5

DESK STUDY : INDUS FLOODS RESEARCH PROJECT

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INTRODUCTION

The catastrophic floods of 2010 in the Indus Basin were the largest in recorded history. The magnitude of the damages losses and destruction forced water resource managers in general and the academic community in particular to re-examine and revisit the existing management regime in the Indus basin river system.

The Indus Basin is potentially the most highly regulated hydrologic basin globally. Considerable research has been carried out on the physical hydrological and hydraulic aspects of the Indus basin river system. However research into social and cultural dimensions of vulnerability capacities resilience spontaneous climate change adaptation and indigenous coping mechanisms have in general been starkly inadequate. The overwhelming impacts of the Indus floods in 2010 have raised numerous concerns relating to the resilience of physical infrastructure strengths and weaknesses of marginalized communities exposed to flood hazards and resource management in general. Yet in our techno-centric world there has been a failure to adequately evaluate flood impacts and response holistically taking into account both the conventional hydrological/engineering lens and the social impacts and responses.

This report delves into flood impacts flood response and flood reconstruction as it is reflected in a broad cross-section of print media. This report is composed of three primary components:

1. A meta-analysis of the published academic literature assessing the 2010 flood. The goal of this analysis was to understand what questions were being asked and studied about the floods where issues affecting resilience and vulnerability have been identified and where gaps remain.
2. A review of the grey literature to identify strengths and weaknesses of the on-the-ground disaster response flood management and recovery.
3. A review of response and recovery financing undertaken to assess whether the 2010 flood response had any relation to what the field study component of this project identified as crucial sectors geographical areas or specific populations required for fast recovery.

Taken together these three elements were designed to inform the design and implementation of the field study identify opportunities for action that the field study could help inform make direct links between the field study and needed policy actions in terms of sectoral or regional investment and obtain stakeholder buy-in regarding the need to and direction in which to act.

However as will be seen in the following materials much of the documentation and analysis we expected to find either does not exist or is internally inconsistent. Consequently results from the first and third components of the literature study though enlightening in their own way provided insufficient support to allow us to link field study results to policy action as directly as we had intended.

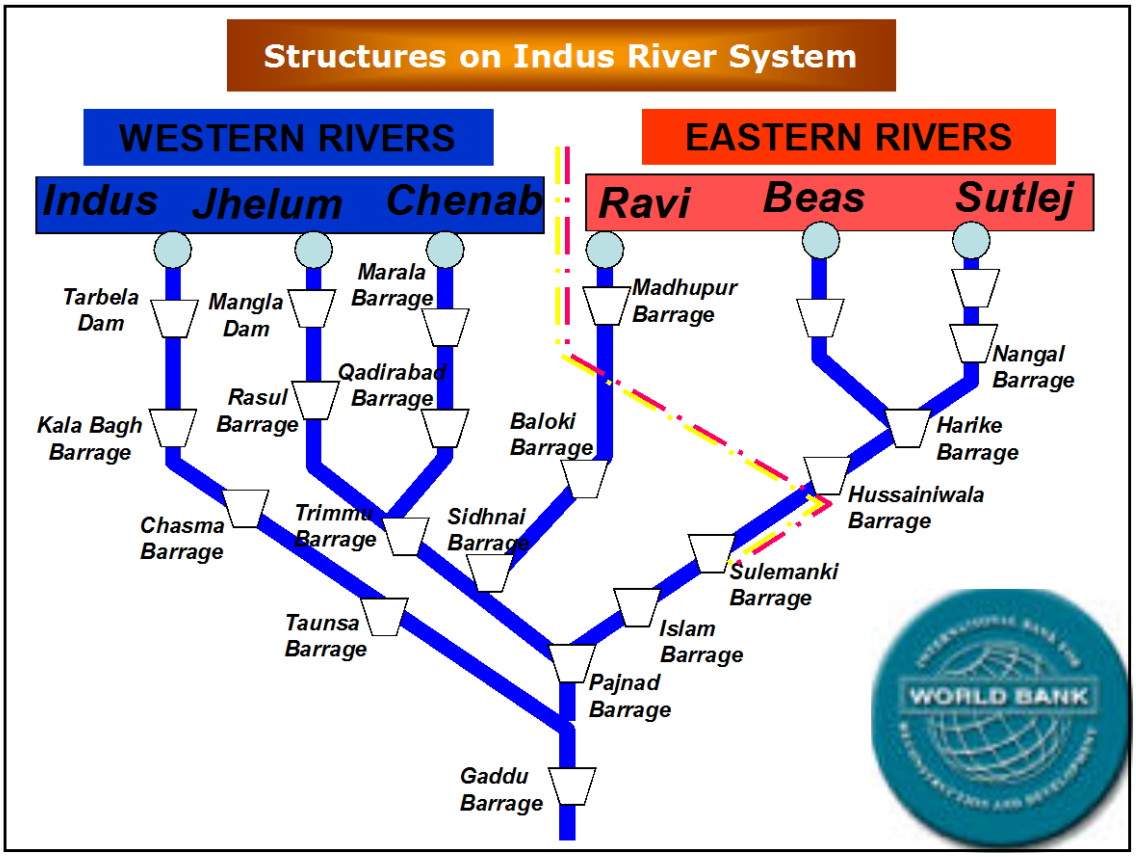
INDUS BASIN: BACKGROUND

OVERVIEW

The Indus river basin with a drainage area of 944574 square kilometers and length of 3.199 kilometers is one of the world's largest rivers. The Indus basin is drained by the Kabul Swat Kurram Jhelum Chenab Ravi Beas and Satluj rivers. The Indus River and its major tributaries Figure 1 originate in the Tibetan plateau and Afghanistan and terminate in the Arabian Sea. In the process they drain lands shared by Pakistan India China and Afghanistan though most of the basin lies in Pakistan and India with only about 13 percent of the total drainage area situated in Tibet and Afghanistan Akhtar 2010.

In general the climate of the Indus basin is arid and semi-arid with an average annual rainfall of 23cm. Precipitation in the form of rainfall snow and glacier-melt constitutes the sources of surface water. Nearly half of the average flow of the Indus River and its tributaries comes from snow and glacial melt ICIMOD 2010. Given the climate evaporation is very high; mean annual evaporation is 204cm in the lower basin and 164cm in the upper basin WCD 2000. The combined average annual flow volume in the basin all rivers included is 178 BCM.

FIGURE 1: MAJOR TRIBUTARIES AND WATER MANAGEMENT STRUCTURES OF THE INDUS RIVER SYSTEM



HISTORICAL INDUS VALLEY CIVILIZATION

Indus Valley Civilization or Harappan Civilization was a Bronze Age civilization that thrived in the Indus basin from 5500 BCE to 1300 BCE. Geographically stretching over an area of one and a half million square kilometers it was one of the world's earliest and largest ancient civilizations with a population of well over five million IVC 2010. At it's peak around 2600 BC the Indus Civilization included nearly a thousand settlements dispersed across Northwestern India and Pakistan ranging from village farming communities and small towns to several fully developed metropolises housing large populations Weber 1999.

The Indus Valley Civilization enjoyed a sophisticated and technologically advanced culture included pre-planned urban settlements use of sun baked or burnt mud-brick of standard size and water control with a plethora of hydraulic features such as drains wells pits and baths. Use of standard weights and measure unique pottery in terms of manufacturing technique decoration shape and style distinctive animal and human figurines and a as yet to be deciphered script have also been documented Kostman 2010.

The Indus Civilization economy was predominantly based on agriculture. Dominant crops were wheat rice millets and barley pulses and vegetables and oil seeds fiber and fruit plants. Archeological evidence indicates this agriculture was supported by highly developed irrigation systems including drainage sewerage artificial reservoirs and an irrigation canal system. The size and prosperity of the civilization grew as a result of this technology.

The fall of the Indus Valley Civilization according to the archeological community was highly enigmatic. Currently the strongest theories about the collapse suggest that it was heavily influenced by ecological and climatic factors including frequent flooding decreased precipitation over-exploitation of the environment drastic changes of river courses and desertification Kostman 1998. This has clear implications for modern society.

MODERN INDUS VALLEY

The rapid transformation in the Indus basin in terms of agriculture and irrigation systems began during the later half of the 19th century; the British in order to bring large areas under cultivation and generate revenue planned and implemented a number of barrages head-works canals and other water related infrastructure Figure 1. Further development followed after the partition of united India in 1947. This continued development over 150 years has made the Indus Basin Irrigation System the world's largest contiguous irrigation system Wolf 1986. Existing irrigation infrastructure includes:

TABLE 1: SALIENT FEATURES OF THE PAKISTAN IRRIGATION NETWORK

Structure	Number
Major Storage Reservoirs	3
Barrages	19
Inter-River Link Canals	12
Independent Irrigation Canal Commands	45
Large Dams of height 15 meter and above	143

FFC, 2011

Today the Indus Basin irrigation system commands an area of about 14.3 million hectares. On average 106 maf of river flow is diverted to the canal system annually. The percentage of current water use in the agriculture industries and domestic and infrastructure sectors is 92% 3% and 5% respectively TFCC 2010.

Pakistan's water storage system is dominated by three large reservoirs: Mangla 1967 Chashma 1971 and Tarbela 1976 with original design capacities of 5.88 maf 0.87 maf and 11.63 maf respectively. Agricultural water distribution is via tens of thousands of kilometers of main canals branches distributaries and minor canals servicing a cropped irrigated area of 40 mha. However increasing unmet demand has also given rise to increased groundwater use. By 2002 the total number of tube wells in all four provinces was estimated to be 629602 with total groundwater extraction of 38.21 MAF with over 2.5 million users Qureshi 2002.

Among the various problems confronted by the irrigation system sedimentation salt accumulation and drainage have been at the forefront. The river Indus and its tributaries carry a staggering load of sediments which has seriously compromised the designed capacity of existing irrigation infrastructure particularly that of storage reservoirs. The original capacities of Mangla Chashma and Tarbela reservoirs have decreased from a total designed capacity of 18.37 maf to 13.5 maf in 2003. Total capacity in 2010 was projected to be 12.34 maf TFCC 2010; Federal Flood Inquiry Commission 2010. This is approximately a 30% loss in capacity in about 30 years.

Concurrently inadequate drainage is causing widespread waterlogging and salinity. By the early 1960s due primarily to waterlogging and salinity 40000 hectares was being lost annually. As an initial response Salinity Control and Reclamation Projects were launched in the 1950's in an attempt to lower the groundwater table. However waterlogging and salinity have continued to be a problem especially in the irrigated areas of Sindh where RBOD and LBOD were implemented with assistance from the World Bank HESSD 2010 Bengali 2000.

TRANSBOUNDARY WATER MANAGEMENT

During the Indo-Pak partition the Indus Basin Irrigation System conceived originally as a whole was divided between India and Pakistan. Without regard to the irrigated boundaries institutions governing trans-boundary water use between the two dominions were left ambiguous. As a result dispute over water distribution arose immediately after independence in 1948 when India cut off supplies of water unilaterally with the head-works in its territory on the eastern rivers Ravi and Sutlej thus depriving Pakistan of the supply of irrigation water and ecosystem flows for about 0.7 million hectares of it's most fertile land. Provisional arrangements were made to restore the irrigation supplies through a standstill agreement. In addition to resolve the protracted dispute various proposals were put forth but without consequence. The dispute was finally resolved by the World Bank with active support from the USA through the enforcement of Indus Water Treaty in 1960 allocating the entire flow of eastern rivers Ravi Sutlej and Beas to India while the western rivers Indus Jhelum and Chenab were allotted to Pakistan. The Indus Water Treaty gave Pakistan rights in perpetuity to the waters of the Indus Jhelum and Chenab rivers which comprise 75% of the flow of the whole Indus system WB 2005.

Both India and Pakistan were rewarded with massive aid inflows to improve and further develop existing irrigation infrastructure leading to massive water resources development in India and Pakistan. Furthermore the Indus Water Treaty set up a Permanent Indus Commission for adjudication of future water disputes between the two states USIP 2010 Akhatar 2010 WCD 2000. The Indus Water Treaty has survived major wars and numerous ups and downs ever since it came into effect and is consequently cited as a model settlement with reference to international water-sharing. However India's ongoing plans to implement a large number of water sector projects of different scales on eastern and western rivers have created fears in Pakistan about their adverse implications in terms of reduced flow downstream and consequent enormous ecological impacts. In view of looming water stress in Pakistan coupled with climate variability Pakistan's water disputes with India are becoming a source of serious tension Akhtar 2010.

MANAGEMENT OF THE BASIN

A massive structure comprising numerous authorities councils commissions centres cells units and institutes is in place to deal with the water resource management in Pakistan including management

of irrigation drainage water-logging and salinity reservoir and dam operations and maintenance floods power generation transmission and distribution and so on. At the federal level the Ministry of Water and Power under the Rules of Business 1973 is at the top of this structure. The ministry's role and responsibilities include strategic inputs towards the Master Plan five year plan and annual development plans relating to the water and power sector; inter-provincial coordination on irrigation water allocations; coordination among federal agencies; and overall oversight and supervision of performance of organizations such as Federal Flood Commission FFC Water and Power Development Authority WAPDA Private Power and Infrastructure Board PPIB Pakistan Commissioner for Indus Water Treaty PCIW National Power Construction Cooperation NPCC National Engineering Services of Pakistan NESPAK Indus River System Authority IRSA Dams and Barrages Safety Organization DBSO Centre of Excellence on Water Resources Engineering University Lahore MoWP 2011. All these federal agencies under the Ministry of Water and Power have different purviews and mandates to deal with matters relating to water and power ranging from civil engineering projects research operations trans-boundary water disputes to mitigation and preparedness measures for water-born hazards.

Provincial Irrigation and Power Departments PIDs in all four provinces are mandated to deal with irrigation and power matters within their respective provinces. PIDs' responsibility begins after water is diverted from dams or barrages into canals. All operations and maintenance of the irrigation system then fall within the purview of PIDs. Chief responsibilities include: operation and upkeep of the irrigation system; planning prioritization and implementation of maintenance work; optimization of water resource use through equitable distribution; assessment of water tariffs aabiana; development of micro-hydropower and management of river floods and construction and maintenance of flood protection works PIDs 2011.

Flood control being one of the chief responsibilities both at federal and provincial level the federal and provincial irrigation agencies manage floods – including mitigation preparedness response and recovery – in coordination with other concerned national and provincial authorities such as NDMA the PDMAs and relief commissioners. Prior to the establishment of the Federal Flood Commission FFC in 1978 PIDs were responsible for construction and maintenance of flood embankments. The FFC since its establishment has implemented National Flood Protection Plans. During the 1978-87 plan altogether 350 flood protection and river training works were executed across the country while under the 1988-98 Plan besides completion of projects initiated under the first plan 250 flood control structures were established and existing flood forecasting and warning systems strengthened IUCN 2010.

MAJOR WATER MANAGEMENT CHALLENGES IN THE INDUS BASIN

Major water management challenges currently faced in the Indus Basin include decline in reservoir storage due to sedimentation and poor maintenance increased salinization and water logging of irrigated lands an increase in domestic and industrial demand with increasing urbanization increasing demand for and decrease in availability and quality of groundwater resources reduced environmental flows and increasing water-related impacts from climate change. Poor resource governance and ad-hoc measures to meet the emerging needs have further exacerbated the water sector situation HSSED 2010. As a result Pakistan now stands among the water stressed countries.

There is a need to review the existing system and formulate an integrated and comprehensive plan of action that can address the challenges faced by the system thereby ensuring that this resource which is vital for Pakistan's economy is employed sustainably both spatially and temporally.

The World Bank study has identified 14 key water management challenges Pakistan faces:

1. Pakistan is a water stressed country moving towards water scarcity.
2. Additional water is not available to inject into the system.
3. The country depends on single river system which conveys a lack of robustness compared to countries with multiple river basins and diverse water resources.

4. There is wide-scale degradation of natural resources on which people depend.
5. Groundwater is being over-exploited in many areas and its quality is deteriorating.
6. Flooding and drainage problems are going to get worse especially in the lower Indus Basin.
7. Climate change is affecting the Himalayan glaciers and snowpack. A dramatic decrease is glacier and snowmelt runoff is projected in the future replaced with an increase in flashier rainfall runoff.
8. There is inadequate knowledge available to adaptively manage such a single massive complex and interconnected ecosystem.
9. Much of the water infrastructure is in poor repair and no modern Asset Management Plan for in place for major infrastructure investment.
10. The quality of water project implementation has declined over the years.
11. The system is not financially sustainable.
12. There is meager investment in decaying and aging water infrastructure.
13. There is poor governance by water managers and low trust among users.
14. Productivity per drop of water is low.

To address these challenges the World Bank suggests various key measures to be undertaken for sustainable and efficient management of the Indus Basin. Primary among these is developing an adaptive management system for the Indus Basin. However this would require high levels of knowledge and understanding of a series of linked basic natural processes including: the behaviour of glaciers as climate change proceeds; the fate of the large amounts of salts being mobilized; the qualitative and quantitative dimensions of the aquifer systems in the Indus and other parts of the country; the evolution and behaviour of the ecosystems of the delta; and the impact of changed sediments load on river morphology.

On the physical infrastructure side Pakistan needs to: modernize transmission and distribution of water; develop its indigenous capacity and establish and nurture a set of institutions that can provide the scientific technical and policy support for the management of increasing scarce water; formulate a systematic Asset Management Plan to guide water infrastructure replacement rehabilitation operation and maintenance and associated costs; construct major new water storage; address water and sanitation services in cities towns and villages; and invest in addressing municipal and industrial waste. The World Bank estimates the replacement value of the old ageing water infrastructure to be US$ 60-70 billion.

CLIMATE CHANGE

Climate change impacts are beginning to be felt globally and impacts to human systems and structures are expected to increase over the next several decades. Climate change impacts in Pakistan are likely to include:

- An increase in the frequency of warm spells and heat waves;
- Increased variability of the monsoon;
- More rapid recession of Himalaya Karakoram and Hindu Kush HKH glaciers;
- A decrease in the proportion of precipitation falling as snow and earlier of melt of existing snowpack;
- Changes in the timing and intensity of rainfall;
- An increase in evaporation and evapotranspiration;
- Food insecurity due to reduced agriculture productivity;
- Upstream intrusion of saline water in the Indus delta due to sea level risk; and
- Risk to mangroves coral reefs and breeding grounds of fish.

These changes and their resulting impacts have serious implications for Pakistan. Pressure on food and water supplies is likely to increase even if population were held constant; water supply may become more variable; and the frequency and magnitude of both floods and droughts is likely to increase. However given the unavailability of long-term quality data that can support the reliable modeling and validation coupled with challenging topography it has been difficult to analyze and predict climate changes in the region ICIMOD 2010. Overall Pakistan has been a slow starter with reference to climate change research and analysis. To ascertain the rates and directions of climate change a more comprehensive sustained programme of field observation and measurement is necessary.

Nonetheless it is clear that climate change will have profound effects in terms of future distribution productivity and biodiversity of both managed and natural ecosystems. Extreme and erratic weather will add to deaths and number of healthy days lost while climate change in general will immensely affect the wellbeing of people in the region as it is likely to exacerbate the existing food insecurity and malnutrition along with likely increases in vector-borne diseases. In addition increasing water stress will result in lack of safe drinking water and adequate sanitation. The most affected could be women and poor and marginalized groups as the climate change scenarios will have differentiated impacts ICIMOD 2010.

INDUS FLOODS 2010

Exceptional flooding in the Indus is not an unusual phenomenon; it has been occurring since time immemorial. However based on modern flood data recorded in Pakistan since 1922 only the 1929 Shyok Floods caused by a glacial lake outburst flood in upper Shyok river are comparable. The Indus Floods 2010 also called Pakistan Floods 2010 were 'unprecedented' 'historical' 'the most devastating' 'super' or 'worst floods'. The resulting massive destruction across the Indus Basin triggered a discourse on the occurrence of floods and flood management in Pakistan.

Each year prior to monsoon season the Pakistan Meteorological Department issues outlook forecasts for the monsoon season July-September. In 2010 the overall monsoon forecast was for a normal monsoon. During the third week of July the pattern changed significantly after a long dry spell. The PMD issued advisories respectively on July 24 25 and 27 forecast heavy rainfall with likely flash flooding in Hazara Mardan and Peshawar areas presentation by DG PMD Astana Kirgizstan PMD Advisories 2010 Inquiry Commission 2010.

The NOAA 2010 annual report noted that initial flooding was caused by a major rain spell from 28-29 July; rainfall totals exceeded 120mm over a large area of northern Pakistan. The situation was exacerbated by additional rains from 2-8 August and flooding extended through the entire Indus valley. Over the north and central part of Pakistan seasonal rainfall was recorded at more than 75% above normal. Total monsoon rainfall in 2010 was the fourth highest on record and the highest since 1994. According to the NOAA report these heavy precipitation events over Pakistan could be attributed to an interaction of extended monsoon flow and an upper level trough in the westerly jet stream. The persistent trough in the jet stream associated with upper-layer blocking patterns over West Asia caused strong upper layer divergent flow and ascent of warm and moist surface air. Near the surface the monsoon easterly winds extended unusually far along the Himalayan foothills into northern Pakistan.

Flood records made available by the Federal Flood Commission FFC WAPDA and Irrigation Departments indicate that floods flows were unprecedented at many points along the system as shown in Table 2. Interestingly however in many placed they did not exceed design capacity yet flooding was not limited to only those areas where design capacity was exceeded. This clearly points to other factors at work in the flooding beyond engineering failure.

TABLE 2: HISTORIC MAXIMUM VS 2010 MAXIMUM PEAK DISCHARGES

River	Barrages Head-works Bridges	Design Capacity	Historic Maximum Peak cusecs		Maximum 2010 Peak cusecs	
			Flood	Date	Flood	Date
Indus	Tarbela	1500000	510000	31-7-89	833000	30-7-10
	Kalabagh	950000	950000	14-7-42	937453	30-7-10
	Chashma	**950000**	786600	3-8-76	**1036673**	01-8-10
	Taunsa	1100000	788646	22-7-58	959991	02-8-10
	Guddu	1200000	1199672	15-8-76	1148738**	8&9-8-10
	Sukkur	1500000*	1166574	15-8-76	1131000#	9&11-8-10
	Kotri	**875000**	981000	14-8-56	**964900**	27-8-10

* Existing design capacity as reported by PID Sindh is 900000 cusecs. FFC, 2010

** Does not include flood flows passed through breach of LMB of Guddu Barrage.

\# Does not include flood flows passed through Tori Bund reach u/s Sukkur Barrage.

In the aftermath of the flood there were numerous news reports regarding inadequate early warning by the flood forecasting agencies. The Federal Flood Inquiry Commission and the Punjab Flood Inquiry Tribunal took up this issue among others in the course of their proceedings.

Official responses generally denied responsibility. The Met office pled that it was not expecting widespread rains the irrigation department officially said they could not gauge the intensity and magnitude of floods while the Provincial Disaster Management Authority PDMA claimed that it is not the 'first responder' during such disasters. Rather than try to identify problems and work toward solutions responses devolved toward finger-pointing. For example Met officials were quoted as saying "When we got the weather advisory at around 2pm on Thursday July 29th we tried to inform the District Coordination Officers DCOs of Nowshera and Charsadda through fax and kept trying till 6pm as their fax was not working properly" The Dawn 2010. Locally where flood forecasts were received residents often did not respond until floodwaters were already rising as is further documented in the field study report.

The combination of missing or delayed official notice and lack of understanding and urgency on the part of citizens greatly exacerbated flood impacts and loss. Exceptionally high floods generated by major secondary and tertiary rivers in KPK began to travel downstream through the barrages of Punjab and Sindh to the Arabian Sea leaving behind a trail of destruction through the entire length of the country. The extreme flood situation was further exacerbated by additional rains breaching of major canals and embankments to prevent flooding in urban areas and to save irrigation infrastructure and canal and embankment failure due to years of maintenance negligence Inquiry Commission 2010 DNA 2010. Massive evacuation and displacement resulted. The UN Secretary General termed it as a 'Slow Evolving Tsunami.' NDMA 2010.

Approximately 20 million people were affected by the floods with over 100000 km^2 of area inundated by the floodwater including over 2.1 million hectares of cultivated land NDMA 24.2.2011. Roads bridges railway networks power installations and small dams were severely damaged. The magnitude and scale of destruction was more than twice the Pakistan Earthquake 2005 Indian Ocean Tsunami 2004 Cyclone Katrina 2008 and Haiti Earthquake 2010 collectively in terms of geographical space and population affected NDMA.

TABLE 3: COUNTRYWIDE LOSSES/DAMAGES

Province/ Agency	Total Affected Districts	Cropped Area Affected Ha	Population Affected Millions	Houses Damaged	Affected Road Mileage Km	Villages Affected	Persons Kiled	Persons Injured
Punjab	11	746900	8.20	375773	2819	1778	110	262
Sindh	17	1043500	7.185	879978	8467	11988	411	1235
KP	24	121500	3.80	257294	6511	544	1156	1198
Balochistan	12	132500	0.70	79720	2077	2896	54	104
FATA	#	7220	#	5419	1257	#	#	#
Gilgit-Baltistan	7	7900	0.10	3157	382	347	183	60
AJK	7	33100	0.20	6843	3575	0	71	87
G. Total	**78**	**2092600**	**20.185**	**1608184**	**25088**	**17553**	**1985**	**2946**
Information Source	*NDMA 24.2.2011*	*DNA Report p.153*	*NDMA 24.2.2011*	*DNA Report p.89*	*DNA Report p.129*	*NDMA 24.2.2011*	*NDMA 24.2.2011*	*NDMA 24.2.2011*

Data not received by NDMA

THE PAKISTAN DISASTER MANAGEMENT SYSTEM

Viewed in isolation from mainstream development and poverty alleviation planning processes state level disaster preparedness and mitigation initiatives in Pakistan are primarily focused on structural measures. There have never been integrated institutional arrangements in place with a long-term perspective to deal with disasters while efforts to bring disaster risk reduction into the mainstream have been non-existent NDMA 2010 WCDR 2005. As a results there are numerous entities with overlapping jurisdictions involved in disaster response and recovery.

CURRENT DISASTER MANAGEMENT ACTORS

The existing disaster management system in Pakistan has numerous actors and entities at the national provincial district and sub-district level. Key players include:

- Civil Defense
- Commission for Indus Water
- Dams and Barrages Safety Council
- Drought Emergency Relief Assistance DERA
- Earthquake Reconstruction and Rehabilitation Authority ERRA
- Emergency Relief Cell ERC
- Emergency Services
- Federal Flood Commission FFC
- Fire Fighting Services
- Indus River System Authority IRSA
- National Crisis Management Cell
- National Disaster Management Authority NDMA
- National Oversight Disaster Management Council NODMC
- Pakistan Armed Forces
- Pakistan Humanitarian Forum PHF
- Pakistan Meteorological Department PMD
- Pakistan Red Crescent Society
- Police Department
- Provincial Irrigation Departments PIDs
- Provincial Relief Commissioner
- SUPARCO
- The UN System
- Water and Power Development Authority WAPDA

A brief overview of these players and their roles in the existing disaster management system are given below.

CIVIL DEFENSE

The Civil Defense was created by British Administration during the World War II. The Civil Defense Department is responsible for protecting the general population in war situations before during and after the time of foreign aggression. It also includes remedial measures against natural and man made disasters in peace time including assisting local administration in rescue evacuation and relief measures; searching for and/or defusing unexploded bombs in affected areas; awareness and training of volunteers regarding protection and preventive measures; provision of quick and effective search and rescue coverage; and protection and operations in case of disaster. The Civil Defense has facilities for training/capacity building through short-term and long-term courses including: the Civil Defense Academy Lahore; the National Institute of Fire Technology Islamabad; the Bomb Disposal Unit Lahore; and Civil Defense Training Schools in all provincial headquarters Civil Defense 2011.

Commission for Indus Water

The Commission for Indus Water serves as the communication channel for all matters relating to the implementation of the Indus Water Treaty 1960. The Pakistan Commissioner for Indus Waters receives rainfall and flow data for river catchment areas located in Indian Territory including the Jhelum Chenab Ravi Sutlej and Beas rivers. Data received from Indian authorities are transmitted to FFD for forecasting purposes PMD 2010 FFC 2010. This is the only forum through which any clarification or information can be obtained from India regarding flood data.

Dams and Barrages Safety Council

Established in 1981 the Dams and Barrages Safety Council headed by the Chief Engineer is part of Ministry of Water and Power. The Council's responsibilities include periodical inspections of dams and reservoirs and recommendations to regarding repairs and maintenance measures; revision of plans for new dams and the monitoring of them during construction; compilation and collation of technical data; and liaising with the International Commission on Large Dams the World Bank and concerned UN agencies. Ministry of Water and Power 2011

Drought Emergency Relief Assistance DERA

The Drought Emergency Relief Assistance DERA Unit is the principle federal agency managing droughts. Launched in 2002 with a portfolio of US$360 million DERA's drought relief implementation strategy focuses on need-based projects identified by communities and livelihood generation schemes. Focus areas include OCHA 2006:

- Improving water resource management and water supply sub-projects to support efficient water use water conservation and water harvesting
- Improving accessibility by providing rural roads to rural communities to enhance rural employment
- Supporting a range of services in agriculture livestock forestry and rangelands to help and protect livelihood opportunities for the poor
- Enhancing health care and nutrition supplementation for the rural poor in drought-affected areas.

Earthquake Reconstruction and Rehabilitation Authority ERRA

In the wake of the 2005 earthquake ERRA was established to direct reconstruction and rehabilitation of nine earthquake affected areas in KPK and AJ&K. ERRA's primary tasks were to strategize approve projects and provide funds to State Reconstruction and Rehabilitation Authorities SERRA and Provincial Reconstruction and Rehabilitation Authorities PERRA. In 2011 under the Earthquake Reconstruction and Rehabilitation Act the ERRA scope and mandate was extended to the whole of Pakistan ERRA 2011. With the extension of scope and mandate an institutional anomaly has been created between ERRA and NDMA because the latter is already mandated to deal with earthquake hazard. The NDMA in its annual report of 2010 has observed that following the passage of 18th Amendment acceptability of such organization by the provinces is highly circumspect and therefore this anomaly needs to be corrected NDMA 2011

Emergency Relief Cell ERC

The Emergency Relief Cell ERC a federal agency established in 1973 is housed within the Cabinet Division headed by a Director General. ERC is mandated to provide relief assistance both in cash and kind at provincial and international levels in disaster situations. Relief assistance is provided to disaster-hit provinces on the direction and approval of the Prime Minister to supplement provincial relief efforts if a calamity overwhelms a province. ERC maintains warehouses in Islamabad and Karachi and an Aviation Squadron with a fleet of 4 helicopters in order to assist rescue operations and officials' visits to affected areas ERC website PMD/ proposal for early warning.

Emergency Services

In 2006 Rescue 1122 emergency services was created in the province of Punjab to deliver emergency rescue and medical treatment NDMA 2010. Since the success of the pilot project in Lahore in 2004 this service has been expanded to all districts of Punjab. Rescue 1122 now includes emergency ambulance rescue and fire services and a community safety programme. In addition for development of human resources in this field the Emergency Services Academy has been established and is now serving as a centre of excellence in Pakistan for capacity building in emergency management skills such as emergency medical training fire fighting search and rescue water rescue etc. Similar emergency service was replicated in Khyber-Pakhtunkhwa province in August 2010 Rescue 1122 Punjab.

Federal Flood Commission FFC

Federal Flood Commission was established in 1977 for countrywide integrated flood management. Key responsibilities includes:

- Preparation of National Flood Protection Plans.
- Approval of flood control schemes prepared by the provincial governments and concerned federal agencies.
- Measures for effective flood early warning and forecasting systems.
- Monitoring and evaluation of implementation of the National Flood Protection Plan.
- Implementation of a research programme on flood control and protection.

Fire Fighting Services

The Civil Defense city district governments and municipal entities at different levels are responsible for fire-fighting facilities and services. Some 155 fire stations are in place in major cities of Pakistan. A national policy to deal with fire hazards does not exist and a draft policy the National Fire Policy 2010 has not yet been finalized. Fire fighting/suppression equipment and systems are generally out-of date and there is no capability to deal with chemical fires. Given the expanding cities and industrial zones across Pakistan fire-fighting legislation and capability require urgent attention draft National Fire Policy 2010 OCHA 2006.

Indus River System Authority IRSA

The Indus River System Authority IRSA was created in 1992 to implement the water apportionment accord of 1991. The accord was meant to ascertain provision of share of water to each province from the Indus river system in accordance with the agreed apportionment of water to each federating unit. IRSA allocate available supplies within the system according to accepted distributional principles to each province and resolves water disputes.

National Crisis Management Cell

The National Crisis Management Cell NCMC under the Ministry of Interior is the focal point in all emergencies in Pakistan. The Cell gathers relevant information and coordinates plans for emergency response to emergencies or disasters particularly with regard to terrorist related incidents. At the provincial level Provincial Crisis Management Cells PCMC have been established with a similar purview. In addition NCMC issues situation reports and security advisories to relevant stakeholders on a twenty-four hour basis PMD 2006/OCHA 2006

National Disaster Management Authority NDMA

The NDMA established in 2006 is the national level apex agency for disaster management with counterpart Provincial Disaster Management Authorities PDMAs at the provincial level and District Disaster Management Authorities DDMA at the district level. The NDMA was tasked with addressing the entire spectrum of disaster management NDMA 2010. All stakeholders including government

bodies agencies at the federal and provincial level armed forces UN agencies international organizations and NGOs are expected to work through the NDMA in all stages of disaster management.

The NDMA is responsible for nine priority DRR intervention areas including:

- Institutional and legal arrangements of DRM
- Hazard and vulnerability assessment
- Training education and awareness
- Disaster risk management planning
- Community and local level programming
- Multi- hazard early warning system
- Mainstreaming disaster risk reduction into development
- Emergency response system
- Capacity development for post disaster recovery.

The associated National Disaster Management Act passed in 2010 established the National Disaster Management Commission NDMC. The Commission headed by the Prime Minister of Pakistan is the apex body for policy-making with regard to disaster management. Members of the Commission include: leaders of the opposition in Senate and National Assembly Federal Ministers for Defense Health Foreign Affairs Social welfare & Special Education communication Finance and Interior Governor NWFP for FATA Chief Ministers of all the Provinces Governor KPK for FATA Prime Minister of AJ&K Chief Executive of NAs Chairman Joint Chiefs of Staff Committee and representatives of civil society or any other person appointed by the Prime Minister. The Chairman of NDMA acts as ex-officio Secretary of the commission.

NATIONAL OVERSIGHT DISASTER MANAGEMENT COUNCIL NODMC

To ensure transparency and monitoring of recovery and reconstruction resources the government established the National Oversight Disaster Management Council NODMC in September 2011. The Council's mandate includes:

- Monitor inflows of funds for various phases of post-flood recovery and reconstruction
- Review plans for post-flood reconstruction
- Monitor progress of implementation of reconstruction
- Interact with authorities relevant to reconstruction Economic Affairs Division Planning Commission NDMA and Provincial Governments
- Ensure effective targeting and transparent disbursement of support to those affected
- Prepare quarterly reports for the Council of Common Interests
- Commission and supervise audits on utilization of funds.

The Council is comprised of five members at the federal level including the head of the council. At the provincial level structures are comprised of two members Cabinet Division 2010. The Council met only once after notification and has remained dormant since.

PAKISTAN ARMED FORCES

In all major disasters Pakistan armed forces have played a key role in relief and rescue operations.

- The Pakistan army has an elaborate structure and system to deal with flood hazards. The General Headquarter GHQ Flood Relief Centre established in 1977 works under the general staff branch the Corps Flood Control Centres under the Corp Headquarter division while Commanders Corp Engineers in provincial headquarters function as Army liaison/coordinating officers with the respective provincial governments. The army protects irrigation structures and critical infrastructure by breaching embankments in accordance with directions from provincial government. Provincial governments are responsible for providing support equipment to the Army such as explosive material life jackets boats

vehicles tents etc. All relief and rescue operations by the Army are carried out in coordination with respective civil authorities FFC 2010 PAF 2011.

- The Pakistan Air Force PAF participates in rescue and relief operations by airlifting relief assistance and rescue of marooned people to safer areas through its aviation facilities and support. During the 2010 floods PAF handled relief flights arranged boats for the Pakistan Army and Navy to assist in evacuations participated in the early recovery phase and constructed houses in different flood affected areas from its own resources 650 houses in Sindh alone PAF 2010 Federal Inquiry Commission 2010.
- The Pakistan Navy provides relief and rescues people from affected areas. The Pakistan Navy launched the largest relief operations 'Madad' meaning 'help' during the 2010 devastating floods in the province of Sindh. They also built houses in flood-affected areas in Sindh during the early recovery phase of 2010 floods Pakistan Navy 2011.

PAKISTAN HUMANITARIAN FORUM PHF

The Pakistan Humanitarian Forum PHF was formed in 2003 to strengthen the efforts INGOs working in Pakistan. Made up of 40 international non-governmental organizations the PHF aims to share information on regular a basis enhance coordination with the government and other key players in the humanitarian community monitor emergency response in Pakistan coordinate response and rehabilitation interventions in disaster affected areas and respond to changes in the working environment in Pakistan that may affect the delivery of humanitarian assistance and the adherence to humanitarian principles in Pakistan. During the 2010 floods the 40 member INGOs of the PHF rolled out emergency programmes across multiple sectors to meet the immediate and subsequent needs of the flood affected communities.

PAKISTAN METEOROLOGICAL DEPARTMENT PMD

The Pakistan Meteorological Department PMD attached to the Ministry of Defence is the apex entity for multi-hazard early warning and forecasting including weather forecasts aeronautical forecasts tropical cyclone forecasts and marine forecasts. The major responsibility of the PMD is to provide information on meteorology and geophysical matters in support of traffic safety in air overland and sea and to mitigate disasters due to weather or geophysical phenomena by reliable early warning and forecast. The Flood Forecasting Division FFD established in 1978 is a specialized unit of the PMD responsible for collection of hydrological and meteorological data analysis and preparation of flood forecasting river flow forecasting water availability forecasting for dams and issuances of warnings to relevant stakeholders for further dissemination at different levels.

PAKISTAN RED CRESCENT SOCIETY

The Pakistan Red Crescent Society PRCS was established in 1947 PRCS is headquartered in Islamabad with branch headquarters in all provinces including FATA Azad Jammu and Kashmir. Being a humanitarian organization the PRCS principle areas of focus are disaster management healthcare dissemination of humanitarian values and humanitarian services in armed conflicts. PRCS is part of the International Federation of the Red Cross IFRC and International Committee of the Red Cross ICRC. With active support from IFRC and ICRC PRCS and its counterparts contribute towards relief shelter livelihood health water and sanitation reconstruction and capacity building activities. OCHA 2006 PRCS 2011.

POLICE DEPARTMENT

The Police Department is the first responder in all kinds of disasters in terms of maintaining law and order in emergency situations. Police Departments of respective provinces provide assistance in the rescue relief and evacuation of population from affected areas. The Police Telecommunication Unit part of the field establishment of Irrigation Department is critically important for receiving and transmitting floods data and information. During the floods season Police Telecommunication officials are appointed to strategic locations to communicate flood related data and information

through wireless/tele-printer/fax to concerned agencies and departments. The Police Emergency Services have been put in place in all provinces in selected cities to expedite police response in terms of medical services rescue and legal assistance.

PROVINCIAL IRRIGATION DEPARTMENTS PIDS

1. Prior to the establishment of the Federal Flood Commission PIDs were responsible for measures regarding flood monitoring control and mitigation and are presently the frontline organization in these matters. Current PID functions include:

- Oversee construction maintenance and repair of flood protection works
- Assist and coordinate repair of public services
- Operate gauge stations and provide information and data to concerned authorities for alerts warnings and forecast
- Survey and address damages to flood protection works
- Position requisite machinery and material at safe locations near vulnerable points
- Provide explosive material to the Army for breaching.

PROVINCIAL RELIEF COMMISSIONER

Housed within the Board of Revenue at the provincial level the Relief Commissioner is empowered to maintain order prevent check or control and provide immediate relief to the affected population within the calamity affected area. In addition the Relief Commissioner may by declaring an areas 'calamity hit' remit in part or whole any Government dues by persons or property affected by the calamity in addition to monetary compensations to victims. Calamities include floods famine earthquake hailstorm fire epidemics pest attack or any other disaster that warrants action.

SUPARCO

The Pakistan Space and Upper Atmosphere Research Commission SUPARCO carries out research and development activities in the field of space science space technology and their peaceful applications in Pakistan develops national capacities in space technology and promotes space applications for socio-economic development. Headquartered in Karachi SUPARCO maintains a number of centres and facilities including the Space Applications and Research Centre the National Centre for Remote Sensing and Geo-informatics the Satellite Research and Development Centre the Telemetry Tracking and Command Facility and the Space and Atmospheric Research Station. Over the years SUPARCO has enhanced its capabilities for disaster risk management particularly in early warning and forecasting. During the 2010 floods SUPARCO monitored the floods and facilitated flood impact assessments on different sectors OCHA 2006 SUPARCO 2011.

THE UN SYSTEM

The United Nations according to international norms and conventions are meant to assist national governments in management of humanitarian emergencies. The UN Office for the Coordination of Humanitarian Affairs OCHA takes the lead when it comes to humanitarian crises. As part of the UN Secretariat OCHA is responsible for bringing together humanitarian actors to ensure a coherent response to emergencies. OCHA mission include the mobilization and coordination of effective and principled humanitarian action in partnership with national and international actors promotion of preparedness and prevention advocacy of the rights of people in need as well as the search for sustainable solutions.

OCHA's critical role after a humanitarian emergency is to coordinate and facilitate humanitarian actors in the field in order to provide immediate life-saving assistance using pool funds managed by OCHA. The pooled funds include the Central Emergency Response Funds CERF Common Humanitarian Fund CHF and Emergency Response Funds ERF and are made available for assistance in food water medical care and shelter. They are part of voluntary contributions by 120 countries and private sector donors. Based on priorities set by humanitarian actors in the field OCHA organize

these priority needs into an appeal document for submission to member states and other potential donors for funding. Appeal documents include 'flash appeal' which is issued immediately following a disaster and 'consolidated appeal' made on an annual basis for countries with humanitarian needs.

WATER AND POWER DEVELOPMENT AUTHORITY WAPDA

The Water and Power Development Authority WAPDA part of the Ministry of Water and Power is responsible for providing flow data from the field stations controlled by WAPDA regulating discharge flows from dams and barrages protection of dams grid stations transmission lines and other installations controlled by WAPDA and maintaining statistical and hydrological data on floods. WAPDA's telemetric system is directly linked with FFD Lahore and provides hydrometric flood data WAPDA 2011. WAPDA's authority extends to managing releases from Tarbela Chashma and Mangla Reservoirs allowing them significant opportunity to manage flood peaks.

DEVOLUTION AND THE DRM AGENDA IN PAKISTAN

The 2005 Pakistan earthquake was an eye-opener in terms of highlighting the deficiencies of the existing institutional arrangements for dealing with disasters at a national scale. This led to the creation of the Earthquake Reconstruction and Rehabilitation Authority ERRA specifically mandated for reconstruction and rehabilitation of earthquake-affected areas and the National Disaster Management Authority NDMA to address comprehensive disaster management.

Prior to creation of the NDMA the Emergency Relief Cell the armed forces and the Federal Flood Commission were the main governmental agencies that responded to national disaster. Creation of a new administration led to integration issues. In response to some of these issues further structural changes continued to take place within the DRM system. Primary among these was the 18th Amendment.

Immediately following the Indus Flood 2010 NDMA took the lead in flood response. However during this response the 18th Amendment was passed and implemented. The Amendment devolved responsibility for 17 ministries from the federal government to the provincial government. This included disaster management. However this devolution was done without any planning or capacity building. Consequently from implementation of the 18th Amendment onward reconstruction was not informed or regulated by any federal disaster response agency. Nor were there monitoring or tracking systems in place; as a result assessing ex post facto what actions were taken where they were taken and what resources were devoted to their implementation is challenging to impossible.

Most of the reconstruction took place through usual development channels at the provincial and national level depending on the size of intervention. For expediency reconstruction was primarily done on the basis of pre-approved project documents. This was particularly true to primary transportation infrastructure. By relying on pre-approved project documents reconstruction expense and time was minimized. However the risks and vulnerabilities inherent to the original systems were maintained.

Since the initial reconstruction judicial order has been given to review major infrastructure including roads bridges embankments and irrigation canals to assess their strength in floods and the role they play exacerbating floods and/or disrupting national drainage. In conjunction with this a systemic review of standards and guidelines for infrastructure improvement is being undertaken with the goal of identifying vulnerabilities and making recommendations for future infrastructure design.

META-ANALYSIS OF PEER-REVIEWED LITERATURE

A meta-analysis of the published academic literature assessing the 2010 flood was undertaken to understand what questions were being asked and studied about the floods where issues affecting resilience and vulnerability have been identified and where gaps remain. The analysis focused on six key variables where these variables had been studied in the literature and what gaps or additional indicators vital to broader topics of resilience and vulnerability had been identified.

METHODOLOGY

The six key variables used for the analysis were:

- Approaches and policies to manage flood hazards
- The role of different stakeholders in formulating and implementing these approaches and policies
- Adaptation studies
- Climate change
- Early recovery
- Reconstruction and rehabilitation.

These six variables were used to search academic databases including ABI inform Academic Search Complete Greenfile and E-Journals. Search results were limited to Pakistan for the years 2000 onwards. This initial search produced 0-28 results for each variable from ABI inform; other databases provided anywhere from 0-535 results. Results were further filtered to exclude 2005 earthquake papers and general historical papers. Documents selected were solely from academic journals were initially coded to identify key areas of concern and were further examined using cross tabulation. The resultant tables and charts are presented below.

A total of 20 articles were assessed. A large number of them overlapped between variables which explains why the percentage total in the table below exceeds 100%. However this was a useful way of calculating the proportions.

TABLE 4: CATEGORIES AND COUNTS OF ARTICLES USED IN THE META-ANALYSIS

	Total Articles	Percentage
Approaches and policies to manage flood hazard	11	58%
Role of different stakeholders	7	37%
Adaptation studies	7	37%
Climate change	10	53%
Early recovery	6	32%
Reconstruction and rehabilitation	5	26%

Articles were cross-tabulation between our six key variables independent and twenty-six areas of concern dependent.

RESULTS AND ANALYSIS

In Table 5 below independent variables are presented in the columns dependent variables in the rows. Again overlap between the independent variables explains why the percentage totals are in excess of a hundred percent. To illustrate 9% of the 11 articles dealing with approaches and policies to mange flood hazard dealt with biodiversity.

TABLE 5: DISTRIBUTION OF ARTICLES USED IN THE META-ANALYSIS

		INDEPENDENT VARIABLE						
		11	7	7	10	6	5	
	DEPENDENT VARIABLE	Biodiversity	Roles of different stakeholders	Adaptation studies	Climate change	Early recovery	Reconstruction and Rehabilitation	% Totals
DEPENDENT VARIABLE	Biodiversity	9%	29%	14%	20%	17%	20%	109%
	Demand management vs. supply augmentation	9%	14%	29%	30%	0%	0%	82%
	Open basin vs. closed basin management	27%	14%	29%	20%	17%	20%	127%
	Lack of security and 'faith'	45%	71%	29%	30%	83%	100%	359%
	Gender	27%	29%	57%	20%	17%	40%	190%
	Ecological systems	64%	71%	43%	70%	67%	60%	375%
	Vulnerability	73%	86%	100%	70%	83%	80%	492%
	Mitigation	55%	71%	71%	70%	50%	60%	377%
	Communication	45%	71%	43%	40%	67%	60%	326%
	Info-sharing	55%	86%	43%	50%	50%	60%	343%
	Enabling activities	45%	57%	71%	50%	50%	60%	334%
	Damages	64%	71%	71%	50%	100%	100%	456%
	Minority groups	36%	57%	57%	40%	67%	80%	337%
	Provincial divide	18%	29%	29%	40%	33%	40%	189%
	Children	27%	29%	29%	10%	33%	20%	148%
	Health	55%	71%	43%	30%	67%	80%	345%
	Social dynamics	45%	57%	71%	40%	50%	80%	344%
	Food security	36%	57%	43%	50%	67%	60%	313%
	Socio-economic	36%	57%	57%	40%	50%	80%	321%
	Technology	55%	43%	29%	50%	33%	40%	249%
	Quantitative	36%	14%	14%	20%	0%	20%	105%
	State of flood infrastructure	27%	14%	14%	10%	17%	20%	103%
	Roads and bridges	9%	14%	0%	10%	17%	20%	70%
	Transboundary	9%	14%	14%	10%	0%	0%	48%
	Glaciers	9%	0%	0%	0%	0%	0%	9%
	IRBM	36%	43%	29%	20%	33%	20%	181%

FIGURE 2: GRAPHICAL REPRESENTATION OF TOPICAL DISTRIBUTION OF ARTICLES

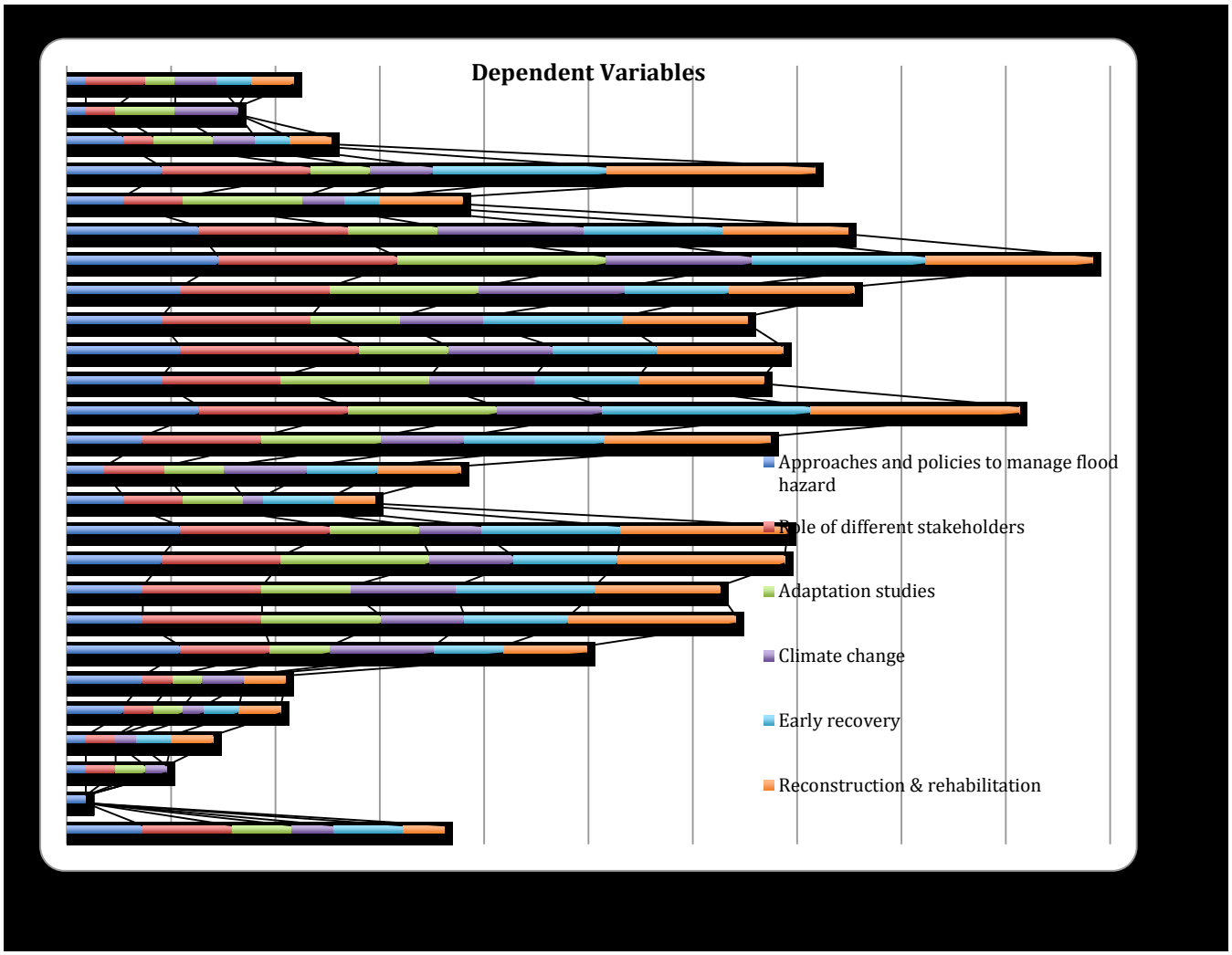


Figure 2 visually represents the table above. As can be seen 'vulnerability' has been identified in most of the literature followed by 'damages' 'ecological systems' and 'lack of security and faith'. Areas with the least coverage were 'glaciers' 'transboundary' issues 'roads and bridges' and 'demand management vs. supply augmentation' approaches in that order.

Though vulnerability ranked quite high in our analysis it is imperative to point out that in the majority of articles the term was treated as a 'buzz word' rather than a concept in need of elaboration and context specific analysis. No attempts were made to understand the underlying conditions or ways to decrease vulnerability of the population affected or ways in which it can be a barrier in trying to implement broader measures of adaptation. Under the 'Climate Agenda' the UNEP has identified the inclusion of "Climate Impact Assessments and Response strategies" as vital in efforts to reduce vulnerability Usher 2000. Such suggestions have yet to be incorporated into the decision making and planning processes of Pakistan. Theoretical studies have received momentum however as Adger 2001 identifies an 'emerging research agenda focused on identifying generic determinants of resilience'.

Gilbert White in developing a human ecology approach emphasizes "the role of scientific knowledge the need for understanding perceptions and behavior with regard to resources and hazards and the ultimate expansion of the range of choice open to individuals communities and societies in their resource management decision" Mustafa 2002. This highlights the critical need to develop an

understanding of the individual's view of vulnerability and adaptation by assessing their perceptions regarding their current conditions and how these can be altered in order to increase their resilience.

Definitions of vulnerability as found in the literature review include:

> "…a socially constructed phenomenon influenced by institution and economic dynamics. The vulnerability of a system to climate change is determined by its exposure by its physical setting and sensitivity and by its ability and opportunity to adapt to change". Adger Huq Brown Conway and Hulme 2003

Mustafa 2005 cites Dow 1992 and Cutter 1996 when defining vulnerability:

> "…as the susceptibility of hazard victims to suffer damage from extreme events and their relative inability to recover from those events on account of their social positionality". Mustafa 2005

Though ecological systems ranked quite high this is because a lot of the articles examined weather to explain the occurrence of the 2010 floods. There was an absence of analysis however in regards to effects on ecological systems when talking about mitigation and management strategies climate change or even the socio economic implications of the flood. This is surprising since most of the affected populations belong to rural areas and therefore depend heavily on ecological systems and the services they provide. The role of ecosystems should not be ignored when trying to understand the slow recovery of the populace or when trying to assess the effect mitigation or adaptive measures will have on resilience enhancement of those affected.

Lack of security and faith were dominant issues when talking about reconstruction and rehabilitation and early recovery. Due to the involvement of Muslim charity groups especially those funded by extremist organizations there was a lot of debate regarding the origins of the donations and where they were disseminated. There were instances where aid agencies were hesitant to act due to ongoing efforts by these groups in areas. In other countries one of the reasons for the slow relief response was the need to respond to the perceptions of their citizens; Pakistan as a country harboring terrorism vs. a country in need of funds and goods for aid. This was exacerbated by the political and institutional organization of Pakistan. After the experience of the 2005 earthquake and given the reputation of the existing governing regime both national and international donors were hesitant to coordinate and contribute towards the government's efforts to provide relief recovery or rehabilitation.

Glaciers received the least amount of coverage in the analysis surprisingly even though climate change was one of our key variables. The pressing issue of rising temperature increased glacial melt and associated increased flows and the role this might have played in contributing to current or future flooding was virtually missing from all of the articles. uture efforts towards adaptation will have to bear this in mind while analyzing climate change projections and understanding the effects on snow cover and glacial melt.

Trans-boundary issues and roads and bridges also received minimal coverage. Trans-boundary issues are a very controversial topic in Pakistan. This area needs to be explored to understand if vulnerabilities are being transferred across boundaries by the manipulation of the Indus River system. The efficiencies of the Indus Water Treaty governance and decision making process should also be assessed to understand the reasoning behind the decisions. Roads and bridges are a core element related to vulnerability and were neglected in the articles. This neglect was surprising given that these infrastructures can be the primary route of escape and/or the cause of hazard during flood disasters.

Lastly when looking at articles dealing with adaptation studies and climate change the issue of demand management vs. supply augmentation was not adequately covered. Most of the publications dealt with approaches characterized by supply augmentation rather than trying to promote and adopt demand management practices vital for ensuring the sustainable and equitable use of the natural resource.

DISCUSSION

The inclusion of local knowledge in mitigation and adaptation strategies at the national level is clearly missing in the literature. Mustafa 2002 highlights this by commenting: "it is quite remarkable that the political ecologists who have been concerned with highlighting ordinary people's knowledge and their struggles for equity and justice have not drawn upon the perception studies tradition's strength in systematically highlighting local knowledge". It is now well recognized in research and through experience of implementing agencies that unless strategies incorporate the voice of the community and relay to them a sense of ownership by having them involved in the formulation stage it is very likely that these measures will not lead to success.

Forecasting climatic events may have come a long way in the past decades. However this requires knowledge technology and relevant expertise which currently seem to be beyond the capacity of Pakistan. In particular the study of seasonality which traditionally uses a linear analysis needs to be modified if we are to be able to predict future events. To this end Hassan and Ansari 2010 present a nonlinear model for analysis.

The contribution of natural systems in mitigating the damages caused by floods needs to be recognized more actively. The destruction of wetlands and the rate of deforestation will be detrimental to livelihoods and livelihood diversification strategies of communities that are already vulnerable and are heavily reliant on their environment for the ecosystem services it provides. Apart from acting as carbon sinks some species also have the ability to retain water and thereby provide soil moisture in times of drought. Deforestation can also have an impact on man made infrastructure. Pakistan has been experiencing a deforestation rate of 4% per year and the increased soil erosion has led to a further reduction in the storage capacity of reservoirs Faruqui 2004.

Finally with respect to flood mitigation the mainstream view is focused on large-scale water reservoir projects. Though providing numerous benefits this tends to ignore related issues for example the displacement of numerous already vulnerable people the damage to biodiversity decreased environmental flows contribution to climate change through carbon dioxide emissions a lack of maintenance and operating systems and most importantly lack of monitoring maintenance and enforcement of floodplains which are encroached and built upon without regard to laws and safety. These are the areas that constitute the crux of the damages incurred in the past. Vulnerability and risk will be perpetuated if they are left unmitigated in the future.

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GREY LITERATURE REVIEW

INTRODUCTION

A review of the grey literature was undertaken to map the actors involved in the Indus Flood 2010 relief recovery and reconstruction and to identify strengths and weaknesses of the on-the-ground disaster response flood management and recovery. Sources for this analysis were mainly secondary: governmental non-governmental agency and donor organizations progress reports and assessments popular print media online data and information participatory dialogues interviews and bi-lateral discussions. In particular the print media was useful for tracking how the discourse around the floods was being framed and for identifying where formal inquiries and reviews were being held.

Based on initial findings ISET prepared a list of core findings which were shared with and agreed to by key stakeholders at a Lessons Sharing Session in January 2013.

METHODOLOGY

Reviewed literature included:

- All reports and evaluations available in the governmental and non-governmental sectors concerning the 2010 floods;
- All real-time evaluations and assessments available from the UN system and donors;
- All newspaper and magazine articles printed in the mainstream Pakistan print media concerning flood management and disaster response.

ISET reviewed all materials published between the flood onset and December 2012 and identified core issues for further exploration.

Identified core issues were further analyzed via literature review interviews and shared learning dialogues. Where warranted particularly for highly controversial issues bi-lateral meetings were held with the relevant agencies and departments to refine our understanding and come to initial agreement with the agency and department leadership about gaps and weaknesses.

Based on the above evaluation and analysis a set of 29 core findings were documented. A Lessons Sharing Workshop assembled all key stakeholders to discuss and agree to the findings.

RESULTS

The primary result of the grey-literature review was obtaining broad stakeholder agreement to the list of core findings shared at a Results Sharing Session in January 2013. The session agenda press release and list of core findings are provided in Appendices A B and C respectively.

The remainder of this report section summarizes information from the grey literature review that led to the core findings. The majority of these findings pertain to planned response relief and reconstruction. In many cases due to lack of coordinated monitoring it is impossible to determine to what extend these plans have been implemented.

IMMEDIATE FLOOD IMPACTS

> "The people affected by the floods were the first responders to the disaster helping themselves and each other to overcome the floods. Communities supported each other as they could providing shelter water and food regardless of their own difficulties and challenges the UN observed. The displaced families sought refuge in places such as roadside public buildings or wherever they could find dry land or shelter. In the early days of the response many thousands of people including men women children had no choice but to go without food or water or to increase their debts in order to feed and protect their families". UN 2011

The impacts of the Indus Floods 2010 were widespread and devastating. At least 1.6 million families with damaged or destroyed homes took refuge in schools public buildings camps with host families and in spontaneous settlements such as roadsides. The displaced families in all four provinces reported loss of documents such as identity cards property documents and birth/death certificates. The floods devastated agriculture the primary means of livelihood for rural population. Around 2.4 million hectares of cultivable land including standing crops including rice maize sugarcane cotton and vegetables were severely damaged. In addition an estimated 400000 small and larger animals were killed and about 6 million poultry were washed away. Those with diversified livelihoods were not immune however. Over 50 percent of the people engaged in non-agriculture livelihood reportedly lost their businesses or employment UN-One year onward.

The World Food Programme's initial vulnerability assessment identified more than 10 million people as 'extremely vulnerable' and in need of urgent assistance. A subsequent survey identified over 8 million people as in urgent need of healthcare food and safe water. In some instances however a number of communities familiar with responding to both man-made and natural disasters were proactive in responding to the flood risk. Likewise those communities who participated in community based disaster preparedness initiatives had experience identifying risks and were proactive in protecting their families by moving to safer areas.

The Multi-Cluster Rapid Assessment Mechanism McRAM carried out in mid-September 2010 provided a clearer pictures in terms of extent and diversity of the relief and recovery needs. Based on the McRAM over 8 million were identified as in urgent need of healthcare. 236 health facilities were damaged 200 more destroyed and thousands of healthcare workers were directly affected by the floods. Destruction of sanitation infrastructures and lack of safe drinking water caused serious health problems including acute diarrhea sickness skin problems and infections particularly among women and children. The nutritional situation was also of extreme concern for women and children; about 15% of women reportedly had stopped breastfeeding after the floods. Severe acute malnutrition among children of 6-59 months was at 9%.

The UN made an initial appeal on 11 August 2010 seeking US$ 459 million. A revised appeal the Pakistan Floods Emergency Relief and Early Recovery Response Plan was launched on 5 November 2010 seeking assistance to the tune of US$ 1.96 billion. The appeal contained a total of 397 projects prepared in line with Government priorities and approved by the NDMA. The revised appeal was meant to finance 139 projects worth US$ 928 million relating to relief 224 projects for early recovery worth US$ 956 million and 34 combined projects for relief and early recovery worth US$ 53 million. The projects under the revised appeal were to be implemented by UN agencies and national and international organizations. Funding made available under the revised appeal was not intended to be routed through the government channels OCHA 2011.

Rescue and relief operations were extended through January 2011 with residual relief in selected districts of Sindh and Balochistan continuing until March 2011. Early Recovery began in September 2010 alongside relief operations and was expected to be completed by December 2011. Initiation of reconstruction and rehabilitation was planned to start January 2011 and to continue for 3-5 years. NDMA 2011 PRERRP 2010.

Initial Relief and Rescue

The government of Pakistan launched the rescue and relief operations led by the NDMA at the federal level and PDMAs at the provincial level supported by relevant agencies. The armed forces were called in on 30 July 2010 and launched the biggest relief and rescue operations in history. Over 20000 army troops including medical teams were called. Around 2500 international troops were also deployed upon the request of GoP DNA 2010. Over the course of the crisis the military was reported to have rescued over 1.4 million people and using around 60 helicopters and over 1200 boats across the country. The evacuations and relocations significantly reduced the number of potential fatalities from the floods particularly in the most remote areas. The military response in the early period also included the distribution of essential items such as food and water and provision of health services

for a reported 4.7 million people. Given the extreme and exceptional circumstances the military also participated in setting up camps for displaced people collaborating with national and local provincial and national authorities which coordinated with the UN and humanitarian agencies in supporting people urgently in need of assistance UN 2011.

With OCHA leading the UN rolled out its cluster system to assist the GoP in relief and recovery where floodwater had receded. Some communities had already started to rebuild their homes and community infrastructure. Altogether 11 clusters were formed for relief and response activities. The clusters included: agriculture camp coordination and management community infrastructure restoration education food health nutrition protection shelter and NFIs WASH and logistics.

Relief support both in cash and kind was received from friendly countries donor agencies national and international NGOs financial institutions private sector philanthropists and civil society organizations. Operations Groups for strategic decision making comprised of all major stakeholders were formed at the federal level and provincial levels for smooth implementation of relief operations. Relief support was provided in four main sectors including Food Shelter Health and WASH water sanitation and hygiene.

During the peak of the flooding 5928 relief camps were established within the country. As of 31 December 2010 97% of the internally displaced persons IDPs had returned to their homes NDMA 2010. IDPs whose houses were still inundated experienced secondary displacement particularly those who were relocated in vacant schools and public buildings. Towards the end of 2010 50 camps were operational in Sindh hosting around 102000 people 44 in Balochistan sheltering some 24000 people and 15 spontaneous camps in KPK hosting 12000 people. At the time though floodwater had receded large tracts of both Sindh and Balochistan remained under 3-4 feet of standing water. One year on no official camps existed. A few unofficial camps remained where residents had been reluctant to return due to land-disputes UN-One year on.

Direct Aid

Citizen Damage Compensation Programme

One component of immediate relief was cash assistance. The Citizen Damage Compensation Programme CDCP was launched in September 2010 by the Government of Pakistan to provide cash grants to 1.6 million flood affected households. This first phase of the CDCP known as Watan Card Project provided cash grants of Rs20000 US$230 to families in flood affected areas. In most provinces provincial authorities identified flood-affected areas and NADRA using its database of CNICs extracted a list of Heads of Families from those notified areas. In Khyber Pakhtunkhwa KP Azad Jammu & Kashmir AJK and Gilgit Baltistan GB a house damage survey was carried out to identify needy people NDMA 2010 UNHCR 2010. The CDCP was not the first cash transfer programme to be implemented after a major disaster in Pakistan; similar programmes were launched in the Kashmir earthquake 2005 and during conflict induced displacement in Khyber-Pakhtunkhwa in 2009 UNHCR 2011

NADRA was entrusted with the lead role in processing and registering cases to determine eligibility for cash compensation. The NDMA the Ministry of Social Welfare UNHCR and respective provincial authorities acting through the Provincial Disaster Management Authorities PDMAs provided necessary support. To provide efficient and transparent delivery of cash assistance measures ensuring grievance redressal were taken.

Money was disbursed through the issuance of Watan Cards debit cards. According to NADRA eligibility criteria any citizen of Pakistan registered in the NADRA database as head of family and residing in the government notified flood affected areas was eligible to benefit from the CDCP. Refugees stateless and other immigrants could not receive compensation. 124 centres were established to disburse the cash assistance. According to NADRA by March 2011 Rs28 billion had been disbursed and by June 2011 99% of the affected families had received Watan Cards NADRA 2011.

Of the registered respondents between September and December 2010 92% were male heads of families or their representatives. Only 8% registrants were women. Women are rarely registered as heads of families on their CNIC even though they are de jure heads and were therefore not eligible for aid. Un-accompanied/separated minors and child-headed households were similarly excluded from receiving cash assistance because CNIC is issued only to Pakistani nationals of 18 years or above. Therefore child-headed households were ineligible despite the common practice of early marriages across Pakistan particularly in rural areas. A total of 72177 un-accompanied and separated children were reported from flood-affected areas.

Other major findings of the UNHCR report prepared in collaboration with Protection Cluster Group are as follows:

- Overall the information campaign on Watan Cards was not sufficient. Many communities and individuals were unsure of how to access the cash assistance the eligibility criteria the grievance procedure and were therefore at risk of missing out on assistance being exploited or excluded.
- Some flood-affected villages were not included in the list provided by the revenue department and processes for identifying flood-affected villages were not systematic or transparent.
- The cost and inconvenience of travel impacted many families' ability to access registration centres.
- Allegations of extortion and corruption added extra obstacles to accessing registration. Access to registration was not facilitated for women and persons with special needs.
- There was an unequal access to CNIC registration and access for women and children. Female-headed household were at particular risk of exclusion from Watan Card Scheme.

Overall the CDCP was considered an effective cash transfer mechanism. Given its success it was retained for a second phase. However based on lesson learned in phase I comprehensive procedures and specific responsibilities were put in place WB 2011.

An Aurat Foundation AF study found that a total of 123311 women headed households were acknowledged and supported by the Watan Card scheme. These female-headed households became a distinct category for relief and rehabilitation workers and agencies and are recognized in almost all government and non-government initiatives. The study further notes that "the Watan Cards offer practical and critical assistance but are also strategically creating inroads towards significant change- that of creating claims and entitlements" AF 2011.

AGRICULTURE AND LIVESTOCK PACKAGE

Given the scale of destruction to standing crops and loss of livestock the government along with the UN INGOs NGOs and the donor community launched an emergency assistance to vulnerable farmers in flood-affected areas. 2.1 million hectares of standing crops were destroyed and 1.5 million livestock killed while millions of animals faced acute shortage of fodder. Agriculture input assistance was meant to enable vulnerable affected farmers to cultivate winter crops. In kind support of certified seeds and fertilizers was provided to small affected farmers with holding of 12.5 acres. Over 768000 households benefited from the support. Animal compound feed was distributed to more than 320000 affected households NDMA 2011.

However effectiveness of planned assistance was compromised by poor implementation and information dissemination. Eligibility and entitlements were inadequately publicized many farmers complained about the poor quality of the wheat seeds and inefficiency in distribution resulted in farmers having to pay a number of visits to collect inputs from distant centres Pattan 2011.

EVALUATION OF RESPONSE

The enormity of the floods coupled with the large number of vulnerable people exceeded the capacity of any single actor in the humanitarian community. Post flood reports of various humanitarian organizations reflect general dissatisfaction with the way the government responded to the slow moving catastrophe. National and international press is replete with reports regarding mismanagement and gaps in flood disaster response. The UN admitted that given the magnitude – 18 million affected vast geographical area scattered locations and varying densities – the capacity of the UN and other humanitarian organizations was severely tested. Massive damage to infrastructure including roads bridges and storage facilities greatly impeded the mobilization of relief and aid workers to affected areas. As a result relief imbalances were significant UNHCR 2011 particularly in the southern provinces UN 2011.These factors impacted the timeliness of response and meant that some flood-affected people did not receive support until months after the floods by which time it was not necessarily relevant UN 2011.

Oxfam attributed deficiencies of response to an inadequate disaster management system and lack of emergency relief coordination and leadership. Despite the efforts of many hard-working government and aid agency personnel the response to the 2010 floods was weakly coordinated and poorly prioritized. Oxfam recommendations include resolution of institutional challenge and heavy investment in DRR in addition to addressing social inequalities that leave people vulnerable to disasters Oxfam 2011.

The Federal Flood Inquiry Commission observed that the NDMA's lead role in coordination of rescue and relief phases during and after the floods to save life if not the property was outstanding by any standard. But it did not put in position pre-disaster structural framework or administrative network mandated in the Ordinance.

Nonetheless much was achieved by Pakistani officials civil society organizations the international aid community private and institutional donors armed forces and private individuals in minimizing the loss of lives providing food water shelter and cash assistance and preventing major outbreak of diseases. However the prevailing volatile socio-political environmental and pressing economic situation in Pakistan have increased challenges of responding to future disasters of this scale NDMA 2010.

PAKISTAN AFFECTEES SURVEY

To record how flood affected people viewed the flood response the Oxfam commissioned the Pakistan Affectees Survey in early 2011. Apart from recording affectees priorities for early recovery and reconstruction 2040 respondents across Pakistan were also asked about the their experience of flood relief efforts by the government of Pakistan Pakistan armed forces foreign governments national and international organizations as well as informal help from friends relatives and society at large. Table 6 illustrates how satisfied respondents were with the flood relief efforts of the Pakistan government foreign governments and international aid organizations.

TABLE 6: LEVEL OF SATISFACTION WITH FLOOD RESPONSE

	Government of Pakistan	Foreign governments	International aid organizations
Extremely unsatisfied	11	6	5
Unsatisfied	42	27	22
Satisfied	36	49	52
Extremely satisfied	6	12	14
Don't know	5	6	8

NDMA Flood Response Review

This general dissatisfaction with government response was further explored by the NDMA in January 2010. The NDMA carried out a review of response to 2010 floods with reference to the UN and other agencies including national and international partners. The review was based on the Flood Relief and Early Recovery Response Plan. The review not only analyzed the gaps in the response but also identified disconnects between the Government of Pakistan the UN and the donors. Nine key issues emerged from the review:

1. Relationship of UN and Government: UN agencies felt more accountable to donors than to the Government and Government agencies although funds were raised in the name of the country and should be effectively spent and reported in that country. According to the NDMA fissures probably developed in these relationships because of systemic weaknesses within the UN system its limited accountability to Government and weak monitoring reporting and communication arrangements although many forums were put in place to facilitate discussion.

2. District Level and Provincial Level Focus: Mechanisms to assess the needs and gaps at the district level in a coordinated manner were lacking. The unavailability of information management systems both within the UN and the district DDMAs led to multiple Damage and Needs' figures and assessments. As a result there are many districts that have been only partially covered and others where there was duplication. The NDMA recommended that for early recovery and reconstruction coordination efforts at the district level need to be strengthened.

3. Damage Assessments: Different agencies and clusters carried out different assessments without sharing their methodology with the NDMA. It was recommended that any future assessments should be coordinated by UNOCHA and MCRAM the leading agencies agreeing on the basics with NDMA. Similarly given the sensitivities involved the use of GIS and remote sensing survey activities should be coordinated by OCHA with NDMA.

4. Strategic Approach: Cluster meetings were acknowledged as a good forum for coordination and information sharing. However not all clusters were strategic in the manner in which issues were brought up and discussed. The membership needs to include the Government to ensure ownership.

5. Monitoring & Evaluation: Monitoring and reporting systems are inadequate and need to be addressed urgently. The Single Reporting Format a self-reporting online system should be finalized and rolled out as soon as possible in partnership with the key stakeholders. The system should be tested to assess if it can deliver the promised outputs its utility in producing a consolidated database for all clusters and how this can help to identify gaps and assist in targeting of the relief and early recovery efforts.

6. Financial Tracking: The UN system has been slow to respond to the Government's request for provision of expenditure reports by cluster agency and province. Reports did not contain information on the agency overhead costs delivery costs and the proportion of funds received by the target beneficiaries. The NDMA directed that for future operations meaningful and complete information on the use of funds and the indicators should be provided to facilitate analysis of their use.

7. Performance Assessment: To maintain transparency and accountability the NDMA recommended the performance of UN Agencies be reviewed in terms of value for money cost-effectiveness and efficiency with reference to response and early recovery. Each UN partner should present unit costs to deliver key services per beneficiary. Indicators of cost-effectiveness should be included where appropriate and third party auditors asked to verify these. This information should be compared with other countries where emergency response of a similar nature has been provided. This should be a standard practice for UN agencies and the information generated should be used to promote greater transparency and accountability. In the long run measures of this nature could be used to enhance the credibility and reputation of the UN system and build greater trust in the Government's ability to effectively manage utilize and monitor emergency donor assistance.

8. Targeting: Targeting of emergency assistance will become an increasing challenge as displaced populations return to their places of origin. Planning for providing services in the places of origin needs to focus on implementation and scaling-up of activities in areas where more service providers are needed. Gender and vulnerability targeting will have to be thought through separately and the role of the Watan Card criteria developed and coordinated.

9. Gender Aspects: UN Agencies need to provide an assessment of how well they have been able to meet their gender mandate. This is particularly important given the weakness of response efforts to address the special needs of women. Gender disaggregated data should be provided to show the proportion of women included in direct assistance within each cluster and the special strategies adopted to make assistance more gender sensitive. Lessons from this experience can help inform NDMA's protection strategy during disaster management. The UN Women can take a lead role in this together with all the other cluster leads.

INTER-AGENCY REAL TIME EVALUATION

The Inter Agency-Real Time Evaluation RTE of the International Humanitarian Community's response to the 2010 floods Crisis was carried out towards the end of relief phase commissioned by the Inter-agency Standing Committee IASC and funded by OCHA. The RTE was meant to assess response to date and provide real time feedback and input into ongoing decision making to enable the adoption of corrective actions as needed and demonstrate a visible capacity to learn lessons for the humanitarian system as a whole. The RTE while acknowledging the overall response as primarily positive made a number of specific observations.

Funding

The Initial Response Plan appeal of US$ 0.5 billion launched by the OCHA in August 2010 received a swift response. 67% of the funds were obtained by August and 90% by 15 September 2010 respectively. A revised appeal of US$ 2 billion to fund the Pakistan Floods Emergency Response Plan PFERP was launched in September 2010. However the Government of Pakistan did not endorse the appeal because of disagreement between the GoP and the UN over the scope of the Plan. At the same time a second stand-alone appeal was launched the Pakistan Humanitarian Response Plan PHRP for flood affectees and IDPs from terrorist affected areas leading to Government concern that too many appeals could portray Pakistan as a failed state. The Government finally endorsed a revised Plan in November 2010 entitled Pakistan Floods Relief and Early Recovery Response Plan PFRERRP. By the time it was launched however the data on which it was based was out-of-date need had shifted and many relief activities had already been concluded. Additionally evaluators noted that cluster lead agencies had to dedicate too much effort to the appeal process taking focus away from the actual response.

OFDA Overseas Fund for Disaster Assistance the largest donor to the 2010 floods was generally praised for allowing modifications to existing grants and providing room for flexibility to adapt programmes to changing needs. OFDA also created various funding mechanisms to facilitate organizations' response. In contrast DFID had cumbersome procedures for approval of funding for new partners though funding was more streamlined for long-term DFID partners. ECHO European Commission for Humanitarian Aid made funding available to organizations weeks after the floods though some humanitarian actors were of the view that the ECHO funding was slow. Overall key donors opted to contribute to the UN response plan rather than the GoP response fund due to concerns about past lack of transparency in disbursements and a track record of corruption. The RTE recommended that OCHA build capacity of implementing partners to ensure they can effectively access funding.

With reference to funding accountability the RTE found that the UN is not always perceived as accountable for resources spending and some UN agencies did not manage to spend the large amounts of funding received. Some donors questioned high UN transaction cost where funding is routed through multiple implementing partners.

Assessment

Several joint assessments were carried out in the wake of floods in order to have comprehensive understanding of the needs of affected populations including the Multi-Cluster Rapid Assessment Mechanism MACRAM for assessing humanitarian needs the Early Recovery Needs Assessment ERNA for recovery needs and the Damage and Needs Assessment that looked at reconstruction needs. However linkages between assessments were missing as was joint programming around the assessments. The humanitarian partners were unable to jointly prioritize interventions owing to multiple single agency assessments and lack of common formats and criteria for needs. Similarly the early recovery assessment was delayed by months an dthe process had inherent problems with data consolidation and prioritization of area and needs. The RTE concluded "Without compatible information relief and early recovery activities are more likely to be provided in an un-coordinated manner based on organizational priorities and assumptions of what the affected population needs.

Response

Although most of the flood response coordination was led by NDMA and the PDMAs apparently unresolved divisions of labour between national institutions hindered smooth cooperation between the Government of Pakistan and the UN. The UN performance during the initial stages did not foster smooth collaboration either. The Government lobbied to limiting flood response to four key clusters arguing that it would allow for more focused rapid response. The UN favoured a 'traditional set up' through 11 clusters too allow for a more inclusive and all encompassing scope. The RTE found that while all clusters independently contributed to ease sufferings of the affected population the large cluster set up was too cumbersome and took away focus from the response. This was exacerbated by lack of leadership both within the humanitarian community and the UN clusters. As a result strategic prioritization often served agency interests rather sector priorities there was limited availability and reporting on sex and age disaggregated data and the humanitarian community did not take stock of lessons learned from prior evaluations.

This led to poor response prioritization from the start. The selection of beneficiaries was at times not done independently but was subordinated to political interference. Targeting was particularly weak as there was no systematic registration or verification process. As a result unknown quantities of assistance reportedly reached those who were less vulnerable close to feudal lords or connected through certain political affiliations. Many people from ethnic tribal and most vulnerable groups such as widows or female-headed households were not prioritized and were therefore deprived of assistance. Those who took refuge in organized camps were better assisted than those in spontaneous camps while those in host families received limited assistance. The sheer scope of the disaster however made it difficult to apply internationally agreed standards SPHERE.

Bund Breaching

Detailed SOPs outlining responsibilities and conditions exist for breaching flood protection works to preserve life and property. Deliberate breaching is implemented during extraordinary high floods when flood waters threaten to destroy major infrastructure such as barrage or a city. The breach is conducted upstream to release water in ways that impact strategically less important areas and reduce pressure on the remaining embankment. Designating breach points and areas to be inundated is part of flood preparedness. The army is responsible for placing explosives at these points so that they are prepared to carry out breaching when needed. Actual implementation of breaching in terms of who decides breaching must be done how it will be implemented and which areas will be sacrificed however is a political decision wherein political elites carry weight Semple 2003.

Not surprisingly then opinion following the 2010 floods was that breaches were carried out under political duress to save lands of local influentials and politicians. Numerous news-reports were published on the issue noting that most of the breaches were carried out to save lands of politicians and local elites in connivance with the irrigation officials. In response to mass media reports the Supreme Court constituted a commission to enquire into the matter. In Sindh and Punjab the High Courts in the respective provinces constituted their own commissions.

Given the widespread destruction it caused in many districts the Tori embankment breach was the most important in terms of establishing the facts and determining the culprits. The Commission's finding as opposed to popular notion that breaching on Tori was meant to save the land of influentials was that provincial Irrigation Department's officials including the Chief Engineer the Supervisor and the Secretary Irrigation were responsible for the breach primarily due to negligence and not following the 'Bund Manual' official Manual to manage floods and embankments breaches to upkeep the embankments prior to monsoon and carry out breaches in accordance with the provisions in the Manual. In Punjab the Punjab Judicial Commission's findings attributed breaches to poor governance and poor maintenance of barrages and embankments by the Irrigation Department. The popular notion that the breaches were conducted under political duress could not be substantiated through the evidences and written records.

Overall the Flood Inquiry Commission found that a host of factors & reasons contributed to the breaches including poor pre-flood maintenance existence of private bunds in the river belt non-observance of barrage gate regulations at critical hours use of incompatible quality of material for rehabilitation conceptual and design issues and complacency.

Major highways/motorways constructed by the Irrigation Departments the National Highway Authority NHA and others across the country exacerbated the situation by damming floodwater. The Commission observed that motorways act like bunds obstructing the natural course of water flow. The Commission on this specific issue recommends "it is imperative for National Highway Authority NHA and Federal Flood Commission FFC to carry out a joint survey and study of all its road network in the country to identify areas of possible flooding as a result of obstruction caused by these roads and take remedial measures for provision of designed escape channels to ease the pressure of flood at various potential locations" Flood Commission 2010

Rebuilding Risk

During the 2010 flood the Peshawar-Islamabad Motorway M-1 acted like a dam. Narrow culverts designed to allow water to drain beneath the road were unable to discharge the huge amounts of floodwater and got choked. With the water continuing to rise and destroy villages and standing crops the NHA had to finally breach a portion of the motorway for disposal of floodwater. This worked and brought relief to the area but traffic remained suspended for many days. The breached section was reconstructed as it is disregarding the flood risk the current design creates. SLD at Agra Charsadda 2011

The Flood Commission issued several particularly relevant recommendations based on their assessment. The Commission recommended the Irrigation Department become more professional dynamic and holistic observing that:

> "Floods cannot be contained by artificial structures. Floods are to be considered as a natural bounty that brings agricultural fecundity and economic prosperity. They recharge the aquifers and enrich the soil. Flood Control is therefore a misnomer. Flood resilience flood mitigation flood risk assessment and management are the terms of the day - leading to an Integrated and holistic Flood Management Plan – which is the way ahead".

Secondly the Commission observed that federal and provincial entities lacked an integrated policy to manage floods:

> "To our dismay we found out that since independence I & P Department Federal Flood Commission FFC or the Planning Commission have not developed an Integrated Flood Management Plan for the country. FFC's National Flood Protection Plans I II and III give a robust prefatory start but no more. These Plans are a huge misnomer- they are actually a compendium of flood schemes which are the brain-child of the zonal irrigation chiefs and the local politicians. FFC has not injected any

> vision or drawn up a Plan of its own for the country – this is against its grain and the legal mandate it enjoys. FFC has therefore been a disappointment".

Finally with respect to climate change the Commission noted:

> "I & P Department being the lead provincial department dealing with fresh water has little to show in the area of research and development in the context of floods at least- We were surprised to note that the I & P Department had not factored in climate change or climate variability in the flood fighting strategy or in their future water management strategy. Similarly PMD and FFD being the principal weather and flood forecasters displayed blunted alertness and rusted alacrity in reading the weather. At a deeper level PMD and FFD have no cutting edge research on monsoons or climate change and seem to make little of the changing weather patterns in the country. We found our flood guardians off guard."

Private Bunds

The issues of illegal encroachment into pond areas and floodplain often protected by private embankments also came up during the Commissions' proceedings. Most of the Indus flood plain and pond areas of barrages have been encroached for farming raising human settlements and villages. For example most the pond area of Taunsa barrage originally comprising over 13168 Acres has been encroached largely by the local influentials and is being used for illegal farming. Private bunds embankments have been raised in the encroached areas to protect these lands and settlements. The Sindh PDMA acknowledged in the deposition that natural flow of water was being blocked due to massive encroachments in most water-ways private landowners' bunds embankments and unplanned habitation by rising population.

Investment in Private Ring Bunds

The pattern of competitive flood defense in areas where public flood infrastructure does not offer protection is becoming increasingly common. It is a game in which the non –cooperative outcome is socially sub-optimal. We have reports from southern Multan of the spread of cotton into marginal riverine areas being associated with private investment in ring bunds to protect cotton fields. The flow of floodwater is impeded unprotected land is doubly vulnerable the duration of floods increases and major public health hazard is created by failure of water to recede. Increased vulnerability of the poorest is an inevitable outcome. Semple 2003

Development of infrastructure residential colonies and industrial units in the flood plain is continuing unabated and there are no regulations or actions by the concerned authorities to check it. In response the Flood Inquiry Commission made various recommendations including zoning and demarcation of floodplain areas regulation of construction in floodplains and flood resilient housing such stilt-houses and houses with high plinth. The Commission also suggested that architecture and design of schools and health units should be such as can be used for emergency shelters as well as early warning centres Federal Flood Inquiry Commission 2010.

Comparisons of Historical Floods

The 2010 floods were initially characterized as 'unprecedented'. The media reinforced this perception and official position taken before the judicial flood commissions was the same. The Flood Inquiry Commission after perusal and analysis of recorded peak flows at controlled structures testimonies and field visits established a different picture. The Commission observed that the flood flows were unprecedented at six major controlled structures in KP and Punjab; less than historic highest flows passed through the three main barrages in Sindh the Guddu Sukkur and Kotri (Table 7).

TABLE 7: 2010 PEAK DISCHARGES VS. HISTORICAL PEAK FLOWS

Irrigation Structure/ River	Peak Discharge 2010 Cusecs	Historic Highest Cusecs	Year
Swat River	220000	97500	1995
Kabul River at Nowshehra	400000	223000	1965
Tarbela Dam	835000	800000	1929
Jinnah Barrage	936000	917000	1942
Chashma Barrage	1037000	781000	1976
Taunsa Barrage	959000	788600	1958
Guddu Barrage	1148000	1176000	1976
Sukkur Barrage	1131000	1161000	1976
Kotri Barrage	965000	981000	1956

Source: Federal Flood Commission and WAPDA/Flood Inquiry Commission 2010

Another critical feature of the 2010 floods documented by the Commission and tribunals was time lag. The historical time lag travel time for flood waters vs. the 2010 floodwater time lag is shown in Table 8. As can be seen, disposal of floodwater took longer than usual. This was caused by both the massive encroachment within the active floodplain and pond areas and public works and infrastructure executed by the authorities that was poorly designed and blocked flows. The Punjab Flood Tribunal noted that the sustained flood peak of over one million cusecs at Guddu lasted for eight days and 17 hours. Previous similar historic flood peaks of 1992, 1998 and 1986 at Guddu lasted for 28 hours, six days 22 hours, and five days 11 hours respectively.

TABLE 8: HISTORICAL VS. 2010 FLOOD WATER TIME LAG

Date	Location	Peak Flow cusecs	Historical Time Lag (hrs) / Next Gaging Station	2010 Time Lag (hrs)	Remarks
29-7-2010	Besham	713500	7 Tarbela	6	Flood information is disseminated to Flood Centre of PMD on hourly basis along with Irrigation Departments of Punjab and Sindh and Federal Flood Commission Islamabad.
30-7-2010	Tarbela	835000	9 Khairabad	9	
30-7-2010	Khairabad/Attock	997300	24 Jinnah	18	
30-7-2010	Jinnah Kalabagh	936000	12 Chashma	18	
1-8-2010	Chashma	1038900	60 Taunsa	50	
2-8-2010	Taunsa	959000	72 Guddu	76	
9-8-2010	Guddu	1148700	24 Sukkur	33	
10-8-2010	Sukkur	1131000	72 Kotri	408	

Source: Flood Inquiry Commission 2010 WAPDA/FFC

In reference to the anomaly in travel time of floodwater the Commission observed:

> "Unfortunately the local and provincial governments have themselves indulged in encouraging illegal acts promoting encroachments. Unauthorized and technically unsound public works have been executed by local authorities. Construction of roads and gas pipelines have been allowed to pass through bunds in contravention

> of legal provisions. All such encroachments have contributed to obstructions in the flow of water resulting in flooding of many areas. A matter of grave concern, which came to the notice of the Commission was that some of the governments are selling acquired lands in pond areas to raise revenues. Under the law no construction of any infrastructure is allowed to be erected within a distance of 200 feet from banks of the rivers/streams. It should be a matter of serious concern if the government itself indulges in unlawful acts of selling those very lands which it had acquired to protect irrigation infrastructure and property of the citizens".

The Commission recommended "The governments must correct that and ensure that no encroachments are permitted and no acquired lands are sold or leased out. Actions should be initiated by governments to remove all encroachments with a firm hand. It should also ensure that all such illegally constructed structures on government lands which had been destroyed by the recent floods are not allowed to be re-erected".

The damage and losses that occurred during the 2010 floods are unprecedented. According to the Federal Flood Commission, during the past 60 years Pakistan has suffered 18 major flood disasters; one major flood in every three years. These floods have caused a cumulative financial loss of US$ 30 billion. During the period from 1950 to 2009 floods rendered a total financial loss of US$ 20 billion, some 10,000 loss of lives, 127,375 villages damaged and destroyed and an overall area of 567,132 sq.km affected. The 2010 floods alone resulted in a cumulative financial loss of US$ 10 billion, 2000 deaths, 17,553 villages damaged or destroyed and a total area of 160,000 sq.km affected.

The Federal Flood Commission has attributed the increased quantum of flood damages and losses to the massive encroachments in riverine areas (FFC 2010). According to a DNA report, 24% of the completely damaged housing stock and 14% of total affected houses were situated within the fifty - year floodplain of the Indus River. However, the Commission further noted that embankments and bunds contribute to damage even for the lands they theoretically protect. This is because when bunds are breached, they cause greater damages than would have occurred without bunds because of their unexpected nature and intensification of land use following the provision of flood protection. This is exacerbated when combined with poor maintenance. The Flood Inquiry Commission observed that bunds and embankments are required to be maintained at a level of 6 feet above the last highest flood level, but prior to 2010 bunds were admittedly not maintained for decades. This was collaborated by the Pattan report, which found that the damage done by the flood was greatly exacerbated by catastrophic failures of embankments which could have been averted if adequate maintenance had been carried out (Pattan, 2011).

Landlessness

A significant portion of rural poor are landless, particularly in Sindh where big landholdings have left 60 of the population landless. This issue was highlighted and analyzed in nearly all major reports and press reports concerning the 2010 flood. About 2 percent of Pakistani households control more than 45 percent of the land (WB 2011); in Pakistan as whole women own only 3 per cent of the land (Oxfam 2011). For the landless, the deeply entrenched feudal system deprives tenants of basic rights. These people, already affected by the chronic poverty and vulnerability, were further marginalized as a result of the 2010 flood (RTE 2011).

Many of those living within river floodplains are these poor, who have no legal ownership of land (Oxfam 2011). Consequently, clearing these lands of inhabitants could further disenfranchise citizens and exacerbate vulnerabilities. Given these challenges, the DNA report urges that government should adopt right-based approaches to reconstruction, and caveated that any hasty efforts to remove settlements in katcha areas or floodplains must be avoided unless implementation mechanisms are place to ensure people are promptly compensated, with grievance redressal at the local level. The DNA report further recommends, with regard to land-titles for landless, "Opportunities exist to provide titles to land when reconstructing housing for the landless. Distributing land among the landless, including women, when restoring livelihoods regularize informal settlements and provide

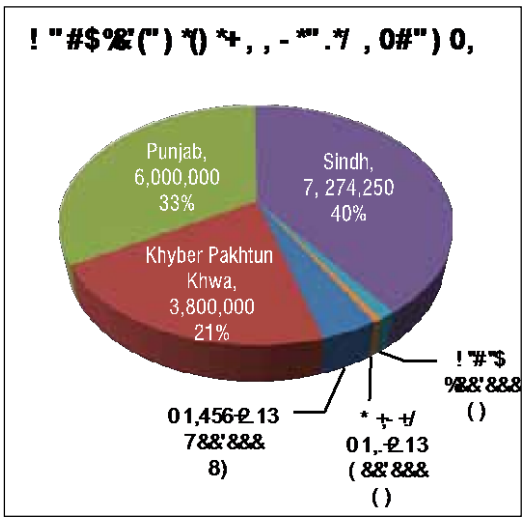
basic infrastructure when reconstructing records including land record established computerized and transparent recording system" (Oxfam 2011).

The Government of Sindh is currently implementing the Land Redistribution Scheme. This scheme provides state land to landless agricultural workers and sharecroppers with a primary focus on women as recipient. According to the programme, the government will distribute 212,864 acres of state land among landless haris, preferably amongst women workers, in almost all the districts of Sindh under a land grant policy. In the first phase the scheme covers 160 union councils and those districts where state land is available for free distribution. The prime goal is to reach out the poorest of the poor and the most marginalized people to reduce poverty, provide basic livelihood sources and ultimately ensure food security (PDI 2011). By 2009 over 40,000 acres of land had been distributed to 2845 women and 1184 men. The slow process, lack of knowledge among the eligible, corrupt and incorrect land identification, and competing unresolved land claims are hindrances in the programme (AF 2011).

EARLY RECOVERY

In September 2010 Early Recovery (ER) was initiated both spontaneously by the affected population and with the support of outside actors during the rescue and relief operations as people began to return to their homes where floodwater had receded. In accordance with the decisions of the National Disaster Management Commission NDMC headed by the Prime Minister of Pakistan, ER would be completed by December 2011, the reconstruction phase started in early January 2011, and reconstruction completed within 3-5 years (NDMA 2010).

FIGURE 3: GEOGRAPHICAL DISTRIBUTUION OF POPULATION IN NEED OF RESPONSE



The Government of Pakistan designated UNDP as the lead agency to prepare Early Recovery Response Plan for the flood affected areas of the country. Based on the Early Recovery Need Assessment by the UNDP and assessments by various other UN agencies, UNDP revised the initial appeal launched in August 2010 for the flood emergency relief. The revised appeal, Pakistan Floods Relief and Early Recovery Response Plan, PFRERRP, was launched in November 2010. The Plan aimed to address residual relief and early recovery needs of affected families for the next 12 months. The overarching goal of this plan was to prevent excess morbidity and mortality and to enable flood affected communities to return to their normal lives. It sought US$ 1.9 billion to enable the UN and NGOs to support residual relief and early recovery needs, including implementation of 139 relief projects worth US$ 92 million 224 early recovery project worth US$ 956 and 34 combined projects

for relief and early recovery with a cost of US$ 34 million. Projects will be implemented by UN agencies and national and international NGOs with the UN fulfilling the role of custodian to the funds (NDMA 2010; PFRERRP 2010).

To coordinate actors working for early recovery in the flood affected areas, NDMA and the UN agreed to set up an Early Recovery Working Group (ERWG) co-chaired by the NDMA and the UNDP. The Group will remain in existence till December 2011 and has been established at the federal and provincial level as well as within the 29 districts most affected by the floods. The Group comprises eight Sectoral Working Groups organized around the eight prioritized sectors for early recovery. In addition to that four, Thematic Groups have been formed around four cross-cutting themes and are meant to mainstream these across the sectoral spectrum of early recovery (NDMA 2010). These sector and thematic areas and their UN and Government co-chairs are shown in Table 9 below.

TABLE 9: SECTOR AND THEMATIC WORKING GROUPS

Sector Working Group	**UN Lead**	**Government of Pakistan Lead**
Food Security & Agriculture	FAO & WFP	Ministry of Food and Agriculture
Health and Nutrition	WHO & UNICEF	Ministry of Health
Water and Sanitation	UNICEF	NDMA
Education	UNICEF	Ministry of Education
Housing	UN Habitat	NDMA
Governance	UNDP	NDMA
Non Farm Livelihood	ILO	Ministry of Labour and Manpower
Community Physical Infrastructure	UNDP	NDMA
Thematic Group	**UN Lead**	**Government of Pakistan Lead**
Disaster Risk Reduction	UNDP	NDMA
Environment	UNDP	NDMA
Gender	UN Women	NDMA
Protection	UNHCR	NDMA

A Strategic Planning Unit SPU comprised of 6 advisors was established to provide programme related inputs for Early Recovery. Apart from facilitating policy advocacy, supporting donors, humanitarian and intra-governmental engagement, and providing technical inputs, SPU prepared several strategy papers, guidelines and policy documents based on consultation with major stakeholders. The most important of these, the 'Strategic Early Recovery Action Plan', was prepared in collaboration with the UN and other development partners and exclusively focuses on early recovery. The Action Plan envisages targeting the most vulnerable among the affected population.

Progress on early recovery projects as of August 2011 are described below. Not all eight sectors and four themes are addressed.

Food Security and Agriculture

Approximately 340,000 households are being assisted through the distribution of agricultural inputs livestock support interventions and different cash for work programmes. Currently a detailed Livelihood Assessment is being carried out. Early recovery support will continue for the next four planting seasons. Some 5800 peasants in Sindh province are set to receive farmland previously designated as government-owned flood runoff. By the end of March some 92,000 acres will be allotted to women only (Christian Science Monitor, Issam Ahmed, 23 March 2011).

Water and Sanitation

The main focus has been on repair of damaged water supply schemes, hand pumps and latrines. Approximately 1.6 million households have been reached through hand-pump installations or water supply repairs. In addition 30,000 households have been provided with latrines. Hygiene sessions were held with 1.2 million households in four provinces.

Housing

The Strategic Working Group set standards for One Room Shelters according to situation specific disaster resilience standards. A total of 453,293 one room units and 637,00 transition shelters have been completed so far. For the 144,000 registered One Room Shelters, DRR measures for flood and earthquake are underway.

Community Physical Infrastructure (CPI)

The CPI working group member organizations have been able to restore 3637 community physical infrastructure schemes including 458 km of roads, 424 pathways and 1440 culverts, benefitting 1.5 million people. Cash for work activities have also been advantageous to 0.3 million people in 1100 villages across the flood affected districts.

Education

Apart from hardware recovery, provision of skills and tools and restoration of psycho-social state of the minds of both teachers and students continues. 745,000 beneficiaries have been reached, including 297,040 women and girls, through school renovation, temporary school structures, reactivation of parent-teacher associations, and training.

Cross cutting Themes

Relevant thematic working groups are doing advocacy and monitoring of stakeholders in terms of cross-cutting themes, including gender, protection and Disaster Risk Reduction, in early recovery interventions.

Reconstruction

The National Disaster Management Act 2010 fully empowered the NDMA to manage the entire spectrum of disaster risk management – preparedness, response, recovery, rehabilitation and reconstruction. However, the Federal Government assigned responsibility for reconstruction and rehabilitation of flood affected areas to the Planning Commission. Following the federal government's decision the NDMA confined itself to relief and early recovery (NDMA 2011).

Council of Common Interest (CCI) provided policy guidance for reconstruction at the federal, provincial and local government levels. In addition, CCI was charged with overseeing rational allocation of resources and resolving inter-provincial issues relating to reconstruction policy and implementation.

To ensure transparent and efficient utilization of reconstruction funds a National Oversight Disaster Management Council NODMC was established to monitor funds, review plans, monitor progress, and ensure effective targeting and transparent support disbursement.

In parallel, a dedicated Flood Reconstruction Unit (FRU) headed by the Secretary of Planning & Development was established within the Planning Commission. The FRU was tasked with preparing post-flood Reconstruction Plans, assessing damages and needs, proposing cost effective technology, building codes, architecture designs and construction materials for infrastructure development, obtaining funds and implementing and monitoring projects, ensuring donor compliance, and throughout incorporating environmental and gender concerns.

All federal ministries and agencies are responsible for the implementation of projects that fall within their purview while line department at the district level prepare and implement reconstruction projects within their respective areas. The Planning Commission will take special measure/procedures for identification and speedy processing of projects as well as robust monitoring and evaluation systems.

DAMAGE AND NEED ASSESSMENT

To formulate post flood, medium to long-term reconstruction recovery, planning prioritization and programming the GoP requested the World Bank and Asian Development Bank to carry out a Damage and Needs Assessment (DNA). The DNA was meant to assess the extent of damage and required needs for rehabilitation and reconstruction of the damaged assets, infrastructure, livelihoods and economic productivity. The DNA is based on four broad sectors, including social infrastructure, physical infrastructure, economic sectors and inter-sectoral concerns. Both direct and indirect damage and losses are incorporated, as well as cost for reconstruction. Table 10 presents estimated damage costs by sectors; The DNA recommended three reconstruction options: option 1 costing US$ 6.8 billion which is replacement of lost infrastructure build-back-as before; option 2 costing US$ 7.4 billion based on a Build-back-Better approach; and option 3 costing US$ 8.9 billion meant to be Build-back-Better and Safer. The government has however decided in view of the financial crunch to go for option 1 which is the least cost and least desirable option.

Table 11 presents reconstruction cost estimates by sector (DNA, 2010).

TABLE 10: ESTIMATES OF TOTAL DAMAGE COSTS BY SECTOR

Sector	Direct Damages PKR Millions	Indirect Losses PKR Million	Total Damages	
			PKR Millions	USD Millions
1. Social Infrastructure				
Housing	91843	43171	135014	1588
Health	1562	2661	4222	50
Education	22047	4418	26464	311
Subtotal	**115451**	**50249**	**165700**	**1949**
2. Physical Infrastructure				
Irrigation and Flood Management	23600	-	23600	278
Transport and Communication	62491	50420	112911	1328
Water Supply and Sanitation	3194	6112	9306	109
Energy	13184	13116	26300	309
Subtotal	**102469**	**69648**	**172117**	**2025**
3. Economic Sector				
Agriculture Livestock & Fishries	315547	113257	428805	5045
Private Sector &Industries	14463	9468	23932	282

Financial Sector	110	57141	57251	674
Subtotal	**330120**	**179866**	**509987**	**6000**
4. Cross Cutting Sectors				
Governance	3141	2835	5976	70
Environment	992	-	992	12
Subtotal	**4133**	**2835**	**6968**	**82**
Total	**552173**	**302599**	**854771**	**10056**

The DNA recommended three reconstruction options: option 1 costing US$ 6.8 billion which is replacement of lost infrastructure build-back-as before; option 2 costing US$ 7.4 billion based on a Build-back-Better approach; and option 3 costing US$ 8.9 billion meant to be Build-back-Better and Safer. The government has however decided in view of the financial crunch to go for option 1 which is the least cost and least desirable option.

TABLE 11: RECONSTRUCTION COSTS BY SECTOR

Sector	Reconstruction Option 1		Reconstruction Option 2		Reconstruction Option 3	
	PKR Millions	USD Millions	PKR Millions	USD Millions	PKR Millions	USD Millions
1. Infrastructure						
Housing	126075	1483	143676	1690	187491	2206
Health	4151	49	4151	49	4151	49
Education	42907	505	42907	505	42907	505
Subtotal	**173133**	**2037**	**190734**	**2242**	**234549**	**2759**
2. Physical Infrastructure						
Irrigation & Flood Management	36294	427	36294	427	83499	982
Transport & Communication	200260	2356	200260	2356	200260	2356
Water Supply and Sanitation	6292	74	6292	74	7982	94
Energy	9038	106	9038	106	9038	106
Subtotal	**251884**	**2963**	**251884**	**2963**	**300779**	**3539**
3. Economic Sector						
Agriculture Livestock & Fishries	21879	257	56925	670	89134	1049
Private Sector & Industries	8636	102	8636	102	10923	129
Financial Sector	39358	463	39358	463	39358	463
Social Protection & Livelihoods	58076	683	58076	683	58076	683
Subtotal	**127949**	**1505**	**162995**	**1918**	**197491**	**2323**
4. Cross Cutting Sector						
Governance	4900	58	4900	58	4900	58
Disaster Risk Management	2295	27	2295	27	2295	27
Environment	17746	209	17746	209	17746	209
Subtotal	**24941**	**293**	**24941**	**293**	**24941**	**293**
Total	**577908**	**6799**	**630554**	**7418**	**757761**	**8915**

The overall flood damages and losses have been estimated at US$10 billion. Sectorally, 50% of the losses are in the agriculture sector, 16% in housing, and 13% in transport & communication. Geographically, 44% of total damages, both direct and indirect, were in Sindh, 26% in Punjab, 12% in KP, and the federal government 11%, mostly indirect owing to damages to federally owned banks and financial institutions. Table 12 provides estimated damage and reconstruction costs by province (DNA, 2010).

TABLE 12: ESTIMATED DAMAGE AND RECONSTRUCTION COSTS BY PROVINCE/AREA

Province/Region	Damage Costs		Reconstruction Option 1		Reconstruction Option 2		Reconstruction Option 3	
	PKR Million	USD Million	PKR Million	UDS Million	PKR Million	USD Million	PKR Million	USD Million
AJK	7303	86	13190	155	13886	163	16009	188
Balochistan	52676	620	27258	321	34359	404	58116	684
FATA	6271	74	7595	89	7873	93	9544	112
Gilgit-Baltistan	4165	49	6627	78	6893	81	10027	118
Khyber Pakhtunkhwa	99625	1172	105957	1247	109942	1293	179844	2116
Punjab	219272	2580	93521	1100	107903	1269	117650	1384
Sindh	372341	4380	227850	2681	253791	2986	269704	3173
Federal/Cross Cutting Sectors	93117	1095	95911	1128	95911	1128	96866	1140
National Total	**854771**	**10056**	**577908**	**6799**	**630556**	**7418**	**757760**	**8915**

NATIONAL FLOOD RECONSTRUCTION PLAN 2010

Based on the WB and ADB Damage and Needs Assessment, the Flood Reconstruction Unit came up with a National Flood Reconstruction Plan 2010, made public in February 2011. The plan outlines priorities in cost reconstruction and modalities to go about them. The Plan has been formulated keeping in view the macro economic situation of a country overwhelmingly unstable since 2008 due to internal and external factors. With 1.6 million homes fully/partially damaged, leaving 7.3 million people without shelter in 82 districts, with loss of crops of about 2 million hectares and loss of 316,000 cattle, the 2010 floods have further burdened Pakistan's development agenda (PC 2011). Against this backdrop the Reconstruction Plan's objectives include: flood disaster relief, economic recovery, revival of livelihoods, rehabilitation of public services, and community and gender empowerment.

The Reconstruction Plan asserts that given available resources and institutional capacities, which are relatively weak, priorities have to be set and innovative models of implementation will have to be adopted. These include:

- Immediate and small restoration works will be given top priority followed by works of medium term nature such as rehabilitation of weak canal banks and watercourses and then the third priority would involve long term works such as improvements of irrigation drainage and flood protection infrastructure.

- Rebuilding of soft and vital physical infrastructure.
- Improvement of the weak implementation capacity. All models of private sector involvement consulting contracting leasing and implementation will be considered to meet the demands of reconstruction.
- Building the capacity of the planning and implementing agencies; providing an enabling environment and policy support.
- Pursuing devolved responsibilities resulting from the 18th Amendment.
- Enhancing financing capacity of the provinces. The 7th NFC Award allows larger transfer of additional resources from divisible pool to the provinces.
- Fast tracking the approval of projects for flood reconstruction.
- Robust monitoring of flood reconstruction projects through result based monitoring and IT applications for real time data generation and data sharing.
- Third party validation to ensure transparency and effective utilization of funds.

Preliminary estimates of the required resources are given in Table 13 below:

TABLE 13: RECONSTRUCTION PROGRAMME SUMMARY

Item	Needs (Rs Billion)	Indicative Financing
Government Infrastructure	323	Development budget
Physical Infrastructure	279	
Soft Infrastructure	44	
Transfers and Subsidies	177	Recurrent budget
Housing Sector	161	
Agriculture	16	
Private Sector/PSE	113	Off budget
Total	**613**	

Source: GoP 2011

The minimum cost for reconstruction is estimated to be 578 billion. However the Plan estimate stands at 613 billion; 35 billion has been added for housing reconstruction under the Citizen Damage Compensation Programme. Total estimated reconstruction cost for replacement of physical and strengthening of soft infrastructure alone has been estimated at Rs323 billion (US$3.8 billion) to be financed from the development budget. Reconstruction needs of infrastructure will be met largely from federal and provincial government resources. Respective governments will reprioritize development budgets and additional resources will be mobilized through appropriate tax reforms and tariff rationalization in the energy sector. Public-private partnership will also be encouraged. The Reconstruction Plan will be implemented using existing project planning agencies and processes established at federal and provincial level.

HOUSING RECONSTRUCTION

According to DNA report, as of the 2010 flood there were 12.34 million housing units in flood-affected districts in all seven regions of the country. 43% of the units were pucca 43%; 57% were katcha. None of the house was designed for flood-resistance. The proportion of katcha and pucca houses varies significantly across and within provinces. In Balochistan 87% of housing units were katcha, whereas 42% were katcha in AJK. Flood damage has primarily affected katcha houses. 1.45 million katcha houses were impacted and 847,455 completely destroyed. Only 156,000 pucca housing units suffered from the floods and only 65,000 were completely destroyed. The percentage of destruction for katcha and pucca houses national-wide is estimated to be 19% and 3% respectively (DNA 2010).

The proposed housing reconstruction strategy is cash grants to owners. The DNA proposed several different possible strategies for these cash grants, as shown in Table 14.

TABLE 14: SUMMARY OF HOUSING CASH GRANT OPTIONS

Reconstruction Options	Pros and Cons	Reconstruction /Repair Costs US$ million
Option-1 Base case scenario –Uniform Subsidy for Building-as-Before calculated on the basis of a *katcha* core unit. Subsidy of PKR 100000 for reconstruction; PKR 50000 for repairs	**Not Recommended**: Cheapest but sub-optimal option from engineering/disaster-risk reduction perspective	1483
Option-2 Partially Differential Subsidy – providing for restoration to flood resistant standard for units located within the flood hazard area. Subsidy of PKR 180000 for reconstruction of flood resistant hybrid houses; PKR 50000 for repairs.	**Recommended for Sindh and Punjab only:** Caters to flood risk – but not seismic risk in applicable areas	1690
Option-3; Differential subsidy for BBB – Option-2+premium to build to multi-hazard-resistant standard for units at risk of flood and earthquake. Subsidy of PKR 415000 for reconstruction of flood and seismic resistant *pucca* house; PKR 50000 for repairs.	**Recommended Option**: providing optimal balance between affordability and BBB	2206

Source: DNA 2010

The DNA report emphasized that given the multi-hazard risks in the affected areas, reconstruction of houses should be based on appropriate cost-effective hazard resistant and engineering standards as far as possible. This approach will increase initial costs of reconstruction to some extent; however, this will constitute the most economically efficient solution when viewed over the full useful life of these investments.

The Flood Reconstruction Unit, however, formulated a blanket cost and strategy. According to Reconstruction Plan each of the 1.6 million affected households would get cash assistance of Rs100000 in two installments under the Citizen Damage Compensation Programme: Rs20000 to meet immediate needs followed by Rs80000 for reconstruction of houses. However, faced with financial constraints, the Government of Pakistan decided that the second installment would be of Rs.40000 in two installments and only those households whose houses were damaged in the floods, or to families headed by widows and disabled. Altogether 1.1 million flood affected households would benefit from the second phase of CDCP.

The second tranche of Rs40000, instead of Rs80000, was envisioned as supporting owner-driven house reconstruction, with the Government providing partial payment and the remaining cost being borne by the prospective house owners. All beneficiaries received the same funds, regardless of the degree of damage (WB 2011), and beneficiaries would sign MOUs with the beneficiarie to ensure judicious use of the grant and adherence to specified standards (Reconstruction Plan 2010).

There are many drawbacks to this approach. According to UNDP a key concern is that if aid is being provided in an environment where DRR measures are not being prioritized the impact and effectiveness of that aid will be limited Oxfam 2011. The DNA report prepared by the World Bank and ADB strongly recommended for a build back better approach to housing reconstruction. Yet, as the housing reconstruction funds were being determined, the cost of construction material soared as a result of inflation and profiteering. For instance, prior to floods kiln-fired brick cost Rs2.50 each and post-flood were at Rs5.50 in some areas. It is clear that the government has chosen to re-building risks by opting for a reduced Option 1.

Numerous other actors have undertaken housing reconstruction, including the armed forces, foreign governments, individual philanthropists and other charities. The provincial governments of Punjab and Sindh have undertaken a model village approach to be built in flood-affected areas respectively in Punjab and Sindh (Oxfam 2011). In Punjab, apart from 11,000 basic one-room constructions that went in during early recovery around 3000 houses have been constructed with funding from Turkey, Iran and Qatar. Another 4000 houses were made with private donations (CDKN 2012). Pakistan Heritage Foundation, a civil society organization, is implementing a housing project in Sindh called 'Green Karwan Ghar' using indigenous techniques and local material. The aim is to build low-cost and low carbon-footprint houses for flood affected families. So far 268 housing units have been completed (PHF 2012). However, the multiple players involved in housing reconstruction and the disparity in the value of housing interventions, ranging from US$300 to US$2500, has led to tensions at the community level (Oxfam 2011).

RECONSTRUCTION MONITORING

In accordance with the Reconstruction Plan a website/portal was launched to provide information on flood reconstruction activities, the results of monitoring and evaluation of projects, and progress on various flood related development works. Unfortunately, the website does not provide information or updates on reconstruction except the summary of flood reconstruction projects to be implemented in Punjab or similar preliminary information (Oxfam 2011).

The reconstruction phase has now entered its second year and there is no documentation available, either on the website or via other published material regarding evaluation data or progress. Relevant FRU officials admitted that the FRU function is just like a 'post office'; the FRU receives projects from provincial counterparts and federal agencies and forward them for funding processes (SLD 2012).

FINANCING

INTRODUCTION

The third area of analysis undertaken in the literature review was a review of response and recovery financing. The goal in this assessment was to understand the geographical and sectoral distribution of response, relief and reconstruction financing. This could then be compared with crucial sectors, geographical areas and specific populations identified in the field study as required for fast recovery and opportunities for more effective and efficient use of funds identified.

METHODOLOGY

Primary inputs for this analysis were the real-time evaluations and assessments available from the government, the UN system, and donors. These were supplemented with other materials already compiled for the meta-analysis and grey literature review.

RESULTS

Our primary findings regarding the flood response financing are:

- Government tracking of flood financing is incomplete. The NDMA established a central system, but failed to get voluntary input from the multitude of players involved in reconstruction.
- A large part of the flood response was managed through the UN system. However, the cumulative report produced by OCHA in December 2012 did not tally with the monthly reports.
- There is insufficient information available from individual government and donor sources to compile a meaningful picture of relief and reconstruction financing within the scope of this project.

Consequently, we conclude that unless a detailed, comprehensive analysis of the flood response and financing is undertaken, there is no way to establish how disaster response was distributed across sectors and geography during and following the 2010 floods. Because of this, we are unable to make direct links between field studies and needed policy actions in terms of sectoral or regional investment.

The remainder of this report section summarizes information from the finance review that led to this conclusion.

FINANCIAL AND SECTORAL PROFILE

In response to the 2010 floods, the UN made the largest humanitarian appeal in the history of Pakistan and the UN. Immediately after the floods in mid August an initial appeal was launched that requested US$459 million. Initial funding for the response plan was swift, with commitments and pledges which met 67% initial requirements. An additional $490 million had been pledged or committed outside the framework of the inter-agency plan by that time.

Response to a second, revised appeal was slow. The UN prior to the revised appeal had provided US$30 million from its Central Emergency Response Funds (CERF) to address urgent emergency needs immediately after the floods. An additional US$ 10 million were also pledged to nine UN agencies and IOM (OCHA 2010). The revised Response Plan (Figures 4 and 5) was to support the Government in addressing the residual relief needs and early recovery needs of the flood affected families for the next 12 months.

FIGURE 4: THE REVISED FLOODS EMERGENCY RESPONSE PLAN, UN, 2010

Revised Floods Emergency Response Plan Key parameters		
Duration	12 months (August 2010 – August 2011)	
Number of people affected	18 million people	
Key milestones	Official end of monsoon season *rabi* (spring harvest) and *kharif* (fall harvest). Planting for *rabi:* Sept-Oct Start of winter	
Target beneficiaries	WASH 14 million Health 11 million Shelter 8.8 million Agriculture 7 million Food 6.2 million Protection 5 million Education 1.3 million Nutrition 460,000 Community Restoration (varies by sub-sector; average of 55% of people in need)	
Total funding requested		Funding request per beneficiary
$1,938,207,278		$97

The key needs for which the funds were requested included: food 30%, shelter and non-food items 17%, water and sanitation 13%, health 13%, and agriculture 9%. In total 353 project proposals from 153 organizations for relief and early recovery response for 12 different sectors were submitted.

In extent to which the Response Plan intended to address the overall needs of relief and early recovery varied cluster by cluster. The plan intended to deal with 100% of the people affected by floods in meeting their shelter, health and agriculture needs; 70% of the people affected with regard to meeting their food, water, sanitation and hygiene needs; 35% of people in meeting nutrition needs; 58% for protection needs; and 14% of affected people for meeting education needs (NDMA Review 2011). It was assumed that the Government would address sectoral needs that were covered at less than 100%.

FIGURE 5: SUMMARY OF REQUIREMENTS, UN, 2010

Cluster	REQUIREMENTS				
	Original requirements ($) A	Total Revised requirements ($) B=C1+C2+C3	Early Recovery ($) C1	Relief ($) C2	Relief/Early Recovery ($) C3
AGRICULTURE	-	170,552,906	170,552,906		
CAMP COORDINATION AND CAMP MANAGEMENT	-	12,829,817		12,829,817	
COMMUNITY RESTORATION	-	167,073,420	152,254,698	14,818,722	
COORDINATION AND SUPPORT SERVICES	-	18,895,517			18,895,517
EDUCATION	-	83,402,534	83,306,454	96,080	
FOOD SECURITY	158,250,000	573,284,476	152,693,094	420,591,382	
HEALTH	58,200,000	198,044,064	86,365,884	106,106,956	6,571,224
LOGISTICS AND EMERGENCY COMMUNICATIONS	15,824,000	50,478,269		49,103,514	1,372,755
NUTRITION	14,150,847	44,605,727	20,945,251	17,560,397	6,100,079
PROTECTION	2,000,000	52,932,153	25,213,234	14,795,328	12,923,591
SHELTER & NON-FOOD ITEMS	105,000,000	521,068,320	126,765,004	191,147,660	3,176,656
WATER, SANITATION AND HYGIENE	110,500,000	244,021,075	138,454,115	101,529,907	4,037,053
CLUSTER NOT YET SPECIFIED	-	-		-	
Grand Total	**459,724,847**	**1,938,207,278**	**956,550,640**	**928,579,763**	**53,076,875**

The Response Plan included a wide range of projects addressing relief and early recovery. The NDMA Annual Report 2010 describes 397 projects in total: 139 for relief, 224 for early recovery and 34 for relief/early recovery combined. The Plan however contains 452 projects. This discrepancy occurs because the NDMA while reviewing the appeal projects only approved 397 projects out of the 452 projects. The UN nevertheless retained all projects as part of the revised document.

Multiple agencies submitted proposals to address specified projects; the majority of proposals were submitted by international NGOs. The number of proposing organizations in each cluster is shown in Table 15: Number of proposing organizations by cluster.

TABLE 15: NUMBER OF PROPOSING ORGANIZATIONS BY CLUSTER

Cluster	Number of Organizations
Agriculture	21
Community Restoration	63
Education	22
Food	13
Health	58
Nutrition	22
Protection	41
Shelter and Non-food Items	59
Water Sanitation and Hygiene	42
Camp Coordination and Camp Management	2
Coordination and Support Services	6
Logistics and Emergency	4
Total:	353

In early January 2011 the NDMA carried out a review of the Response Plan and its implementation and came up with a number of observations. Regarding the donors' contributions toward the Response Plan the Review observed:

> "there were 22 main bilateral donors which provided funds for the response plan. However 63% of the funds came from just four main donors: the USA 35%, Saudi Arabia 13%, the United Kingdom 8%, and the European Union 7%. As is evident most funding came from a small group of traditional donors. A large number of non-traditional bilateral donors provided funding outside the Response Plan either directly to the Federal Government or to the affected population. In some cases donors were directly approaching provincial governments. Almost half of the donor funding was provided outside the Response Plan. This indicated the preference to provide funds through diverse channels rather than directing them all through the UN system or the formal channels. The trend in individual corporate and Diaspora philanthropy also indicates that Pakistanis prefer to give to individuals directly rather than public institutions. This trend was also evident during the floods when large amounts of immediate relief assistance were given by individuals directly to flood affected households. Many individuals and corporate philanthropists bypassed the government the UN system and civil society organizations. This kind of relief was also the type which was most rapidly deployed and was the first to reach the affected people".

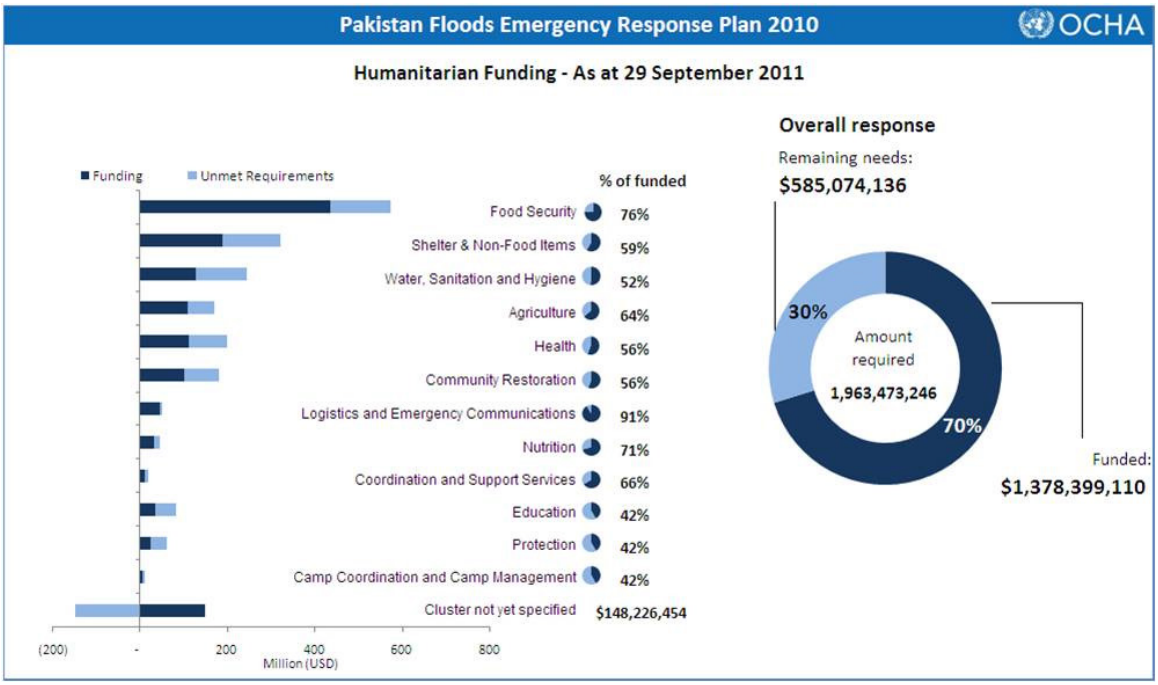
The UN is the custodian of the funds received under the Appeal, and OCHA manages and maintains the Financial Tracking System (FTS) to observe transparency and provide financial updates to the stakeholders. Financial updates are based on information provided by the stakeholders. The FTS also provides data on funds received outside the appeal from different entities. The system has some limitation as it does not give geographical details and project implementation status.

OCHA's Financial Tracking System estimates that Pakistan had received 70% of the appeal amount up to September 2011. Of these funds received, cluster allocations were met as follows: 76% for food,

56% for health, 64% for agriculture, 52% for water and sanitation, 59% for shelter and non-food items, 54% for community restoration, 91% for logistics and emergency communication, 71% for nutrition, 66% for coordination and support services and 42% each for education protection camp coordination and management clusters. The contributions by the corporate sector and individual philanthropists are not included these estimates. The clusters which attracted the most allocations included logistics, nutrition, coordination, food, health, agriculture, water and sanitation – core humanitarian services.

Figure 6 gives a summary of the funding under the appeal and remaining needs as of September 2011:

FIGURE 6: PAKISTAN FLOODS EMERGENCY PESPONSE PLAN 2010



Pakistan also received funds outside the Appeal for relief and early recovery interventions both in kind and cash from bilateral and multilateral sources, corporate entities and individual philanthropists. The OCHA Financial Tracking System estimated that US$ 1,281,880,406 had been received by the end of December 2011. The funds contributed by the individuals philanthropists, organizations, foundations, business entities, etc. have been lumped together and termed 'Private' in the Financial Tracking System of the OCHA. OCHA estimated these private donations to be 13.9 percent of the total funds received. In addition, NDMA, the federal and provincial governments and the armed forces spent an estimated Rs55 to 65 billion during the relief phase. These expenditures were for operations and procurement; remunerations and salaries are not included.

Rs5 billion was collected through the Prime Minister Disaster Fund for 2010 floods. This remaines unutilized to date. The NDMA did try to get allocations from the collected amount during the relief and recovery phase in 2010 but could not due to the bureaucratic hitches Dawn 2011.

Rs32 billion was immediately allocated for the Citizen Damage Compensation Scheme (Watan cards). Under the scheme the first tranche of Rs20000 was given to 1.6 million affected families to meet their immediate needs. Rs5 billion was spent on agricultural inputs for affected farmers. Rs.14 billion was expended by the armed forces for relief operations and procurement of relief goods. Various government institutions also set aside funds for relief activities such as Pakistan Railway that spent Rs6 billion for the transportation of relief goods (NDMA 2010).

The NDMA in its review noted that data collection and analysis had been hampered by the lack of uniform and standardized reporting format, especially at the local and provincial level, and by a lack of clearly defined roles and responsibilities relating to data reporting and sharing. Accordingly, initiative was taken to develop a coordinated and effective monitoring system to ensure efficiency and transparency with regard to the Response Plan. The Government of Pakistan launched an online Single Reporting Format (SRF) to collect information on agreed indicators and track progress against objectives. This was designed jointly by the NDMA iMMAP, an international NGO, and the UN OCHA. The SRF was designed and launched, but being a self-reporting system not all stakeholders were reporting on their own and hence the SRF remained ineffective for research or planning.

TOTAL REQUIREMENTS & FUNDING PER APPEALING ORGANIZATION

What follows here is a systematic breakdown of funds using OCHA's tracking system data as obtained on February 1st 2012. We start by looking at the appealing organizations, followed by humanitarian funding. We then look at the breakdown of sectors and provinces in order to assess how and where the funds were allocated.

Total requirements by appealing organizations amounted to 1.96 billion USD, with 1.38 billion USD having been covered to date.

highlights the top fifteen appealing organizations ranked according to their 'Revised requirements USD'. It also gives a breakdown of the amount available to them, 'Total resources available USD', and the amount still in need of being fulfilled, 'Unmet requirements USD'. 60% of these organizations belong to the United Nations network.

TABLE 16: REQUIREMENTS AND FUNDING PER APPEALING ORGANIZATIONS

REQUIREMENTS & FUNDING PER APPEALING ORGANIZATIONS					
	Revised requirements USD	**Total resources available USD**	**Unmet requirements USD**	**% Covered**	**Uncommitted pledges USD**
WFP	553373699	503663874	49709825	91.0%	0
UNICEF	251107771	194629135	56478636	77.5%	0
UNHCR	134587454	123783277	10804177	92.0%	0
SC	116579892	64328007	52251885	55.2%	0
IOM	114138574	74513525	39625049	65.3%	0
FAO	106998074	97547826	9450248	91.2%	0
WHO	104631122	48615171	56015951	46.5%	0
UNDP	89033931	54250000	34783931	60.9%	0
UN-HABITAT	59118376	50427622	8690754	85.3%	0
OXFAM GB	47740729	28347089	19393640	59.4%	0
UNFPA	29138791	9100559	20038232	31.2%	0
IRC	17757911	9508646	8249265	53.5%	0
ACTED	15930500	14210821	1719679	89.2%	0
UNOPS	14309224	6000000	8309224	41.9%	0
CW	12777471	10235142	2542329	80.1%	0
Others	296249727	89742042	206507685	30.3%	92004628
Grand Total:	**1963473246**	**1378902736**	**584570510**	**70.2%**	**92004628**

Source: OCHA accessed Feb. 1 2012

Includes contributions to the Consolidated Appeal and additional contributions outside of the Consolidated Appeal Process

Funding = Contributions + Commitments

Contribution: the actual payment of funds or transfer of in-kind goods from the donor to the recipient entity.

Commitment: creation of a legal contractual obligation between the donor and recipient entity specifying the amount to be contributed

Pledge: a non-binding announcement of an intended contribution or allocation by the donor. "Uncommitted pledge" on these tables may indicate the balance of original pledges not yet committed.

Zeros in both the funding and uncommitted pledges columns indicate that no value has been reported for in -kind contributions.

TOTAL HUMANITARIAN FUNDING PER DONOR

Table 17 shows the top fifteen donors for total humanitarian funding.

- 'Total funding' represents all funds contributed by individual donors both within and outside of the United Nations' appeal amounting to a total of 2.66 billion USD.
- 'Funding towards appeal', a total of 1.38 billion USD, represents funds contributed towards projects in the appeal.
- '% Of Grand Total' shows 'Total funding' per donor as a percentage of the 'Grand Total' of funds contributed.
- 'Uncommitted pledges', 372.6 million USD, represents the balance of original pledges that have yet to be realized.

As illustrated United States has contributed 25.7% of the total funds amounting to approximately 683.6 million USD. Private individuals and organizations contributed 13.6% i.e. approximately 361.8 million USD making them the second largest donors as of February 1st 2012. Interestingly, there is a staggering 1.28 billion USD that has been donated outside the appeal (the difference between 'Total

funding' and 'Funding toward appeal'). There is no evidence as to how or where these funds have been dispersed.

TABLE 17: HUMANITARIAN FUNDING PER DONOR

TOTAL HUMANITARIAN FUNDING PER DONOR UN Appeal plus other				
Donor	**Funding towards appeal USD**	**Total Funding USD**	**% Of Grand Total**	**Uncommitted pledges USD**
United States	434971653	683568343	25.7%	0
Private individuals & organisations	109864586	361797575	13.6%	43043300
Japan	246863950	301020868	11.3%	0
United Kingdom	115557464	224267490	8.4%	90230047
European Commission	108885649	189564388	7.1%	0
Saudi Arabia	4158904	151357898	5.7%	90841096
Australia	50022417	84363996	3.2%	0
United Arab Emirates	4529464	77561173	2.9%	0
Canada	47900475	77225388	2.9%	0
Norway	37919617	57692776	2.2%	0
Germany	22585765	54651552	2.1%	2410038
Turkey	#	53300000	2.0%	0
Central Emergency Response Fund CERF	41980782	41980782	1.6%	0
Sweden	25634391	36579772	1.4%	0
India	26094092	26094092	1.0%	0
Others	101933527	239757049	8.9%	146091045
Grand Total USD:	**1378902736**	**2660783142**	**100.0%**	**372615526**

Not available

Source: OCHA accessed Feb. 1 2012 on the basis of information provided by donors and appealing organizations.

Includes contributions to the Consolidated Appeal and additional contributions outside of the Consolidated Appeal Process bilateral Red Cross etc...

Funding = Contributions + Commitments

Contribution: the actual payment of funds or transfer of in-kind goods from the donor to the recipient entity.

Commitment: creation of a legal contractual obligation between the donor and recipient entity specifying the amount to be contributed .

Pledge: a non-binding announcement of an intended contribution or allocation by the donor . "Uncommitted pledge" on these tables may indicate the balance of original pledges not yet committed.

Zeros in both the funding and uncommitted pledges columns indicate that no value has been reported for in -kind contributions.

PROVINCIAL AND SECTORAL FUNDING BREAKDOWN

Provincial and sectoral spending was analysed using data obtained from the OCHA Financial Tracking System. The data represent the appeal projects grouped according to sector and province and the funding status of each as of February 1st 2012. To enable us to draw comparisons, projects non-specific to any particular province have been included as their own category in the calculations. Where projects were allocated to more than one province, we divided funding equally between those provinces. In this analysis 'Revised requirements were used instead of 'a Original requirements.

Single Reporting Format data were also reviewed for this analysis. They database cites 659 total projects: 14% (90 projects) are appeal projects, and 86% (569 projects) are non-appeal projects. Unfortunately, is analyzing the data, we found it was incomplete – not all projects had been reported

to the SRF platform – and inconsistencies were prevalent as there was no dominant currency used in the reporting of funds and requirements. Consequently, most of the SRF data was unusable for this assessment and is not included in our analysis.

PROVINCIAL TOTALS

Table 18 illustrates the provincial totals for both projects under the UN appeal plus other projects. Non-specific requirements amounted to 1.48 billion USD; the KPK province had the highest revised requirement, 136.4 million USD. The table also shows that 77% of the non-specific requirements and 58% of Balochistan's requirements have been fulfilled. Total requirements for the provinces stood at 1.96 billion USD with 70% already covered as of February 1st 2012.

TABLE 18: PROVINCIAL TOTAL FUNDING

PROVINCIAL TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding* USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	63861511.17	36821949.58	58%	27039561.58
KPK	136418112.17	71116072.58	52%	65302039.58
PUNJAB	133635214.50	56389765.08	42%	76983949.42
SINDH	131608707.17	70615777.25	54%	61189534.92
KASHMIR	4938709	0	0%	4938709
GILGIT BALTISTAN	11779756	635608.50	5%	11144147.50
FATA	3059831	0	0%	3059831
NON-SPECIFIC**	1477974800	1143323563	77%	334651237
Subtotal	**1963276641**	**1378902736**	**70%**	**584309010**

** Funding = Contributions + Commitments + Carry-over*
Contribution: the actual payment of funds or transfer of in-kind goods from the donor to the recipient entity.
Commitment: creation of a legal contractual obligation between the donor and recipient entity specifying the amount to be contributed.

***Non-Specific here includes totals for non-specific provinces and non-specific sectors.*

SECTORAL

Table 19 presents the sectoral breakdown of revised requirements and funding made available through the UN appeal and other projects. 'Agriculture' and the 'shelter and non-food items' sectors had the highest revised requirements at 118.7 and 96.1 million USD respectively. Total revised requirements for all sectors have been calculated at 0.57 billion USD with 79% coverage at the time of analysis.

TABLE 19: SECTORAL TOTAL FUNDING

SECTORAL TOTAL FUNDING UN appeal plus other				
SECTOR	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
AGRICULTURE	170552906	108863041	64%	61689865
ECONOMIC RECOVERY AND INFRASTRUCTURE	180484815	101930956	56%	78553859
EDUCATION	83402534	34856367	42%	48546167
FOOD	573522277	435499785	76%	138022492
HEALTH	243880379	142935597	59%	100683282
PROTECTION/HUMAN RIGHTS/RULE OF LAW	62531227	25971405	42%	36559822
SHELTER AND NON-FOOD ITEMS	322093129	189278167	59%	132814962
WATER AND SANITATION	244577771	127280520	52%	117493856
NON-SPECIFIC	82231603	212286898	258%	-130055295
Subtotal	**1963276641**	**1378902736**	**70%**	**584309010**

Geographic distribution of funds by sector are presented in the Tables below.

For the agriculture sector non-specific province requirements were assessed as 51.87 million USD of which 13% has been covered. KPK had the highest requirement at 31.06 million USD of which 84% has been fulfilled. Balochistan, with 15% of the total 'revised requirements', has received 100% coverage.

TABLE 20: AGRICULTURE TOTAL FUNDING

AGRICULTURE TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	25505258.17	25443990.25	100%	61267.92
KPK	31064995.33	25998180.58	84%	5066814.75
PUNJAB	26420440.17	24653631.25	93%	1766808.92
SINDH	28063101.33	25884235.92	92%	2178865.42
GILGIT BALTISTAN	7628236	0	0%	7628236
NON-SPECIFIC	51870875	6883003	13%	44987872
Subtotal	170552906	108863041	64%	61689865

For the economic sector, non-specific requirements were 122.63 million USD that have received 70% coverage as of February 1st 2012. Punjab had the highest 'revised requirement' at 18.02 million USD

followed by Sindh at 14.35 million USD. Of these amounts only 19% and 33% have been covered respectively.

TABLE 21: ECONOMIC RECOVERY AND INFRASTRUCTURE

ECONOMIC RECOVERY & INFRASTRUCTURE FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	10610320.17	3340855.50	31%	7269464.67
KPK	13658044	5037373	37%	8620671
PUNJAB	18018896.17	3368328.50	19%	14650567.67
SINDH	14352222.67	4767006	33%	9585216.67
KASHMIR	241793	0	0%	241793
FATA	969700	0	0%	969700
NON-SPECIFIC	122633839	85417393	70%	37216446
Subtotal	180484815	101930956	56%	78553859

Total 'revised requirements' for the education sector were 83.40 million USD of which only 42% has been covered. KPK was the leading province in this sector in terms of requirements at 5.05 million USD and has received 0% coverage, similar to the other provinces. Non-specific requirement totaled 76.50 million USD and has been 46% covered.

TABLE 22: EDUCATION TOTAL FUNDING

EDUCATION TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	124774	0	0%	124774
KPK	5048746	0	0%	5048746
PUNJAB	732864	0	0%	732864
FATA	992500	0	0%	992500
NON-SPECIFIC	76503650	34856367	46%	41647283
Subtotal	83402534	34856367	42%	48546167

TABLE 23: FOOD TOTAL FUNDING

FOOD TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	1216210	250000	21%	966210
KPK	13644817.50	5465733	40%	8179084.50
SINDH	12216823.50	5302778	43%	6914045.50
KASHMIR	237801	0	0%	237801
GILGIT BALTISTAN	1077500	0	0%	1077500
NON-SPECIFIC	545129125	424481274	78%	120647851
Subtotal	573522277	435499785	76%	138022492

TABLE 24: HEALTH TOTAL FUNDING

HEALTH TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	12888475.50	3141636.50	24%	9746839
KPK	23796413.50	9555059.83	40%	14241353.67
PUNJAB	23627888.50	9166469.33	39%	14199919.17
SINDH	17263585.50	7736343.33	45%	9527242.17
KASHMIR	2087635	0	0%	2087635
GILGIT BALTISTAN	796906	200000	25%	596906
FATA	718131	0	0%	718131
NON-SPECIFIC	162701344	113136088	70%	49565256
Subtotal	243880379	142935597	59%	100683282

TABLE 25: PROTECTION/HUMAN RIGHTS/RULE OF LAW

PROTECTION/HUMAN RIGHTS/RULE TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	172000	0	0%	172000
KPK	2514607.50	660000	26%	1854607.50
PUNJAB	2035749.50	660000	32%	1375749.50
SINDH	1802116	875600	49%	926516
KASHMIR	145000	0	0%	145000
NON-SPECIFIC	55861754	23775805	43%	32085949
Subtotal	**62531227**	**25971405**	**42%**	**36559822**

TABLE 26: SHELTER AND NON-FOOD ITEMS- TOTAL FUNDING

SHELTER & NON-FOOD ITEMS TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	3442089.33	3997669.33	116%	-555580
KPK	24300137.67	9162622.67	38%	15137515
PUNJAB	36881943.50	10605852.50	29%	26276091
SINDH	28449146.50	12457416	44%	15991730.50
KASHMIR	1758328	0	0%	1758328
GILGIT BALTISTAN	1240381	435608.50	35%	804772.50
NON-SPECIFIC	226021103	152618998	68%	73402105
Subtotal	**322093129**	**189278167**	**59%**	**132814962**

TABLE 27: WATER AND SANITATION TOTAL FUNDING

WATER & SANITATION TOTAL FUNDING UN appeal plus other				
Province	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
BALOCHISTAN	9902384	647798	7%	9254586
KPK	22390350.67	15237103.50	68%	7153247.17
PUNJAB	25917432.67	7935483.50	31%	17981949.17
SINDH	29461711.67	13592398	46%	16065918.67
KASHMIR	468152	0	0%	468152
GILGIT BALTISTAN	1036733	0	0%	1036733
FATA	379500	0	0%	379500
NON-SPECIFIC	155021507	89867737	58%	65153770
Subtotal	**244577771**	**127280520**	**52%**	**117493856**

TABLE 28: NON-SPECIFIC FUNDING

NON-SPECIFIC TOTAL FUNDING UN appeal plus other				
Sector	**Revised requirements USD**	**Funding USD**	**% Covered**	**Unmet requirements USD**
COORDINATION & SUPPORT SERVICES	82231603	64060444	78%	18171159
SECTOR NOT YET SPECIFIED	0	148226454	-	-148226454
Subtotal	82231603	212286898	258%	-130055295

CONCLUSIONS

Overall, the literature review provided valuable insight into the mechanisms, approaches and processes – or lack thereof – at play in a massive humanitarian disaster. By tracking the public discourse, backing it up with solid data, and engaging with key stakeholders bi-laterally around controversial issues prior to more public discussion, we were able to present a strong summary of key issues and policy changes needed in Pakistan and obtain broad stakeholder agreement to those needs. These are presented below.

The meta-analysis and financing reviews were not as illuminating as we had hoped due to lack of materials and inconsistencies in published financial figures. Nonetheless, the broad conclusions we have been able to draw do provide insight into oversights, gaps, and omissions in both the academic analysis and thinking around the 2010 floods and the policy response to flooding in Pakistan. This information can be used to provide clear starting points for further analysis.

CORE RECOMMENDATIONS FROM THE LESSONS SHARING WORKSHOP

1. Given the limited capacity of 3-4 days of early warning PMD needs to enhance its capacity to generate reliable and timely weather predictions considering the climate change factors. Increased investments have to be made to expand the limited resources and infrastructure of the Met Department. The communication of the early warnings to end-users i.e. the people through the cell phone networks may be more effective Oxfam 2011 Federal Flood Inquiry Commission 2011 NDMA 2011 FFC 2010.
2. Road-network and highways and other physical infrastructure should be designed with provision of culverts and escape channels as can drain floodwater sufficiently and do not exacerbate the situation by standing floodwater. The National Highway Authority and the Federal Flood Commission as ordered by the Judicial Flood Commission while carrying out the country-wide survey of the road-network vulnerable to floods should come up with designed capacity of flood prone sections based on last historical flood such as in 2010. The communities living around these structures should also be consulted over the drainage needs Federal Flood Inquiry Commission 2011 Punjab Flood Inquiry Tribunal 2011.
3. Hundreds of planned and spontaneous breaches occurred during the 2010 floods owing to host of factors and reasons which include among others lack of pre-flood poor maintenance and years' of negligence by PIDs massive encroachment and development within the floodplain that blocked natural flows of floodwater non-observance of flood regulations and SOPs. An in-depth study is required to thoroughly investigate by taking stock of Indus basin management particularly flood management and keeping in view the looming climate change can come up with recommendations for its effective management Federal Flood Inquiry Commission 2011 Punjab Flood Inquiry Tribunal 2011
4. Thousands of acres of land have been brought under cultivation along with raising private embankments hundreds of industrial units established thousands of human settlements located within the floodplain mostly inhabited by the poor. This issue needs further in-depth study in terms of situation analysis and work out strategies for getting them vacated and removing these developments as ordered by the Judicial Flood Commission. For landless poor living in the floodplain an arrangement/system may be devised whereby these rural poor can use the floodplain during the non-flood period Judicial Flood Commission 2011 Punjab Flood Inquiry Tribunal 2011
5. Predominant discourse during the 2010 floods like every major flood has been for the most part to have more dams to avert floods. Dams in general do well with floods of low and moderate level though they cause aggradation over time and deplete riverbeds. For high floods dams are ineffective. Apart from non-structural measures open basin management gaining currency within flood management regimes also deserves the attention of flood managers in Pakistan Various newspapers' articles Punjab Flood Inquiry Tribunal 2011

6. Conflicting findings such as Karakoram anomaly or decreasing of temperature during monsoon have made the impact of climate change in the Upper Indus and associated flows downstream very uncertain. Given the unavailability of long-term quality data that can support the reliable modeling and validation coupled with challenging topography has made climate analyses difficult. Longer-term research is required to determine impact of climate change in Upper Indus ICIMOD 2009 Task Force on Climate Change 2010

7. Current floods show that both seawater surges and flash floods that come laterally due to high rainfall in dry areas or once the water from the Indus channel flowed out owing to breaches or overtopping is not able to return to channel are actually exacerbated by the current irrigation and drainage structures in the deltaic plain. These need urgent attention for rectification and redesign the drainage system to cater to lateral flows SLD with Member DRR NDMA 2011.

8. The protection of hydraulic infrastructure is the priority for flood managers rather than flood management and that is the reason planned breaches are carried out to save these structures by inundating the surrounding areas. This approach has to be changed. Besides whose lands get inundated or house damaged should be compensated fully for their losses.

9. Floods are not all about destruction. Floods are boon for ecosystem as they replenish wetlands recharge groundwater provide fertility to topsoil wash out various viruses and harmful insects etc. The perception about floods needs to be changed benefits of floods should also be highlighted Punjab Flood Inquiry Tribunal 2011.

10. Majority of the people living in flood-affected areas are poor with no legal ownership of land. Ownership of land is critical for livelihood and shelter. Issue of landlessness came out very strongly during the 2010 floods it is recommended that the landless households should be given land titles from the state lands as it would build their resilience and reduce poverty. Government of Sindh ongoing initiative of land distribution to landless peasants particularly women-headed households may serve as model World Bank 2010 Oxfam 2011 UNDP 2011 Pattan 2011 various newspapers.

11. Local government institutions play key role in disaster management. Local government system abolished before the 2010 floods if revived and established with adequate legal and financial powers as they enjoyed under Local Government Ordinance 2002 to deal with disaster risks and emergencies will result in a much more effectively managed response Federal Flood Inquiry Commission 2011 Oxfam 2011

12. Given the limited capacity of the state and non-state actors to deal with flood disaster of scale like in 2010 and the fact that people were the first responders local level disaster management capacity building is critical for initial response. The community based disaster risk management interventions may be undertaken initially with the communities located in hazard prone areas UN 2011 Oxfam 2011 Pattan 2011 NDMA 2011.

13. The existing parallel structures and overlapping mandates to deal with disasters coupled with various constitutional modifications has further confused the disaster management system in Pakistan. The establishment of Ministry of Climate Change is a welcome step with the NDMA and GCISC is attached to it the PMD ERC ERRA Civil Defence and other such relevant entities merged into it for better coordination and effective management. Such steps are also required at provincial and regional level where similar structures and entities exist and could be brought under PDMAs NDMA 2011 Oxfam 2011.

14. In the overall context of aid effectiveness the issue of value for money transparency and accountability of some of the UN agencies and the INGOs was questioned by the government the donors and the civil society. The UN and the international NGOs as well as other humanitarian actors should make their operations more transparent and cost effective. Besides the UN as per the Paris Declaration norms should not overstep its mandate and be accountable to government and follow its priorities IASC 2011 NDMA 2011.

15. Given the limited capacity to manage disaster of scale as has been established in 2010 across the board there is a dire need to review and restructure systems and mode of operations by the government the UN INGOs and other humanitarian actors. The areas among others needs to be reviewed for improvement include data gathering and its integration coordination mechanisms prioritization of response and targeting availability of funds on fast track basis and its efficient utilization. The NDMA and its provincial counterparts PDMAs lacks critical human and financial resources to work effectively it has to be addressed on urgent basis to deal with future disasters NDMA 2011 Oxfam 2011 IASC 2011.

16. Baseline surveys and allied assessments are crucial for decision making to keep the timeliness in disaster situations Data gathering data management and data sharing remained a problem during the 2010 floods This has to be looked at critically in order to modify instruments and put in place responsive systems for effectively collect collate analyze and integrate data for programming and decision making. There was general dearth of gender specific data and disaggregated data related to gender was hard to come by during the 2010 floods which made it impossible to measure impact on women and its analyses as well as how their special needs were addressed. While revamping the data management systems mechanism has to be worked out to ensure that the gender disaggregated data is made available at all stages of response IASC 2011 NDMA 2011.

17. Mainly concentrated in the north of Pakistan the humanitarian community donors and INGO as they moved downstream south during 2010 floods realized that there are areas in Pakistan that also need support other than the north or north-west. Given the marginalization poverty and other deprivations prevalent in southern Punjab Sindh and Baluchistan the international community should continue their interventions on a long-term basis in these areas IASC 2011.

18. For reconstruction interventions the government given the financial crunch chose the least cost option which is 'build as before'. The government however even with the build as before can build smartly by efficiently utilizing the resources as well as through intensive monitoring.

19. The cluster system by and large was cumbersome and therefore was not effective. In case of 2010 floods rolling out of life saving might have been more effective rather then all eleven clusters. It needs to be reviewed that how could cluster approach work well in large-scale disasters IASC 2011 NDMA 2011.

20. The donors need to have flexibility to address changing needs and less-cumbersome procedures to access funds for humanitarian interventions because timeliness is critical in disaster response. Alongside local NGOs/CBOs' capacity needs to be built about relief and response interventions as well as to access funds from the donors the UN and other international NGOs IASC 2011 NDMA 2011.

21. A comprehensive Single Reporting Format SRF an online self-reporting system was good initiative meant to give a common picture of humanitarian activities in terms of who is doing what and where in addition to provides transparency avoid duplication of interventions tracking of funds and planning. It remained a non-starter as not all stakeholders reported on it until it was abandoned as mandatory reporting requirement. The SRF could be an effective tool if reporting on it is made mandatory. Hence it should be owned by the government and the UN and be revived for future use as mandatory requirement IASC 2011 NDMA 2011 UN OCHA 2010.

22. The Citizen Damage Compensation Programme aka watan card scheme was success in terms of providing much needed cash to flood affected households to meet their immediate needs. Speedy redressal mechanism and fast tracking process can make it more effective and transparent for future cash transfer programmes IOM 2011 NDMA 2011 Oxfam 2011 World Bank 2011 AF 2011.

23. Social protection programmes such as the BISP or watan cards can play important role in building resilience against climate change. Realigning these towards climate related vulnerability could bring huge returns in resilience building. The families that received compensations as part of the watan card were able to restore their livelihoods faster than those who did not have access to social protection programs for various reasons SLD with BISP officials 2011.

24. The Government contributed hugely both in cash and kind towards the relief recovery and reconstruction. Various public sector organizations both at the federal provincial and district level spent on the response by utilizing existing budgets or re-directing funds from different heads. The federal Government made specific allocations as well. But there is no system available to track them and know where they were spent in terms of sector area or expenditure. The donors did not contribute toward the Prime Minister's Disaster Management Fund; rather they channeled their funds through the UN or national or international organizations owing to reservations regarding transparency and efficient use of funds. In order for transparency and efficient use of funds the Government needs to put in place a system specific to each disaster giving consolidated details in terms of volume sector locations and source SLDs with relevant entities.

25. Overall the agri-inputs support package was also a success and a positive intervention. In kind support of certified seeds and fertilizers provided to small farmers enabled them to cultivate lands for next crop. Similar was response regarding compound feeds provided for animals in flood affected areas. Such interventions could help in fast recovery of small farmer if these are implemented with proper targeting clear eligibility criteria and efficient distribution NDMA 2011 Pattan 2011.

26. Although spontaneous recovery interventions began by the affected families and actors outside the appeal as the water started to recede which include philanthropists foreign governments INGOs and local organizations the formal early recovery processes was delayed considerably and missed out most of the target and became irrelevant in many cases. For disaster of this scale and scope relief and recovery interventions should be planned and implemented simultaneously IASC 2011 NDMA 2011.

27. In order that housing recovery interventions are compatible and cost efficient in terms of design and flood resistance at the early recovery stage monitoring mechanisms and a set of directions have to be provided by the federal provincial and district level entities to actors involved in housing sector IASC 2011 Oxfam 2011.

28. The Citizen Damage Compensation Programme phase II meant for owner's driven housing reconstruction put into motion in late 2012 unnecessary delay made it irrelevant and ineffective coupled with meager compensation of Rs. 40000 instead of Rs80000. The delay added to the vulnerability of affected households and therefore should be taken up on timely basis in future as shelter is a basic need for recovery and resilience Pattan 2011 various newspapers

29. The transparency and accountability mechanisms designed for reconstruction phase in the Plan including over-sight council third party evaluations; web-portal on reconstruction interventions became defunct or remained deactivated. This has seriously raised questions about the planned progress and impact of reconstruction interventions. This needs to be rectified as reconstruction is ongoing and will take couple of more years to complete SLDs with FRU Oxfam 2011

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APPENDICES

APPENDIX A: RESULT SHARING SESSION AGENDA

CLIMATE CHANGE *ADAPTATION*

30TH JANUARY 2013 AT SERENA HOTEL ISLAMABAD

Timings	Topic	Speaker
9:30-10:00	Registration of Participants	
10:00-10:10	Welcome	Fawad Khan Senior Associate ISET-PK
10:10-10:20	RSPN and Resilience Research	Shandana Khan Chief Executive Officer RSPN
10:20– 11:00	The Making of the Climate Resilience Framework	Marcus Moench President ISET-USA
11:00-11:40	Geographical Scales of Hydro-Politics in the Indus Basin	Dr. Daanish Mustafa Reader Kings College London
11:40-12:10	TEA BREAK	
12:10-12:20	Introduction to Indus Floods Research Project	Fazal Ali Saadi M&E Specialist RSPN
12:20-1:10	Key Findings Field Research	Fawad Khan Senior Associate ISET-PK
1:10-1:30	Open Discussion	
1:30-2:30	LUNCH BREAK	
2:30-3:00	Demographic Vulnerability Ranking	Sharmeen Malik Environmental Economist ISET-PK
3:00-3:30	Human Vulnerability Index for Climate Change Hazards	Fazal Ali Saadi M&E Specialist RSPN
3:30-4:10	Key Findings from 2010 Floods Desk Review	Atta-Ur-Rehman Sheikh Research Associate ISET-PK

Appendix B: Press release Results Sharing Session

30 Jan 2013 – The Rural Support Programmes Network RSPN and Institute for Social Science and Environmental Transition ISET co-hosted "Result Sharing Session on Climate Change Resilience" at Serena Hotel Islamabad.

Cognizant of the need to move beyond disaster reaction into disaster preparedness so that local rural communities become more resilient to future disasters RSPN initiated a research project in collaboration with ISET. The project on the state and access to basic services within rural communities that build adaptive capacity to disasters specifically floods. The study was conducted in four districts along a transact across the Indus River – Chitral Charsadda Dadu and Mithi. The project is co-funded by IDRC and DFID. The research has found that sources of resilience in different communities may stem from provision of certain critical services and systems that support them. The relative importance of different services and some of the supporting systems differs based on geography social conditions and level of development. Access to electricity in the mountain region and desert areas has increased resilience in populations where this service is available. Access to financial services and credit and improved water and sanitation also helped communities recover faster. Assessing demographic factors in Charsadda District the project found that households with higher ratio of women are the slowest to recover due to their inability to participate in the relief and rehabilitation activities in the conservative culture.

Apart from the sharing the specific results and insights gathered under the Indus Flood Research Project Dr. Marcus Moench President ISET-USA made a presentation on climate change adaptation in global and regional context and Dr. Daanish Mustafa Reader Kings College London talked about the Hydro-politics in Indus Basin.

"RSPN and its partner RSPs are among the first national organations that responded to all the major disastors including the 2005 earthquake the IDP cirsis of KPK in 2009 and the floods of 2010 & 2011 in Pakistan with the fiancial support of the its international development partners" said Shandana Khan CEO RSPN. She further added that the current research has stregthened our knowdge base for building resilient communities through RSPs development programmes for example social organization community infrastructure decentralized energy and micro-credit has helped build resilience to climate change.

The event was attended by senior officials from government of Pakistan donor agencies and national NGOs.

Appendix C: Core Recommendations

1. Given the limited capacity of 3-4 days of early warning PMD needs to enhance its capacity to generate reliable and timely weather predictions considering the climate change factors. Increased investments have to be made to expand the limited resources and infrastructure of the Met Department. The communication of the early warnings to end-users i.e. the people through the cell phone networks may be more effective Oxfam 2011 Federal Flood Inquiry Commission 2011 NDMA 2011 FFC 2010.

2. Road-network and highways and other physical infrastructure should be designed with provision of culverts and escape channels as can drain floodwater sufficiently and do not exacerbate the situation by standing floodwater. The National Highway Authority and the Federal Flood Commission as ordered by the Judicial Flood Commission while carrying out the country-wide survey of the road-network vulnerable to floods should come up with designed capacity of flood prone sections based on last historical flood such as in 2010. The communities living around these structures should also be consulted over the drainage needs Federal Flood Inquiry Commission 2011 Punjab Flood Inquiry Tribunal 2011.

3. Hundreds of planned and spontaneous breaches occurred during the 2010 floods owing to host of factors and reasons which include among others lack of pre-flood poor maintenance and years' of negligence by PIDs massive encroachment and development within the floodplain that blocked natural flows of floodwater non-observance of flood regulations and SOPs. An in-depth study is required to thoroughly investigate by taking stock of Indus basin management particularly flood management and keeping in view the looming climate change can come up with recommendations for its effective management Federal Flood Inquiry Commission 2011 Punjab Flood Inquiry Tribunal 2011

4. Thousands of acres of land have been brought under cultivation along with raising private embankments hundreds of industrial units established thousands of human settlements located within the floodplain mostly inhabited by the poor. This issue needs further in-depth study in terms of situation analysis and work out strategies for getting them vacated and removing these developments as ordered by the Judicial Flood Commission. For landless poor living in the floodplain an arrangement/system may be devised whereby these rural poor can use the floodplain during the non-flood period Judicial Flood Commission 2011 Punjab Flood Inquiry Tribunal 2011

5. Predominant discourse during the 2010 floods like every major flood has been for the most part to have more dams to avert floods. Dams in general do well with floods of low and moderate level though they cause aggradation over time and deplete riverbeds. For high floods dams are ineffective. Apart from non-structural measures open basin management gaining currency within flood management regimes also deserves the attention of flood managers in Pakistan Various newspapers' articles Punjab Flood Inquiry Tribunal 2011

6. Conflicting findings such as Karakoram anomaly or decreasing of temperature during monsoon have made the impact of climate change in the Upper Indus and associated flows downstream very uncertain. Given the unavailability of long-term quality data that can support the reliable modeling and validation coupled with challenging topography has made climate analyses difficult. Longer-term research is required to determine impact of climate change in Upper Indus ICIMOD 2009 Task Force on Climate Change 2010

7. Current floods show that both seawater surges and flash floods that come laterally due to high rainfall in dry areas or once the water from the Indus channel flowed out owing to breaches or overtopping is not able to return to channel are actually exacerbated by the current irrigation and drainage structures in the deltaic plain. These need urgent attention for rectification and redesign the drainage system to cater to lateral flows SLD with Member DRR NDMA 2011.

8. The protection of hydraulic infrastructure is the priority for flood managers rather than flood management and that is the reason planned breaches are carried out to save these structures by inundating the surrounding areas. This approach has to be changed. Besides whose lands get inundated or house damaged should be compensated fully for their losses.

9. Floods are not all about destruction. Floods are boon for ecosystem as they replenish wetlands recharge groundwater provide fertility to topsoil wash out various viruses and harmful insects etc. The perception about floods needs to be changed benefits of floods should also be highlighted Punjab Flood Inquiry Tribunal 2011.

10. Majority of the people living in flood-affected areas are poor with no legal ownership of land. Ownership of land is critical for livelihood and shelter. Issue of landlessness came out very strongly during the 2010 floods it is recommended that the landless households should be given land titles from the state lands as it would build their resilience and reduce poverty. Government of Sindh ongoing initiative of land distribution to landless peasants particularly women-headed households may serve as model World Bank 2010 Oxfam 2011 UNDP 2011 Pattan 2011 various newspapers.

11. Local government institutions play key role in disaster management. Local government system abolished before the 2010 floods if revived and established with adequate legal and financial powers as they enjoyed under Local Government Ordinance 2002 to deal with disaster risks and emergencies will result in a much more effectively managed response Federal Flood Inquiry Commission 2011 Oxfam 2011

12. Given the limited capacity of the state and non-state actors to deal with flood disaster of scale like in 2010 and the fact that people were the first responders local level disaster management capacity building is critical for initial response. The community based disaster risk management interventions may be undertaken initially with the communities located in hazard prone areas UN 2011 Oxfam 2011 Pattan 2011 NDMA 2011.

13. The existing parallel structures and overlapping mandates to deal with disasters coupled with various constitutional modifications has further confused the disaster management system in Pakistan. The establishment of Ministry of Climate Change is a welcome step with the NDMA and GCISC is attached to it the PMD ERC ERRA Civil Defence and other such relevant entities merged into it for better coordination and effective management. Such steps are also required at provincial and regional level where similar structures and entities exist and could be brought under PDMAs NDMA 2011 Oxfam 2011.

14. In the overall context of aid effectiveness the issue of value for money transparency and accountability of some of the UN agencies and the INGOs was questioned by the government the donors and the civil society. The UN and the international NGOs as well as other humanitarian actors should make their operations more transparent and cost effective. Besides the UN as per the Paris Declaration norms should not overstep its mandate and be accountable to government and follow its priorities IASC 2011 NDMA 2011.

15. Given the limited capacity to manage disaster of scale as has been established in 2010 across the board there is a dire need to review and restructure systems and mode of operations by the government the UN INGOs and other humanitarian actors. The areas among others needs to be reviewed for improvement include data gathering and its integration coordination mechanisms prioritization of response and targeting availability of funds on fast track basis and its efficient utilization. The NDMA and its provincial counterparts PDMAs lacks critical human and financial resources to work effectively it has to be addressed on urgent basis to deal with future disasters NDMA 2011 Oxfam 2011 IASC 2011.

16. Baseline surveys and allied assessments are crucial for decision making to keep the timeliness in disaster situations Data gathering data management and data sharing remained a problem during the 2010 floods This has to be looked at critically in order to modify instruments and put in place responsive systems for effectively collect collate analyze and

integrate data for programming and decision making. There was general dearth of gender specific data and disaggregated data related to gender was hard to come by during the 2010 floods which made it impossible to measure impact on women and its analyses as well as how their special needs were addressed. While revamping the data management systems mechanism has to be worked out to ensure that the gender disaggregated data is made available at all stages of response IASC 2011 NDMA 2011.

17. Mainly concentrated in the north of Pakistan the humanitarian community donors and INGO as they moved downstream south during 2010 floods realized that there are areas in Pakistan that also need support other than the north or north-west. Given the marginalization poverty and other deprivations prevalent in southern Punjab Sindh and Baluchistan the international community should continue their interventions on a long-term basis in these areas IASC 2011.

18. For reconstruction interventions the government given the financial crunch chose the least cost option which is 'build as before'. The government however even with the build as before can build smartly by efficiently utilizing the resources as well as through intensive monitoring.

19. The cluster system by and large was cumbersome and therefore was not effective. In case of 2010 floods rolling out of life saving might have been more effective rather then all eleven clusters. It needs to be reviewed that how could cluster approach work well in large-scale disasters IASC 2011 NDMA 2011.

20. The donors need to have flexibility to address changing needs and less-cumbersome procedures to access funds for humanitarian interventions because timeliness is critical in disaster response. Alongside local NGOs/CBOs' capacity needs to be built about relief and response interventions as well as to access funds from the donors the UN and other international NGOs IASC 2011 NDMA 2011.

21. A comprehensive Single Reporting Format SRF an online self-reporting system was good initiative meant to give a common picture of humanitarian activities in terms of who is doing what and where in addition to provides transparency avoid duplication of interventions tracking of funds and planning. It remained a non-starter as not all stakeholders reported on it until it was abandoned as mandatory reporting requirement. The SRF could be an effective tool if reporting on it is made mandatory. Hence it should be owned by the government and the UN and be revived for future use as mandatory requirement IASC 2011 NDMA 2011 UN OCHA 2010.

22. The Citizen Damage Compensation Programme aka watan card scheme was success in terms of providing much needed cash to flood affected households to meet their immediate needs. Speedy redressal mechanism and fast tracking process can make it more effective and transparent for future cash transfer programmes IOM 2011 NDMA 2011 Oxfam 2011 World Bank 2011 AF 2011.

23. Social protection programmes such as the BISP or watan cards can play important role in building resilience against climate change. Realigning these towards climate related vulnerability could bring huge returns in resilience building. The families that received compensations as part of the watan card were able to restore their livelihoods faster than those who did not have access to social protection programs for various reasons SLD with BISP officials 2011.

24. The Government contributed hugely both in cash and kind towards the relief recovery and reconstruction. Various public sector organizations both at the federal provincial and district level spent on the response by utilizing existing budgets or re-directing funds from different heads. The federal Government made specific allocations as well. But there is no system available to track them and know where they were spent in terms of sector area or expenditure. The donors did not contribute toward the Prime Minister's Disaster

Management Fund; rather they channeled their funds through the UN or national or international organizations owing to reservations regarding transparency and efficient use of funds. In order for transparency and efficient use of funds the Government needs to put in place a system specific to each disaster giving consolidated details in terms of volume sector locations and source SLDs with relevant entities.

25. Overall the agri-inputs support package was also a success and a positive intervention. In kind support of certified seeds and fertilizers provided to small farmers enabled them to cultivate lands for next crop. Similar was response regarding compound feeds provided for animals in flood affected areas. Such interventions could help in fast recovery of small farmer if these are implemented with proper targeting clear eligibility criteria and efficient distribution NDMA 2011 Pattan 2011.

26. Although spontaneous recovery interventions began by the affected families and actors outside the appeal as the water started to recede which include philanthropists foreign governments INGOs and local organizations the formal early recovery processes was delayed considerably and missed out most of the target and became irrelevant in many cases. For disaster of this scale and scope relief and recovery interventions should be planned and implemented simultaneously IASC 2011 NDMA 2011.

27. In order that housing recovery interventions are compatible and cost efficient in terms of design and flood resistance at the early recovery stage monitoring mechanisms and a set of directions have to be provided by the federal provincial and district level entities to actors involved in housing sector IASC 2011 Oxfam 2011.

28. The Citizen Damage Compensation Programme phase II meant for owner's driven housing reconstruction put into motion in late 2012 unnecessary delay made it irrelevant and ineffective coupled with meager compensation of Rs. 40000 instead of Rs80000. The delay added to the vulnerability of affected households and therefore should be taken up on timely basis in future as shelter is a basic need for recovery and resilience Pattan 2011 various newspapers

29. The transparency and accountability mechanisms designed for reconstruction phase in the Plan including over-sight council third party evaluations; web-portal on reconstruction interventions became defunct or remained deactivated. This has seriously raised questions about the planned progress and impact of reconstruction interventions. This needs to be rectified as reconstruction is ongoing and will take couple of more years to complete SLDs with FRU Oxfam 2011

Appendix D: Results Sharing Session Participant List

Indus Floods Research Project

Result Sharing Session: Climate Change Resilience

(30 January 2013, Serena, Islamabad)

List of Participants

1.	Dr. Qamar uz Zaman Ch., Advisor Climate Change (GoP), Member Task Force on CC, VP (SA), WMO, Islamabad.
2.	Mr. Ahmed Kamal, Head, Federal Flood Commission (DSC), Islamabad.
3.	Dr. Hans Frey, Secretary General, Council of Social Sciences, Islamabad.
4.	Mr. Ayub Qutub, Executive Director, PIEDAR, Islamabad.
5.	Ms. Javeria Afzal, Advisor Climate Change, Oxfam Novib, Islamabad.
6.	Mr. Mehmood Akhtar Cheema, Country Director, IUCN, Islamabad.
7.	Brig. Sajid Naeem, Member (Operations), National Disaster Management Authority (NDMA), Islamabad.
8.	Mr. Sibt-e-Abbas Zaidi, Director, National Disaster Management Authority (NDMA), Islamabad.
9.	Mr. Amanur Rehman Khan, FSA, World Food Programme (WFP), Islamabad.
10.	Mr. Hameed Marwat, Chief (Environment), Planning Commission, Islamabad.
11.	Brig. Tariq Hussain Murredi, Director General (M&E), ERRA, Islamabad.
12.	Dr. Ghulam Mustafa, Director (PAC), ERRA, Islamabad.
13.	Dr. Rehana Siddiqui, Director, Centre for Environmental Economics and Climate Change (PIDE), Islamabad.
14.	Ms. Safia Shafiq, Head of Environment, Asian Development Bank, Islamabad.
15.	Mr. Shiraz Ali Shah, Consultant, World Bank, Islamabad.
16.	Mr. Ghazanfar Ali, Head (Water Resource), Global Change Impact Study Centre (GCISC), Islamabad.
17.	Dr. M. Munir Sheikh, Head (Climatology), Global Change Impact Study Centre (GCISC), Islamabad.
18.	Mr. Adnan Ashraf, Programme Officer, UNHCR, Islamabad.
19.	Mr. Hamza Abbasi, Livelihood Specialist, Concern Worldwide, Islamabad.
20.	Mr. Wasim Wagha, Manager (Advocacy and Research), Aurat Foundation,

	Islamabad.
21.	Ms. Maira Zahur, Programme Officer, UN Women, Islamabad
22.	Mr. Wolfgang Hesse, Programme Associate, GIZ, Islamabad.
23.	Mr. Zaffar Junejo, Chief Executive Officer, TRDP, Mithi (Sindh)
24.	Mr. Munawar Aleekapri, Manager (M&E), TRDP, Mithi (Sindh)
25.	Mr. Atif Zeeshan, Manager (M&E), SRSP, Peshawar
26.	Dr. Arshad Waheed, Director, Institute of Social Policy, Islamabad.
27.	Mr. Amer Habib, Programme Manager, Save the Children Fund (SCF), Islamabad.
28.	Mr. Bilal Ali Qureshi, Programme Officer, UNDP, Islamabad.
29.	Ms. Dina Khan, CDKN (LEAD-Pakistan), Islamabad.
30.	Ms. Anam Zeb, Programme Officer, LEAD Pakistan, Islamabad.
31.	Mr. Farrukh Khan, Assistant Programme Officer, LEAD Pakistan, Islamabad.
32.	Mr. Irteza Haider, Programme Manager, National Rural Support Programme (NRSP), Islamabad.
33.	Mr. M. Yunus, Team Leader, AKRSP, Chitral
34.	Ms. Jamila Nawaz, Programme Officer, Oxfam GB (Pakistan), Islamabad.
35.	Ms. Shahida Sultan, Manager (M&E), Focus Humanitarian, Islamabad.
36.	Mr. Intisar Ahmed, Chief Operating Officer, FIDA, DI Khan.
37.	Ms. Fatima Zafar, M&E Officer, Malteser International, Islamabad.
38.	Ms. Amelie Coue, Programme Officer, Hienrich Boll Foundation, Islamabad.
39.	Mr. Amir Jadoon, Producer, Pakistan Television, Islamabad.
40.	Mr. Marcus Moench, President, ISET International, USA
41.	Dr. Daanish Mustafa, Reader, Kings College, London.
42.	Mr. Fawad Khan, Senior Associate, ISET-PK, Islamabad.
43.	Mr. Atta ur Rehman, Research Associate, ISET-PK, Islamabad.
44.	Ms. Sharmeen Malik, Environmental Economist, ISET-PK, Islamabad.
45.	Mr. Ajaz Ahmed, Environmental Economist, ISET-PK, Islamabad.
46.	Ms. Shandana Khan, Chief Executive Officer, RSPN, Islamabad.
47.	Mr. Khalil Ahmed Tetlay, Chief Operating Officer, RSPN, Islamabad.

48.	Mr. Fazal Ali Saadi, M&E Specialist, RSPN, Islamabad.
49.	Ms. Nida Khan, Programme Manager, RSPN, Islamabad.
50.	Mr. Hussain Kazim, Consultant, RSPN, Islamabad.
51.	Ms. Umm-e-Laila Hussain, Communication Officer, RSPN, Islamabad.
52.	Mr. Burhan Razi, Programme Officer, RSPN, Islamabad.
53.	Mr. M. Ali Azizi, SPSM, RSPN, Islamabad.
54.	Mr. Qazi Haseeb, Internal Auditor, RSPN, Islamabad.
55.	Mr. Asad Ali Hashmi, Chief Finance Officer, RSPN, Islamabad.
56.	Mr. Ziaul Qamar, RSPN, Islamabad.
57.	Mr. Nasir Mehmood, Lecturer, University of Arid Agriculture, Rawalpindi
58.	Mr. Saeed Akhtar, University of Arid Agriculture, Rawalpindi
59.	Mr. Tahir Hamid Rao, University of Arid Agriculture, Rawalpindi
60.	Mr. Faisal Rasool, University of Arid Agriculture, Rawalpindi
61.	Mr. Suhail Ahmed, University of Arid Agriculture, Rawalpindi
62.	Mr. Mohsin Fahim, Research Associate, University of Arid Agriculture, Rawalpindi
63.	Mr. Aqeel Yousuf, University of Arid Agriculture, Rawalpindi
64.	Mr. Tahir Mohammad, University of Agriculture, Rawalpindi
65.	Mr. Khawar Hassan, University of Arid Agriculture, Rawalpindi.