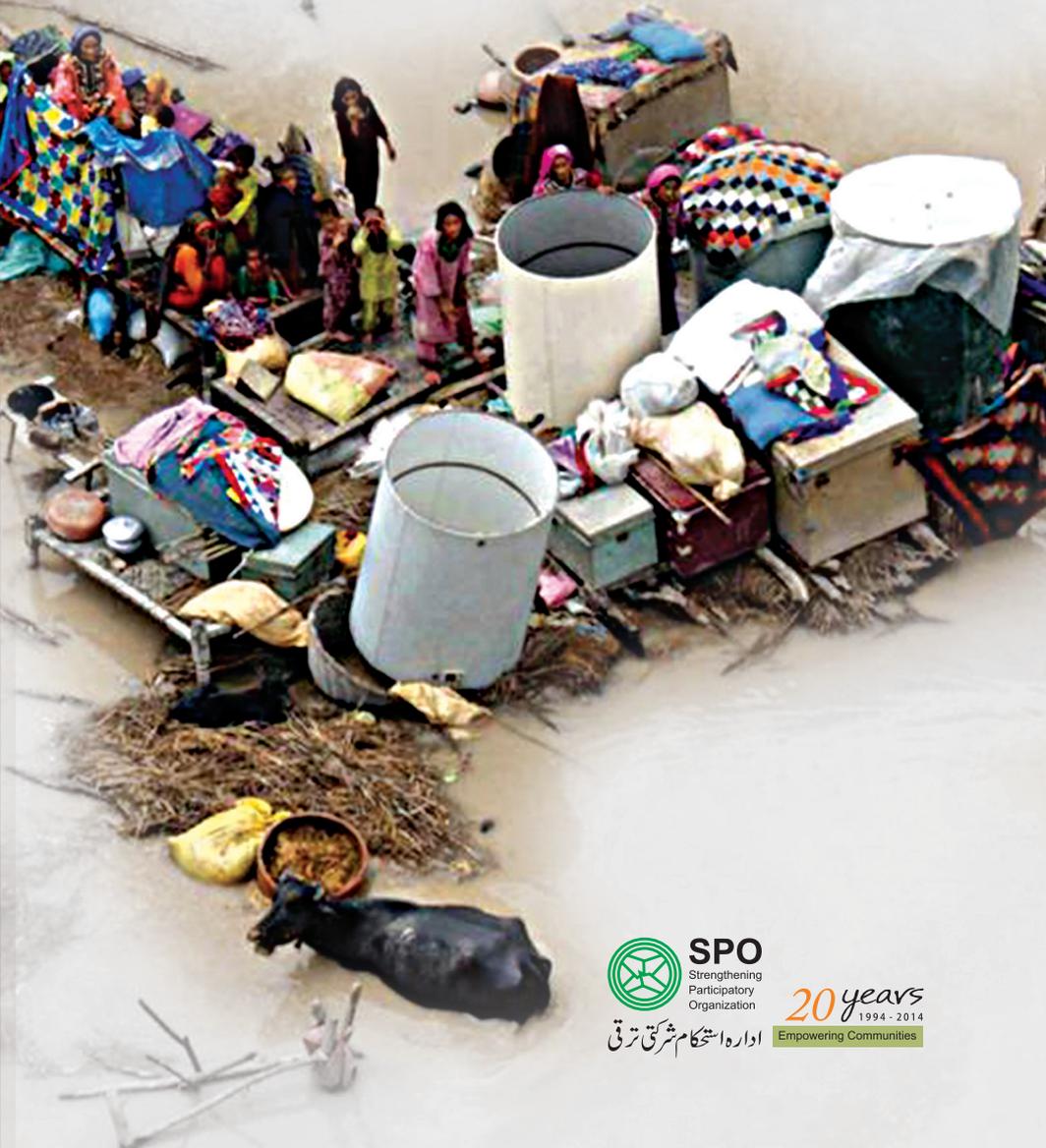


Malevolent Floods of Pakistan

Naseer Memon



اداره استحکام شرکتی ترقی

20 years
1994 - 2014

Empowering Communities

Malevolent Floods of Pakistan 2010-2012

Naseer Memon



Author's Profile

Naseer Memon is the Chief Executive of SPO. Over past 15 years, he has held senior positions at prominent environment, development, academic and corporate sector organizations including LEAD Pakistan, WWF Pakistan, Premier Oil, UNDP and Mehran University of Engineering and Technology.



Mr. Memon has also been serving on the high profile committees and the boards of various government and civil society organizations as well as the regional and international networks and forums. Mr Memon is an ardent writer and a columnist, whose work on socio-political, governance and ecological issues is widely read and acknowledged. He has authored over two dozen articles on climate change and disasters. Two of his books are widely referred among the humanitarian community. These books are “Climate Change and Natural Disasters in Pakistan”-published in four languages and “Disasters in South Asia – A Regional Perspective”-published in two languages. He received awards from IUCN Pakistan and Sindh Environmental Protection Agency for his writings on environment and conservation issues. As the keynote speaker, he regularly presents at the national and international forums, his literary work about the very issues this book touches upon.

Disclaimer

“The views expressed in this publication are those of the author and do not necessarily reflect the views of the SPO”

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Acronyms

ADB	Asian Development Bank
AJ&K	Azad Jammu and Kashmir
ATM	Automated Teller Machine
BBB	Build Back Better
DDMAs	District Disaster Management Authorities
DRR	Disaster Risk Reduction
DCO	District Coordination Officer
EM-Dat	Emergency Events Database (International Disaster Database)
EIA	Environmental Impact Assessment
FFC	Federal Flood Commission
FP	Flood Protection
FRRRR	Flood Response, Recovery, Reconstruction and Rehabilitation
GBV	Gender Based Violence
GDP	Gross Domestic Product
GIS	Geographical Information System
GHG	Green House Gases
HFA	Hyogo Framework Action
IDPs	Internally Displaced Persons
INGOs	International Non-governmental Organizations
LBOD	Left Bank Outfall Drain
MIRA	Multi-cluster Initial Rapid Assessment
MNVD	Main Nara Valley Drain
MRE	Meals Ready to Eat
MAF	Million Acre Feet
NDMA	National Disaster Management Authority
NGOs	Non-Governmental Organisations
NODMC	National Oversight Disaster Management Council
PDMA	Provincial Disaster Management Authority
PIDs	Provincial Irrigation Departments
PILER	Pakistan Institute of Labour Education and Research
PKR	Pakistani Rupee
RBOD	Right Bank Outfall Drain
UN	United Nations
UNOCHA	United Nations Office for Coordination of Humanitarian Assistance
UNFPA	United Nations Fund for Population Activities
USD	US Dollar/\$

WAPDA	Water and Power Development Authority
WHHs	Women-Headed Households
WHO	World Health Organization
WB	World Bank
GOP	Government of Pakistan
DMA	Disaster Management Authorities
NHN	National Humanitarian Network

Foreword

Abnormal and untimely weather events are taking place all over the world in the form of cyclones, hurricanes, tornados, hail storms, thunder storms, blizzards, tsunamis and monsoon rains. To study these events, UN formed a panel of international scientists known as the Intergovernmental Panel on Climate Change (IPCC) which attributes changes in weather patterns to human-induced activities. According to this panel, the industrial revolution has caused burning of fossil fuels such as coal, oil and gas that produce abnormal quantities of Green House Gases (GHG) such as Carbon-dioxide, Nitrous Oxide, Methane and Ozone. These gases block return of sun rays to atmosphere and thereby increase global temperature. This increase in global temperature causes sea level rise, glacier retreat floods, droughts and monsoon variability; in short, climate change. The situation can be corrected, if the cause is removed, i.e. reduce GHG emissions. This is known as mitigation. In the World Bank's report of 2005, the greatest polluters are:-

USA	6080 million cubic tones annually
China	5279 million cubic tones annually
Russia	1750 million cubic tones annually
India	1237 million cubic tones annually
Japan	1221 million cubic tones annually

But these countries reluctant to reduce emissions fearing economic losses. In contrast, it is the poor countries of the third world that do not produce noticeable amount of GHGs yet are affected by the climate change.

Naseer Memon, in this book has analysed the impact of floods in South East Asia in general and Pakistan in particular. He has presented a detailed account of river/rainfall flood disasters for years 2010, 2011 and 2012.

In this book, Mr. Memon has provided an account of the consequences of multifaceted devastation, the donor fraternity's responses and lessons learnt as the way forward.. It presents a well-written account of the horrendous events of three years of floods in Pakistan; which must be read by all; particularly by those living in this part of the world to get a sense of how climatic variations will continue to affect their lives.

(Muhammad Idris Rajput)

Ex-Secretary

Irrigation Department, Government of Sindh, Karachi

1. A History of Floods in Pakistan

a. Overview: Floods in South Asia

Among natural disasters all over the world, floods are the most common ones. According to world statistics, 1.4 billion people were affected and around 100,000 were killed by the floods in 20th century. Each year, about 50-60 billion dollars are spent to address the needs arising from floods – a huge burden on the world economy. A United Nations (UN) study reports that ‘annually, floods claim 22,800 lives and damage to the Asian economy is estimated at around US\$ 136 billion’.

Given the recent unprecedented events, it can be said that Asia is under the influence of climate change and resultant natural disasters. Extreme weather events with debilitating intensity and frequency have brought unprecedented suffering for millions in the region.

About 25% of the world’s population lives in South Asia. The region’s land cover is 3.2% of the world’s land and 10% of Asia. The population in South Asia includes 40% of the world’s poor. The International Disaster Database (EM-DAT) indicates that 332 events of floods were recorded in South Asia during 1979 and 2005 alone. An advance search on the database reveals that in the last five years, 134 incidents of floods have occurred causing 13,795 deaths and injuring 7,973 people. An estimated 135 million people were affected. The following table illustrates the magnitude of these incidents:

Occurrences	134
Deaths	13,795
Injured	7,973
Affected	131,159,282
Homeless	3,971,716
Total Affected	135,138,971
Total Damage ('000 USD)	22,760,948

Source: Journal of South Asia Disaster Studies, <http://saarc-sdmc.nic.in/pdf/publications/journal/chapter-6.pdf>, International Disaster Database (EM DAT)

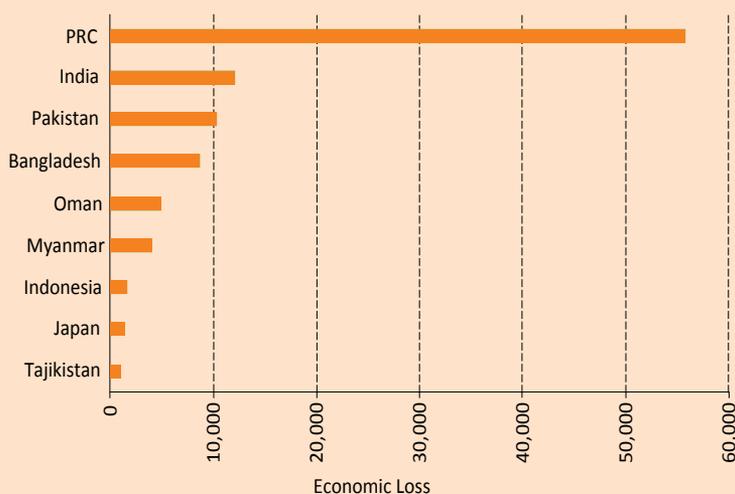
The frequency with which disasters strike and the damage they inflict, it is usually the poor who have to embrace such eventualities. . Table 1 above depicts an overall picture of the fallout of recurrent floods in various South Asian countries. The manner in which extreme weather events have affected people in specific parts of Asia can be assessed from few of the following recent incidents.

In August 2010, Bangladesh received 750 mm of rain which affected nearly 200,000 people in Rajshahi. In the southeast, over 50 people were killed due to landslides and floods, while in Siraiganj about 3,000 hectares of crops were lost and more than 20,000 people were left homeless in Cox's Bazaar and Teknaf district.

Similarly, Seoul in South Korea received over 300 mm rainfall in one day, the largest single-day rainfall during July 2010 recorded since 1907.

In January 2011, Sri Lanka witnessed rains that affected nearly a million people. Climate change is predicted to make tea plantations of Sri Lanka unsuitable for crop production by 2050.

Figure 1: Asian Countries with High Flood Damage, 2000–2011 (\$ million)



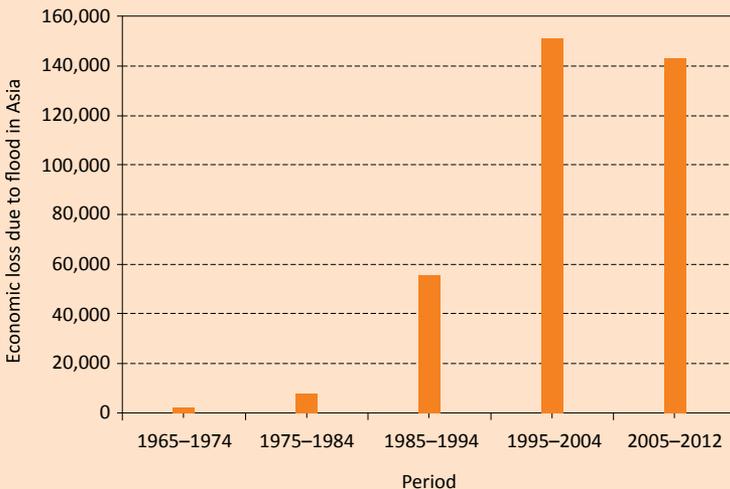
Source: Indus Basin Floods-Mechanisms, Impacts, and Management: Asian Development Bank 2013

In Thailand, thousands of homes were damaged and hundreds of thousands of acres of crop land was inundated by heavy rains. In June 2011, rains pounded six provinces of China forcing the evacuation of 0.35 million people and damaging approximately 33,000 houses. The water level in the Qiantang River rose to the highest in the recorded history of past 50 years.

One thing is common in all of these occurrences: Recorded data from past has become least reliable in terms of predicting future weather patterns and their potential outcomes as well as planning to mitigate their adverse impacts.

Pakistan is located in the South Asia region; therefore, it equally bears the brunt of climate change. In 2010, the country witnessed an unusual shift of the monsoon from the easterly to westerly region. The following year, the lower half of Sindh received record-breaking rains. Rainfall in lower Sindh averages between 200 mm to 250 mm, which normally occurs between July and August. In 2011, the monsoons began in September and the districts of Mirpurkhas, Badin and Shaheed Benazirabad received 810 mm, 680 mm and 640 mm of rain respectively—beyond the normal averages. Badin received 297 mm of

Figure 2: Flood-Induced Economic Losses in Asia (\$ million)



Source: Indus Basin Floods-Mechanisms, Impacts, and Management: Asian Development Bank 2013

rain in just two days (on August 11th and 12th), which buffeted hundreds of villages along the main artery of the Left Bank Outfall Drain (LBOD). The overall damage surpassed the damage caused in upper Sindh by the 2010 floods. Owing to the flat topographical features of Sindh, the province has a 200 mm gradient for little more than a kilometre, as a result of which gravitational drainage to the Arabian Sea is reduced even under normal circumstances.

The un-predictable nature of the climate change suggests that the physical infrastructure, administrative mechanisms need to be revised in the wake of new developments. Prominent climate change campaigner Al Gore, said: “The rules of risk assessment are being rewritten right before our eyes.” What Al Gore said with reference to the disasters in the United States is true for much of the rest of the world as well. Pakistan is no exception, which is why it has moved from 29th in 2009-10 to 16th in 2011, on the Climate Change Vulnerability Index.

b. A Chronology of Floods in Pakistan

Flood disasters in Pakistan are often triggered by mighty Indus River. The Indus River is a major trans-boundary river in Asia with nine tributaries. Its five tributaries on the left bank are the Beas, Chenab, Jhelum, Ravi, and Sutlej rivers. The main right bank tributaries are the Gomal, Kabul, Swat and Kurram rivers.

The Indus River is about 2,800 kilometres (km) long, with 2,682 km of it stretched between northern and southern confines of Pakistan. Its alluvial plain area is about 207,200 km, while its deltaic area is about 20,000 km. It originates in the Tibetan tableland at Singi Kahad spring, on Kailas Parbat (mountain) near Mansarwar Lake.

It then passes through the Himalayan range, and collects runoff from the Hindu Kush and Sulaiman ranges.

According to Professor Martin Gibling of Dalhousie University, the Indus was even mightier during a warm period some 6,000 years ago. Then 4,000 years ago, as the climate cooled, a large part of the Indus dried up and deserts replaced the waterways. The Professor points towards localized warming phenomenon as the element responsible for the disaster. In his opinion, monsoon intensity is somewhat sensitive to the surface temperature of the Indian Ocean. During times of cooler climate, less moisture is picked up from the ocean, the monsoon weakens and the Indus River flow is reduced. Against

this backdrop, climate change seems to be a major factor behind the severe and devastating monsoon in 2010. The dominant threat posed by climate change is an increased degree of non-reliability of historic data, often making all estimates redundant. Khyber Pakhtunkhwa experienced a unique monsoon this time, which was completely unprecedented. None of the analysis of available historic data would have forecasted what actually occurred during 2010. The higher degree of weather un-predictability induced by climate change is the

Figure 3: Line Diagram of the Indus Basin in Pakistan



Source: Indus Basin Floods-Mechanisms, Impacts, and Management: Asian Development Bank 2013

real challenge for the fragile flood management system of Pakistan. Climate change phenomenon is likely to induce erratic disaster patterns making it virtually impossible for the flood managers to respond, with their existing weak institutional structures.

During the last 66 years, Pakistan has embraced various catastrophic disasters triggered by rain-fed floods. According to a report of the Asian Development Bank, Pakistan has experienced 21 major floods between 1950 and 2011 (almost one flood every three years) that claimed a total of 8,887 human lives and inflicted damage to 109,822 villages equalling an estimated economic loss of \$19 billion. . On an average, the annual flood damage from 1960 to 2011 was about one per cent of the mean annual Gross Domestic Product (GDP). The devastating 2010 flood was the worst that casued a total economic loss of about \$10 billion. Major floods occurred in the years 1950, 1955, 1956, 1957, 1959, 1973, 1975, 1976, 1977, 1978, 1981, 1983, 1984, 1988, 1992, 1994, 1995, 2010, 2011 and 2012.

Here is a brief summary of major floods in Pakistan.

1955 Flood: From 4 to 6 October 1955, 200 mm of rain fell in the town of Dalhousie, 200 mm in the city of Sialkot, and 500 mm in the catchments of the Ujh and Basantar rivers, covering almost the entire catchment area of the Ravi River. The 1955 flood was the highest on the record for the Ravi River, Balloki Headworks. It breached the flood embankments of the Bambanwala-Ravi-Bedian-Dipalpur Link Canal, upstream from Ravi Siphon, and at Shahdara Bridge, a suburb of Lahore.

1973 Flood: Intense rainfall of 324 mm generated flood peaks at Khanki Headworks and at Panjnad Barrage, both on the Chenab River, inundating 3.6 million hectares of land in several districts with waters up to a height of about 6 m. Wheat and cotton crops were devastated. Punjab lost 70,000 cattle and 255,000 houses, and 474 people perished. The total damage was estimated at \$2.39 billion.

1976 Flood: Monsoon rainfall of 579 mm during July and September on the Indus catchments resulted in flooding at the Jinnah Barrage and Guddu Barrage, both on the Indus River. The flood killed 425 people and affected another 1.7 million people, inundated 8 million ha of land, and affected 18,390 villages, damaging 11,000 houses. Total economic losses were estimated at \$1.62 billion.

1988 Flood: An average of 400 mm of rainfall occurred on the catchments of the Ravi, Sutlej, and Chenab rivers on the 23-26 September. The flood deluged 1 million ha of agricultural land and irrigated crops, killing 500 people and causing economic damage totalling about \$400 million.

1992 Flood: The 1992 monsoon caused widespread rain on the catchments of the Indus, Jhelum, and Chenab rivers. The continuous 5-day rainfall during 7-11 September was the highest in the history in the same period. The rainfall led to flooding in the Chenab, Jhelum and Indus River. The breaching of flood protection levees (FPLs) exposed large areas to the ravages of the flood, which inundated 13,000 villages, damaged 960,000 houses, affected 4.8 million people, and killed more than 1,000 (World Bank 1996).

The Government of Pakistan estimated the damage at about \$1.4 billion, including \$0.5 billion worth of damage to public infrastructure. The hardest hit were the agriculture and communication sectors, for which the cost of flood damage repair was estimated at a total of \$396 million.

1994 Flood: Widespread rains from July to September caused flooding in the Indus and Sutlej rivers. The Government's damage assessment reported that, as of 21st September, the floods had killed 386 people, damaged 557,000 houses, and resulted in the loss of 14,000 cattle and of about 700,000 ha of crops.

Floods in 2005 and 2006: The Kabul and Chenab rivers experienced high flooding in 2005 and 2006. These two floods resulted in the death of 591 people and affected about 1 million ha of land in 117 districts.

The floods in 2010 were the second worst in terms of devastation. The flood 1,985 lives and inundated 17,553 villages over 160,000-square kilometres, affecting 21 million people.

During 2011 and 2012 floods claimed 516 and 571 lives respectively. Cumulatively in 2010, 2011 and 2012, Pakistan lost 3,072 lives and \$16 billion of physical capital.

In 2013, although no major floods were reported, yet the monsoon rains killed around 69 people, including 22 in Sindh, 18 in Balochistan, 15 in Punjab and 14 in Khyber Pakhtunkhwa.

During the last 66 years, the floods have affected 599,459 square kilometres of area, claimed 11,239 human lives, caused losses worth over PKR 39 billion to the national economy and left 180,234 villages inundated. .

According to a report of Islamic Relief titled “Flooded and Forgotten”, 71 floods occurred between the years 1950 and 2011. These caused the death of 14,866 persons whereas nearly 58.97 million people were affected. The floods have had a huge impact on an already struggling economy of Pakistan, as the total estimated damages accounted for around 12.46 billion USD.

Year	Frequency	Deaths	People Affected	Damage
2010-11	4	2,113	20.35 million	\$9.5 billion
2000-09	33	2,265	9.56 million	\$0.7 billion
1990-99	14	4,180	15.18 million	\$1.09 billion
1980-89	7	519	302,900	0
1970-79	5	2,066	13.38 million	\$1.17 billion
1960-69	2	32	224,427	\$3.3 million
1950-59	6	3,691	n/a	n/a
Total	71	14,866	58.97 million	12.46 billion approx.

Source: Islamic Relief Report, Flooded and Forgotten 2011

Year	Frequency	Deaths	People affected	Damages
2010-11	8	2,118	20.36 million	\$9.58 billion
2000-09	68	77,282	14.57 million	\$7.78 billion
1990-99	44	6,654	17.9 million	\$1.36 billion
1980-89	20	1,074	0.31 million	\$5 million
1970-79	8	6,850	13.4 million	\$1.17 billion
1960-69	5	10,519	0.62 million	\$7.4 million
1950-59	8	3,850	n/a	n/a

Source: Islamic Relief Report, Flooded and Forgotten 2011

c. Ecological Reasons and Routes of Floods in Pakistan

Knowing the climatic and topographic features of the area and the history of frequent floods, it is important to get a real sense of the underlying ecological causes of floods.

Dr. Qamar-uz-Zaman Chaudhry, the author of Pakistan's Climate Change Policy noted that the rainfall in 2010 was about five times higher than the usual July rainfall in Pakistan. This unprecedented rainfall resulted in flash floods in the Swat and Kabul rivers. The heavy rainfall in the Hindu-Kush and Karakoram mountain ranges also accelerated snow and glacial melt and their combined effect caused unprecedented floodwater in the Indus River at Tarbela.

The second rainfall during the same year generated another flood wave. These two flood events caused the longest sustained floods in Pakistan's history. The sustained flood peak of over one million cusecs at Guddu lasted for eight days and 17 hours. Similar flood peaks of 1992, 1988 and 1986 at Guddu lasted for 28 hours, six days-22 hours and five days-11 hours respectively.

A year before these unusual floods in Pakistan, the global weather patterns were under the influence of the El Nino phenomenon, which suppressed monsoon rains in Pakistan. June 2010 saw the sudden transition from El Nino to the opposite La Nina phenomenon that may also have contributed significantly to the enhancement of rains in north-western Pakistan.

Dr. Chaudhry argued that the link between freak weather events and climate change is never drawn so quickly and meteorologists are normally cautious in linking individual extreme storms with climate change. But the World Meteorological Organisation said that this event was more in line with international scientists' projections of more frequent and more intense extreme weather events owing to global warming.

He also links these conditions with a tropical cyclone that hit the country in June of the same year. This cyclone was followed by a severe heat-wave that broke all previous records in the rest of the month of June. While in the last week of July and August, the country experienced the worst floods of its history.

In 2010, heavy rains occurred in Balochistan towards the end of June. These rains brought disaster to Balochistan and the districts of Sindh on its eastern border which also received devastating flash floods. Hill torrents originating from Balochistan entered Sindh through the Khirthar hills and inundated vast areas in the districts of Dadu and Qambar Shahdadkot. Thousands of people lost their homes, and were trapped in flood water for several days. Stories of their suffering and the negligence of the government were widely reported in the media. The unprecedented gushing flood waters from Mula and Bolan rivers shattered the flood protection network and the Main Nara Valley Drain (MNVD) and Right Bank Outfall Drain (RBOD) network were breached at several places bringing devastation to local communities. The floods once again exposed the vulnerability of the drainage project executed by Water And Power Development Authority (WAPDA) on the Right Bank of the Indus. A careful review of the effects of these floods reveals that this disaster was not merely a natural calamity, but also the result of bad engineering, poor flood-management strategies and crumbling institutional systems. There is no doubt that the Irrigation Department made an effort to manage the flood but the approach was reactionary, as opposed to being preventive.

d. Torrential Floods in Sindh

The province of Sindh is host to two types of floods. Riverine floods are predictable and allow enough time to react, whereas torrential floods leave almost no time to respond. Torrential floods have less frequency and duration but one of very high intensity therefore their impact is also sever. These floods normally occur in the monsoon months of July and August when their catchment areas in Balochistan receive heavy rains. The western boundary of Sindh is connected to Balochistan through the Khirthar hills. A series of ferocious torrents including Mula, Boolan, Khanji, Mazarani, Dillan, Buri, Salari, Shole, Gaaj, Angai, Naing and Bandani bring rushing waters from the high altitudes of Khirthar to the Kachhi plains of Sindh. These floods require entirely different management systems, i.e. institutional rapid response capacity and the infrastructure.

The floods of 1942, 1944, 1948, 1956, 1973, 1975, 1976 and 1995 are reminders of this hard reality. Among them the floods of 1976 and 1995 were of huge magnitude that caused massive devastation to the flood protection infrastructure and the local communities.

e. Flood Protection System in Barrage Areas

Pakistan operates one of the largest irrigation systems in the world comprising five main rivers. These include the Indus, Jhelum, Chenab, Ravi and Sutlej. All of these rivers flow through the country's plains. The Indus (including the Kabul, Swat and Panjkora tributaries), Jhelum and Chenab are known as the western rivers, and the Ravi, Beas, and Sutlej are known as the eastern rivers. Supplemented by a number of secondary rivers and streams, these supply water to the entire Indus Basin Irrigation System.

Flood protection mechanisms for these areas comprise four main factors:

1. Flood flow regulation by three major reservoirs (Tarbela, and Chashma on the Indus and Mangla on the Jhelum)
2. Flood forecasting and early warning, and protection of important infrastructure
3. Flood embankments and spurs alongside the river banks⁴. Non-structural interventions including rescue and relief measures in the case of flooding

The Provincial Irrigation Departments (PIDs) maintain about 6,807 km of flood protection embankments, and around 1,410 spurs along the main and other rivers. Provincial data of existing flood protection facilities is given in Table 5.

Name of Province	Embankments (K.M)	Spurs (No.)
Punjab	3,334	496
Sindh	2,424	46
Khyber Pakhtunkhwa	352	186
Balochistan	697	682
Total	6,807	1,410

Source: Annual Flood Report 2012, Federal Flood Commission

The Federal Flood Commission has embarked on advocating a new approach to flood protection, which is integrated and takes

into account the river morphology and analysis of the factors that contributed to the three consecutive floods between 2010 and 2012. It calls for ending traditional and localised ways of dealing with floods and encourages a multidimensional approach. This approach needs to focus on enhancing the benefits of floods for the floodplains and protection from devastation and losses in case of heavy floods.

f. Flood Protection System in Kachi Plains

Before the construction of the Sukkur barrage, its command area on the right bank had natural drainage channels to carry torrential floods into the Indus River. Part of the flow would drain through Main Nara Valley Drain (an old river bed) and would feed into the intricate eco system of Asia's largest natural fresh water lake known as Manchar Lake. In 1932, when the barrage was constructed, the 70 miles long MNVD was correctly shaped to carry a discharge of 2,235 cusecs. The banks of the MNVD acted as the flood protection barrier separating irrigated right bank areas of the Sukkur command from the hill torrents flood plain. The MNVD was later converted into the RBOD by WAPDA to drain effluents from four districts, which destroyed Manchar Lake. At one stage, WAPDA wanted to connect the RBOD with the Indus River, but upon civil society's resistance it withdrew its proposal. Protection in the torrential flood areas is much more vulnerable than Riverine. In 1935, a Flood Protection (FP) Bund was constructed along the natural contours to facilitate a north-south diversion of torrential flows towards Manchar Lake. The objective of this 172 miles long Bund was to protect irrigated areas from flash floods and the safe diversion of floods to the natural lake at Manchar. According to the Indus River Commission, a flood protection Bund has to be provided with 6 feet Free Board above the recorded highest flood. In 1995, the flood water overtopped to breach the FP Bund at more than 30 locations. However, the restoration work just rehabilitated it to the pre-flood level and did not maintain a new Free Board of 6 feet above the 1995 flood level. This was also highlighted in the Flood Fighting Plan for 2007, prepared by the local office of the Sindh Irrigation Department.

A Flood Diversion Bund has also been provided to divert water flow of Gaaj Nai in Dadu district. The 6.4 miles long Bund also protects the FP Bund from the direct stroke of Gaj Nai. In the severe flood of 1995 this structure was badly damaged. This Bund was later remodelled to the pre-flood condition. However, no additional strengthening was provided to structure the impacts of similar or more intensity future

floods. Luckily, in 2010, Gaaj did not bring its usual flow hence, the Bund remained intact.

In 2010, the flood water came from the north-western boundary with Balochistan to hit the Qambar Shahdadkot District fast and later swept through Dadu District. Mula and Boolan rivers brought the major flows, which breached the FP Bund at RD 179, 180, 184 and 230. It set off a series of breaches and cuts as 34 breaches and cuts were recorded in the MNV Drain. These breaches inundated several surrounding small and large villages to pose a potential risk to the towns of Qambar and Shahdadkot.

g. Investment in Flood Management

Pakistan suffered cumulative flood damage of \$20.0 billion from 1986 to 2010, and spent over \$1.2 billion to mitigate the effect of the floods during this period (Table 7). A major percentage of this spending was borrowed from the Asian Development Bank and the World Bank. There was also bilateral financial and in-kind support, which is not detailed here. The FFC (2010) reports that the government spent PKR 12.6 billion (\$163 million as of September 2010) of its own resources. This fund was utilized for the construction of flood levees of about 400 km in length and 13 new flood-diversion structures; capacity building for the FFC, WAPDA, and the PMD; and the development of flood forecasting and telemetry systems.

Detail of the spending on flood management has been provided in Table 7 on page #18.

Table 5: Spending for Flood Management in Pakistan (\$ in millions)

Description	Funding	Amount
1986 Flood Protection Sector Project	ADB	124.0
	Government	24.4
	Beneficiaries	3.9
1988 Flood Protection Sector Project	World Bank	44.0
	ADB	39.0
1992 Flood Protection Sector Project	World Bank	139.0
	ADB	78.0
	Provinces	41.6
1998 Flood Protection Sector Project	ADB	100.0
2010 Flood Emergency Reconstruction	ADB	649.0
	Total	1,242.9

Sources: Government of Pakistan, Federal Flood Commission. 2011. Annual Report 2010. Islamabad; Asian Development Bank. 1992. Completion Report: Flood Damage Restoration Project in Pakistan. Manila; 1998. Completion Report: Flood Protection Sector Project in Pakistan. Manila; 1999 Completion Report: Flood Damage Restoration Project in Pakistan. Manila.

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2. Devastation Revisited

Between 2010 and 2012, a series of floods led to widespread damage, and 2013 was the fourth consecutive year of either heavy floods or other weather related losses of varying degrees in parts of the country. The long term effects of these disasters will take years to dissipate, and this incessant devastation calls for robust Preparedness, Mitigation and Preventive (PMP) measures

The scale of this enormous catastrophe can be imagined from the damage assessment data collected from different sources over the past few years.

a. Damages caused by Floods in 2010

The 2010 flood that affected most parts of Pakistan, claimed 1,600 human lives, caused damage to physical infrastructure at an estimated value of \$10 billion, and inundated about 38,600 km of area. On record, this flood was the most damaging in Pakistan's history. . Sindh Province, located at the tail end of the Indus Basin, suffered the highest damage (43% of the total), followed by Punjab (26%) and Khyber Pakhtunkhwa (12%). In the country, as a whole, the floods damaged nearly 2 million houses and displaced a population of over 20 million.

A 24-hour rainfall on 29th July 2010, ranged from 21 mm to 280 mm at 18 stations in the Indus Basin, with an average of 128 mm. Rainfall was recorded at 143 mm in the city of Mirpur Khas in Sindh Province, and at 73 mm in Zhob area of Balochistan Province. The next day, a 24-hour rainfall of 240 mm was recorded in the city of Kamra in Punjab province, and 189 mm in Garhi Dopatta, Northeast Pakistan. The average rainfall for the 18 Indus Basin stations on 30th July was estimated at 290 mm in July and 189 mm in August. The July and August rainfall was almost double the historical levels for the same months.

The widespread rain generated high runoff in the Chenab, Indus, Jhelum, Kabul, and Swat rivers. Further, flash floods from the Khurram River and hill torrents from the Sulaiman Mountains contributed to the Indus flood peak.

On the Indus River, the water flow into the Tarbela Reservoir was equivalent to a flood event with a return period estimated at more than 3,000 years.

At Chashma Barrage, the 2010 flood peak topped the barrage's design capacity. This flood peak at the barrage was the highest since its construction in 1971, and nearly 10% higher than its design capacity.

The flood peak at Guddu Barrage was exceeded by 25% and Kotri Barrage by 10% approximately.

The damages of the floods in 2010 were so severe that they exceeded the damages of the 2005 Earthquake in Pakistan, Cyclone Katrina, the Tsunami in the Indian Ocean, Cyclone Nargis and the earthquake in Haiti which were all natural disasters. In 2010, the NDMA estimated a loss of around 1.7 million houses, and a total population of 18 million was affected across the country. Sindh was the worst hit province where 7.2 million people and 0.8 million houses were affected. The 2008 floods also resulted in human casualties of around 1,985, while 2,946 were injured (Table 8).

Province	Deaths	Injured	Houses Damaged	Population Affected
Balochistan	54	104	75,596	700,000
Khyber Pakhtunkhwa	1,156	1,198	284,990	3,800,000
Punjab	110	262	497,700	6,000,000
Sindh	411	1,235	876,249	7,274,250
Gilgit-Baltistan	183	60	2,830	100,000
Total	1,985	2,946	1,744,471	18,074,250

Source: National Disaster Management Authority, Pakistan Floods 2010, <http://floods2010.pakresponse.info/FactsandFigures.aspx>

The damages of the floods were spread over 78 districts and an area of 100,000 square km 20 districts were declared as the worst affected. According to NDMA's data on damages in 2010 floods, 1.7 million houses were destroyed. A loss of about 1.588 billion US\$ and 10,192 education centres were destroyed. The cost estimated for the damage was 311 million US\$. The floods affected 485 health facilities, communication facilities spread over 23,931 kilometres were affected, and a total of 6,673 water and sanitation schemes were

also destroyed. The energy sector, which was already in a poor state, also received damages, as 92 plants, 32 grids and 300 km lines were destroyed; suspending electric supply to thousands of consumers. The irrigation sector losses amounted to \$278 million. As per The NDMA estimates, the total damages amounted to US\$ 10.056 billion.

Sector	Damages	Cost (US\$)
Housing	1.7 m	1.588 billion
Education	10,192 education centres	311 million
Health	485 health facilities	50 million
Communication	23,931 km	1.382 billion
Water & Sanitation	6,673 schemes	109 million
Energy	92 plants, 32 grids, 300 km lines	309 million
Irrigation		278 million
Agriculture & Livestock	2.1 m ha agriculture land, 0.3 m large & 1.2 m small animals	5.1 billion
Private Sector	146 industries, 0.1 hotels/shops	109 million
Financial Sector	90 banks, 10 ATMs	674 million
Government & Environment	1,457 structures.	62 million
Overall Damage		10.056 billion\$

Source: National Disaster Management Authority, Pakistan Floods 2010, Learning From Experiences.

Contrary to NDMA, a report of UNESCO puts the number of damaged schools at 10,000 that corresponds to 1.5 to 2.5 million students affected. The Punjab government's initial estimates consider the damages to about PKR 67 billion. The website of the PDMA Sindh shows staggering damage estimates of PKR 446 billion. The sector-division shows housing and agriculture as the worst hit sectors in Sindh with estimated losses of PKR 134 and 122 billion respectively. Secretary Industries Department of Sindh confirmed that 67 industrial units in Sindh were damaged. Similarly, the Sindh Agriculture Department estimated agriculture losses at PKR 102 billion. A report

of the UNOCHA on 10th August 2010 mentioned that 281 bridges and 283 roads were affected in KP. The overall loss and damage was tremendous, and the Federal Cabinet was informed that the combined losses were estimated at US\$ 43 billion, nearly 25% of the annual GDP of Pakistan.

The World Health Organization (WHO) and Johns Hopkins Bloomberg School of Public Health (JHSPH) in collaboration with the Ministry of Health conducted a study to assess the impact of the floods on the lives of the affected communities. The study reported that the affected communities had better or similar access to facilities related to health, water and sanitation; but the quantity of water remained an issue as 24.3% of households did not have adequate water for cooking and drinking. The report highlighted that the economy and food security of the affected communities was severely affected. The survey indicated that 60% of the households did not have sufficient money to buy essential food items and to meet other household needs. Similarly, 88.1% households reported severe reduction vis-a-vis their pre-floods income levels. Average monthly income after the floods was reported around PKR 2,600 (US\$ 31) with around 75% of the population living under PKR 5,000 per month. Before the floods, the monthly income was more than PKR 10,900 and 24% of the households surveyed lived under PKR 5,000 per month.

Table 8: Reported Access to Services since the Flood

Service	Better	Same	Worse
Water	10.3%	50.2%	39.5%
Sanitation/Toilets	4.1%	44.7%	51.3%
Healthcare Access	18.4%	42.7%	38.9%
Healthcare Quality	16.8%	42.3%	40.9%
Pregnancy Services	14.3%	51.7%	34.0%
Education Access	9.5%	64.2%	26.3%
Education Quality	8.1%	61.9%	30.0%
Food Access	7.6%	21.2%	71.2%
Food Quality	2.7%	22.0%	75.3%
Household Income	1.0%	11.0%	88.0%

Source: Pakistan Floods 2010: Impact Assessment - WHO and Ministry of Health.

With regards to food security, 71.2% of the population reported less access to food as compared to before the floods. The conditions were the worst in rural areas where 74.1% did not have enough food and in IDP camps and 85.2% reported reduced food supplies. In urban areas, only 33% reported that they did not have adequate food supplies.

Given the magnitude of damages, the reconstruction and rehabilitation required many resources for the flood affected communities. According to an assessment carried out by the Asian Development Bank (ADB) and the World Bank (WB) for Pakistan, the estimated cost for recovery and reconstruction in flood hit areas was approximately US\$ 8.74 to 10.85 billion. This included cost estimates for relief, early recovery, and medium-to long-term reconstruction (Table 10). Reconstruction was estimated at approximately \$ 6 to 9 million. Relief and early recovery related costs were estimated at \$928 million and \$956 million respectively.

Category	US \$ Million
Relief	928
Early Recovery	956
Relief/Early Recovery	53
Reconstruction	6,799-8,915

Source: ADB and World Bank, Pakistan Floods 2010: Preliminary Damage and Needs Assessment

The report further reveals that “(i) direct and indirect losses estimated at approximately PKR 855 billion; and (ii) the cost of reconstruction needs may range between PKR 578 billion (base case option) to 758 billion (recommended option)”.

An amount of PKR 552 billion or 6.5 billion US\$ were estimated for direct damages caused by the floods. For indirect losses, the estimates were PKR 303 or \$3.6 billion. Damages in agriculture, fisheries and livestock sectors were reported as severe and the estimated cost of damage was PKR 429 billion or \$5billion.

Three options were recommended for reconstruction (Table11).

Table 10: Estimated Damage and Reconstruction Costs by Province/Area

Province/ Region	Damage Costs		Reconstruction Option 1		Reconstruction Option 2		Reconstruction Option 3	
	PKR millions	USD millions	PKR Millions	USD millions	PKR millions	USD millions	PKR Millions	USD millions
AJK	7,303	86	13,190	155	13,886	163	16,009	188
Balochistan	52,676	620	27,258	321	34,359	404	58,11	684
FATA	6,271	74	7,595	89	7,873	93	9,544	112
Gilgit-Baltistan	4,165	49	6,627	78	6,893	81	10,027	118
Khyber Pakhtunkhwa	99,625	1,172	105,957	1,247	109,942	1,293	179,844	2,116
Punjab	219,272	2,580	93,521	1,100	107,903	1,269	117,650	13,173
Sindh	372,341	4,380	227,850	2,681	253,791	2,986	269,704	3,173
Federal/ Cross Cutting Sectors	93,117	1,095	95,911	1,128	95,911	1,128	96,866	1,140
National Total	854,771	10,056	577,908	6,799	630,556	7,418	757,760	8,915

Source: ADB and World Bank, Pakistan Floods 2010: Preliminary Damage and Needs Assessment

b. Damages caused by Floods in 2011

While people were still recovering from the 2010 floods, rains in August and September 2011 caused renewed floods in northern and southern Sindh and parts of Balochistan. The multi-sector needs assessment (MIRA) by relief agencies (UN and other INGOs and local NGOs), reported 33 districts to be affected in all including 22 in Sindh and 11 in Balochistan. However, the government notified only 23 districts stricken by the calamity.

NDMA's 2011's annual report cited 520 fatalities as well as injuries sustained by 1180 persons during 2011 floods. The total population affected by the flood was approximately 9.2 million whereas 1.5 million houses were damaged (partially or fully). The total area affected was over 25,090 sq. Km. Around 881.03 thousand hectares of cropped area was also affected.

Table 11: Damages during Floods in 2011

Death	520
Injuries	1180
Affected districts	23
Affected population	9.2 million
Affected houses	1.5 million
Affected area	25090 square km
Affected cropped area	881.03 thousand hectares

Source: National Disaster Management Authority (NDMA), Annual Report 2011

Furthermore, the NDMA Annual Report indicated serious damage to many other sectors in Pakistan, putting huge burden on the economy that was already struggling to cope with the after effects of 2010 floods. As Table 14 below indicates, the overall damage was estimated at around 324,533 million PKR or \$3730 million.

Table No 12: Damages Caused to Sectors by Floods in 2011

Sector	Direct Damages (PKR Million)	Indirect Damages (PKR Millions)	Total Damages	
			PKR Millions	USD Millions
1. Social Infrastructure				
Housing	77,420	8,046	85,465	982
Health	432	826	1,258	14
Education	10,157	1,856	12,014	138
Sub total	88,009	10,728	98,737	1,135
2. Physical Infrastructure				
Irrigation and Flood Management	4,763		4,763	55
Transport and Communications	16,386	10,082	26,468	304
Water Supply and Sanitation	500	704	1,204	14
Energy	457	783	1,240	14
Sub total	22,106	11,569	33,674	387

3. Economic Sector				
Agriculture, Livestock, Fisheries	142,358	17,749	160,107	1,840
Private Sector, Industries, Financial Sector	22,694	4,560	27,254	313
Social and Gender	39	5	44	1
Sub total	165,091	22,313	187,405	2,154
Total	279,540	44,992	324,533	3,730

Source: National Disaster Management Authority (NDMA), Annual Report 2011

The agriculture and housing sectors were badly affected, and the total damage to the agriculture sector was estimated at PKR 160,107 million, whereas in housing the damage of PKR 85,465 was reported.

As per NDMA's Annual Report 2011, Sindh was the worst hit area with a total damage cost of around 31,0776 million PKR or 3,572 million US\$. As per the reconstruction options, only option 1, or base option, required 239,011 PKR or \$2,747 million.

Table 13: Provincial Damage Need Assessment – 2011 Floods

Province	Damage Costs		Reconstruction Option1	
	PKR Million	USD Million	PKR Million	USD Million
Sindh	310,776	3,572	219,618	2,524
Balochistan	12,356	142	6,035	69
Federal/ Crosscutting Sectors	1,405	16	13,353	153
National Total	324,533	3,730	239,011	2,747

Source: National Disaster Management Authority (NDMA) update on Pakistan Response: <http://pakresponse.info/LinkClick.aspx?fileticket=FUSD0wLGs0g%3d&tabid=144&mid=922>

As per the multi sector assessment, the major damage was to housing and agriculture sectors. 34% lost their houses and 60% reported their houses damaged partially. With regards to paddy crops, the loss was estimated at around 77%, whereas for cotton production the loss amounted to 92%.

With regards to the economy, 40% of the households were reported to have lost their livelihood means due to the floods; while 48% reported disruption of their economic activities. On average, one household lost about PKR 202,500 of income which did not include loss to their assets. The report indicated a total loss of about 1.2 trillion PKR.

Food security was another major crisis in the flood hit areas. The report highlighted that around 2.5 million people were food insecure. Shockingly, the report revealed that half a million people faced hunger in the affected areas. In addition, the report also highlighted commodity price hike. There was 25% paddy price hike, for example, whereas affectees purchase power had gone down by 13%.

The health conditions were also alarming in the affected areas. In the survey of houses, 24% children were reported to have been suffering from diarrhoea, while 28% suffered high fever /malaria, 6% suffered from measles and 11% suffered from cough or wheeze.

The floods also affected education as the report stated drastic reduction in school attendance. The attendance of girl students was particularly recorded as low, and the main causes included inaccessible or non-functional schools due to the damage caused by floods or schools being used as camps for displaced persons.

c. Damages caused by Floods in 2012

The 2012 floods began in September and affected over 5 million people. The areas which were hit the hardest included parts of Balochistan, Punjab and Sindh. Some of these areas remained inundated with water for over a year or two. As per NDMA reports, a total of 14,370 villages were affected by the floods. The total crops affected were spread over 1.1 million acres of land.

A total of 275,023 houses were completely destroyed while 191,003 were partially destroyed.

Under the MIRA 2012, 822 key informants in 523 villages/sites were interviewed. The report revealed that around 2 million people were in need of humanitarian assistance in five districts. In the affected areas, 46% of roads were completely damaged while 36% were partially damaged which hindered 24% local students' access to the schools, besides paralyzing the economic and social activities.

In the affected areas, 58% farm irrigation channels were destroyed, and due to stagnant water, the affected communities were unable to cultivate rabbi crops depriving them of their primary source of income and further aggravating their already appalling economic conditions. Moreover, in the affected areas, 80% of the standing crops were damaged, whereas 91% of communities reported loss to fodder stocks. Non-farm workers were reported as the second most affected economic category, as 24% of the households in the affected areas depended on non-farm sources of income.

Food security again remained a grave concern. Around 88% of surveyed communities reported a loss of one to two meals per day. In 88% of the surveyed communities, diseases such as malaria, diarrhoea, skin infections; cough, cold with fever; and measles were common. And, 32% of the communities reported no access to health facilities and services. Only 10% of the surveyed communities had access to safe drinking water. In 80% of the communities, where hand pumps were the main source of water, the water source was contaminated, which increased chances of water borne diseases.

d. Damages Caused by Floods and Monsoon Rains in 2013

As was witnessed in the aftermath of 2010 floods, in 2013 too, the floods affected almost all provinces, including AJ&K and FATA. The monsoon rain that started in August in turn triggered flash floods. In just one week (17th to 24th August 2013), a rainfall of around 100 mm was recorded across the country. According to the Pakistan Meteorological Department, the recorded rain was around 40% more than the average monthly rain recorded historically. As per the NDMA report, as of 27th August 2013, the floods had affected around 1.4 million people across the country. Sindh and Punjab were the worst affected. A total of 5,439 villages were affected across the country; most villages i.e. 3,341 being in Sindh. The floods claimed 169 human lives and another 855 sustained injuries. In total, 32 districts were affected with a varying scale of damage sustained by each. The hardest hit districts included Sialkot, Narowal, Sheikhpura, Gujranwala, Dera Ghazi Khan and Rajanpur in Punjab, and Jhal Magsi, Jaffarabad and Naseerabad in Balochistan.

Table 14: Damages Caused by Floods and Monsoon Rains in 2013

Province	Persons Died	Persons Injured	Persons Affected	Villages Affected	Cattle Head Perished
Punjab	55	790	634322	1741	9
KP	24	17	336	15	0
Sindh	35	19	720641	3341	25
Balochistan	18	17	64270	342	4555
FATA	12	0	0	0	0
AJ&K	25	12	0	0	13
Total	169	855	1,419,569	5439	4602

Source: NDMA: <http://www.ndma.gov.pk/Documents/27-8-2013Monsoon.pdf>

The floods caused severe damages to the agriculture sector. Almost 826,871 acres of crops were affected. In Punjab the crop damage amounted to 555,030 acres of land. 25,573 houses were partially damaged whereas 20,046 were completely damaged.

Table 15: Damage to Houses in 2013

Province	Crops Affected (Acres)	House Damaged	
		Partially	Fully
PUNJAB	555,030	10,032	8,866
KP	4,279	708	149
SINDH	203,593	12,966	7,998
Balochistan	63,969	1,500	3,000
FATA	0	0	0
AJ&K	0	367	33
Total	826,871	25,573	20,046

Source: National Disaster Management Authority, Annual Report 2011

e. Gender Dimension of Disaster

Among the millions of sufferers the most vulnerable were women, children and the elderly. Some of the most pressing issues highlighted by the noted human rights activist and a volunteer humanitarian worker Ms. Tahira Abdullah are partly reproduced below from her article “Women flood-affectedees: issues and challenges” appeared in a publication of Aurat Foundation and Information Service Foundation “Legislative Watch” (July-September 2010).

1. **Data:** for proper planning for Flood Response, Recovery, Reconstruction and Rehabilitation (FRRRRR), we need accurate numbers of flood-affected men, women and children, disaggregated by sex, age, geographic location (by district), and occupation/livelihood.
2. **Women-Headed Households (WHHs):** the Government does not recognize WHHs, preferring to register such households under the name of the family patriarch or the nearest male sibling. This naturally deprives women of land and property rights, financial compensation, livelihoods, and other urgent support.
3. **Equity and Equality in Compensation:** As opposed to PKR 225,000 disbursed among the earthquake-affected household in 2005, the GoP has announced a first tranche of cash compensation of PKR 20,000, to be followed by PKR 80,000, amounting to a total of PKR 100,000. This is an insignificant compensation, particularly considering the government’s so called slogan of “Build Back Better” (BBB) and ceaseless hike in price and poverty, particularly the feminization of poverty (a ratio of 3:1 in Pakistan). . But whatever the amount, WHHs need to be registered before they are eligible for it.
4. **Identification:** Women, especially those in the rural areas, traditionally do not have national identity cards (which also disenfranchises them in elections), meaning they do not have access to bank accounts, credit/debit/SMART/WATAN cards, or other forms of identification. It is recommended that mobile teams (including women staff) of NADRA urgently need to reach out to flood-affectedees in the rural areas, relief camps and host families, in order to provide ALL women and men with CNICs and registration.

5. **Shelter and Infrastructure:** in line with the BBB, the populist slogan; this time around the reconstruction initiatives must take into account the privacy factor, access of 48% women and 10% disabled/special population, as well as environmental and climate change considerations. There is a need to focus especially on latrines/toilets, kitchens, water sources, hygiene, sanitation and sewerage in the shelter component.
6. **Health issues:**
 - I. the GoP gave a figure of over 300,000 pregnant women who would deliver before the emergency ended. These women were either in temporary shelters or in camps on roadsides and river banks. While I+N NGOs, the UN, private and volunteer health personnel did make efforts to provide ante-natal, natal and post-natal care and RH/EmOC/Ob-Gyn services, yet, the majority delivered without medical help;
 - II. the impacts of floods included injuries, snake bites, infected water-borne gastric diseases, and malaria. It was observed that mostly, the men and boys received treatment, as cultural constraints prevented women from seeing male doctors and paramedics;
 - III. there was an inadequate number of women medical and paramedical health service providers;
 - IV. there was inadequate focus to ensure girls and women's vaccination;
 - V. loss of family and community, shelter, livelihoods, incomes, and the onset of disease, disability and displacement has caused in women and men a widespread loss of coping mechanisms, self-respect, dignity and self-confidence, leading to anger, insecurity and trauma, needing both short- and long-term interventions. While a few NGOs and volunteers have provided psycho-social trauma counselling services, such interventions are required on a much larger scale to achieve desired results
7. **Violence Against Women (VAW) and Protection Issues:** The GoP did not focus on this extremely important dimension of the disaster, but some NGOs and the civil society volunteers

did so. It was reported (however cannot be verified) that some criminal elements were kidnapping girls and women during the initial emergency rescue and relief phase, under the guise of priority evacuation, food and shelter provision. Trafficking, sexual abuse, forced prostitution, child labour, GBV, divorce, desertion, abandonment of women and senior citizens, sale or coercive “adoption” of women and children have been reported however, these issues didn’t receive the attention they deserved. Poverty-stricken flood-affected aggrieved families are too scared to file FIRs with evidence.

8. **Education issues:**

- I. the flood-affected areas had high poverty and low literacy rates (especially among girls) to start with. Now, the loss of schools, teachers and time means that extra efforts are needed to motivate parents to send all their girls and boys to the temporary camp schools;
 - II. the public education system needs to rehabilitate the educational infrastructure and teachers on priority basis;
 - III. (iii) Renewed focus is required on teaching life skills, coping mechanisms, self-awareness, self-confidence and how to face disasters.
9. **Disaster preparedness skills training:** this should include River and urban rescue trainings for everyone, including all girls and women, as well as basic survival skills in harsh terrain and weather conditions. Humanitarian workers, groups and volunteers need such training too.
10. **Energy and Fuel:** Women are responsible for gathering wood as fuel for domestic consumption and fodder for livestock. The pre-flood deforestation led to massive landslides, soil erosion and unprecedented flooding, uprooting huge numbers of trees, hence a massive national campaign of reforestation is required on urgent basis along with the provision of alternate and renewable energy sources and village electrification. Changed water courses, rivers, lakes, streams will cause further destruction unless urgently addressed.

11. Food Security, Employment and Livelihoods:

- I. Pre-floods male migration for employment and high poverty levels meant that large numbers of women and WHHs worked in agriculture, forestry, livestock, dairy and food security - which are now severely damaged or destroyed;
- II. large numbers of livestock and poultry also perished in the floods, with a negative impact on women's income as well as nutrition levels;
- III. in the 81 districts, employment and livelihoods are lost or threatened, but while men used to and could still migrate again, what will rural agricultural women do?
 - Iç. women need agricultural extension, training and inputs for Agriculture and Food Security, e.g. organic seeds and fertilizer; Livestock, Irrigation, Social Forestry and Horticulture; also marketing and quality certification;
 - ç. likewise, in urban districts, employment, livelihoods, vocational skills training and credit programmes must include women, especially home-based workers.

12. Human rights and human dignity; special measures for women:

- I. reports are surfacing of forced return of IDPs - contrary to human rights Conventions and UNOCHA's Guiding Principles, which mandate informed, voluntary, consensual return;
- II. the GoP needs to ensure male-female joint title deeds in reinstating lost land records, assets ownership, property, grant of new land and cash compensation;
- III. free legal aid to women to process claims for compensation and inheritance of land and property;
- IV. the GoP needs to focus on women and girls' special need for protection, security, safety, honour, dignity, respect and upholding their human rights;

- V. sex-disaggregated data must be collected and used in policy making, recovery and rehabilitation (e.g. how many girls' schools vis-à-vis boys' schools were destroyed? how many female vs. male teachers and health workers are dead or missing).

f. Social Dimension of Disaster

It has been repeatedly proven that marginalized groups pay higher cost when natural disasters occur. Due to socio-economic vulnerability their resilience thresholds are very low. Pakistan Institute of Labour Education and Research (PILER) issued an eye-opener report "Rebuilding Lives and Livelihoods: The Case for Structural Reforms" in 2011. PILER conducted detailed analysis of interviews and focus group discussions with 3,000 flood affectees. Some of the key findings of the report indicate that landless rural poor were the worst hit. The majority, i.e. 83.3% reported that they have self-owned dwelling units of which 62% were living in katcha houses and 77.4% of the whole had just one to two rooms indicating very poor status of housing facilities prior to the floods. 48% reported that they earned living through manual labour, while a significant 31.7% were engaged in farming. A very small number, i.e. 5% were employed in offices (government/private) and 8.5% made living through petty trade. Almost 50% earned income between PKR 4,000 to PKR 8,000 per month (US\$ 48 to 96 per month or \$ 1.6 to \$3.2 per day), while 17% reported income below PKR 4,000. The overwhelming majority of the household, 85.7% had only one earner in the family of an average family size of 7. Only 37% reported that they owned a piece of land while 63% did not own land. Almost half of those who owned land, or 46.42%, had just 1 to 5 acres of land whereas 40.44% reported land-ownership of between 6 to 25 acres and 10% had land up to 50 acres. Of the landless IDPs, 21% worked as 'Haris' with different landlords, while 30.6% reported to be engaged in casual labour in different farms. A significant number i.e. 39.3% eked out living through manual labour (i.e. construction, transportation, blacksmith and shoe-making) while 4% engaged in petty trade or hawking. The daily wage earners were reported to be 42.2%. A very large number of the flood-affected population, i.e. 67%, reported to be under debt (compared to 23% Sindh households being under debt as reported in the Agricultural Census, 2000). 28% reported destruction of 1 to 5 acres of their agricultural land holding, and 25% suffered loss of 6 to 10 acres of cultivable land. An amount of PKR 15,000 to 25,000 per person was needed for clearing the

land off debris, levelling and making it cultivable. About 33% of the respondents reported loss of livestock and of them, the majority, i.e. 70%, had lost 1 to 10 cattle (mostly buffaloes). About 10% lost their shops and meagre merchandise or service tools. This profile of IDPs clearly indicates that socially backward groups were in miserable condition.

Equally or even more vulnerable were socially ostracized religious minorities. Dalit communities suffered discrimination in the relief phase too. Some of the faith-based charity groups involved in relief work denied support to these communities and sometimes they had to reach out to special camps exclusively set up for them.

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Multi-sectoral Damage needs Assessment Flood 2011 – October 2011 <http://pakresponse.info/LinkClick.aspx?fileticket=PdYFammaB0g%3d&tabid=88&mid=709>

NDMA Annual report 2011

ADB and World Bank, Pakistan Floods 2010: Preliminary Damage and Needs Assessment

Multi-sectoral Damage needs Assessment Flood 2011 – October 2011 <http://pakresponse.info/LinkClick.aspx?fileticket=PdYFammaB0g%3d&tabid=88&mid=709>

NDMA statistics <http://pakresponse.info/MonsoonUpdates2012/FactsandFigures.aspx>

MIRA 2012 <http://pakresponse.info/LinkClick.aspx?fileticket=QSijWXR5nOg%3d&tabid=148&mid=915>

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PILER; Rebuilding Lives and Livelihoods: The Case for Structural Reforms (2011)

3. Response to Disasters

a. International Response

In Pakistan, the floods from 2010 through 2013 fetched the biggest disasters, not only from a local but the global perspective as well. A multi-dimensional review is required to do an objective review of the assistance provided by the donors during the difficult times of the country's history.

The magnitude of the destruction rendered Pakistan incapable of dealing with it standalone. Even the world's richest nations would have found it harder to cope with such a large scale calamity. The Donor's response showed a downward trend in 2010 and 2011.

According to a report by the Islamic Relief Agency (2011), there was a marked difference in donor response when compared to the earthquake in Haiti. In 2011, the Chairman of the National Disaster Management Authority (NDMA) said that only 40% of the funds were received against the appeal launched by the UN. The UN had launched an appeal for \$ 356 million for support for those affected by the floods in Sindh and Balochistan but hardly \$150 million were mobilised. Despite the fact that the scale of flood disaster surpassed the damages of the previous year's flood, donors' response was comparatively lower this time.

According to a report "Emergency: Lessons from a Continuing Crisis" by Oxfam, Pakistan received 47% of the requested assistance by February 10, 2012. The report claimed that the shortfall in funding was observed despite the fact that Pakistan had put forward a modest request of \$66 per person as compared to \$97 per person after 2010 floods.

The European Commission, United States, Japan, United Kingdom and Norway were among the major donors. A slow response by the humanitarian aid community caused severe stress on relief activities. There was a major shortfall in critical areas of food security (86%), drinking water (83%) and shelter (49%). As a result of this, three quarters of the total affected households in Sindh and Balochistan did not receive any shelter assistance. Among these donors, the European Commission was the most responsive who provided \$40.6 million which was 11.4% of the total appeal. The US was the next major donor

with \$37 million which was 10.4% of the appeal. UK with \$12.1 million was the third largest donor and the amount provided by the UK was 7.2% of the appeal.

In comparison, in Haiti, 3.7 million people were affected, yet it received \$948 per person in aid, whereas in the 2010 floods in Pakistan over 20 million people were affected but only \$122 per affected person were received.

According to an analysis by Oxfam GB, only \$1.30 per person were committed by international donors in the first 10 days of the UN appeal in 2011, as compared to \$3.20 committed in the same period during the 2010 floods. The corresponding figure for the Earthquake in 2005 was \$70 and for the Earthquake in Haiti was \$495. This trend clearly indicated that the donor response did not match the scale of the disaster. Except for the number of deaths, all other accounts of damages in the recent floods were far greater than Haiti's Earthquake.

Table 19: provides, a comparison on aid response to Haiti and Pakistan by January 2010 provided by the Islamic Relief's report 'Flooded and Forgotten'. (2011)

	Pakistan	Haiti
Aid provided	\$2.45 billion	\$3.51 billion
Aid per person affected	\$122	\$948
Number of deaths	1,984	316,000
Number of people affected	18 million	3.7 million
Houses damaged /destroyed	1.7 million	188,000
Hospitals /health facilities damaged/destroyed	544	50
Economic damage	*\$8.7–\$10.9 billion	\$7.8 billion

*According to the World Bank/Asian Development Bank or nearly \$12 billion according to UK government

Source: Islamic Relief Report Flooded and Forgotten (2011)

In 2011, the delayed appeal by the government, economic recession in the Euro Zone and US, lack of efficiency and transparency on part of the GOP, and indifferent coverage by international media

were considered the main reasons for the poor response by the humanitarian aid community.

The government underestimated the scale of the disaster and the appeal for international aid came too late when millions were already without shelter. Also, major aid contributors, e.g. Europe and US, were facing economic recession. The US, after losing US \$550 billion in the Afghanistan war, was dealing with the highest unemployment at home in recent decades.

After losing their credit rating, US law makers were determined to reduce international aid. Deep cuts in food and medicine for Africa and disaster relief aid were being seriously contemplated. US foreign assistance had declined from 2% of its federal budget in the 1970s and 80s to less than 1% in 2011.

The House Appropriation Committee had proposed cutting assistance to Iraq, Afghanistan and Pakistan. Similarly, major countries in the European Union were facing a debt crisis. Gross domestic debt in the Euro Zone was 85% of its GDP. Budget deficit in Britain had reached 10.4% and in the US 8.9%. Unemployment among the 16 to 24 years age group in the UK had reached 14% during the last three years.

According to UN-OCHA, the slow response of the aid community in 2010, had resulted in many of the critical needs left un-met. Water and sanitation activities were only funded up to 27%, leaving millions without access to water.

The United Nations Fund for Population Activities (UNFPA) stated that its appeal for safety of mothers and their babies was responded upto 20% only.

In this scenario, international aid is likely to be reduced in the event of any other future disaster. Countries like Pakistan need to re-appropriate their own resources more prudently to meet contingency needs. With the alarming rise in the frequency of natural disasters, Pakistan needs to contemplate a long-term master plan for disaster risk reduction. A fraction of the large sums of money required for relief and rehabilitation operations can help make better pre-disaster arrangements.

b. National Disaster Management Authority's (NDMA) Support

In its Lessons Learnt Report with regard to the 2010 floods, the NDMA claimed that the government responded to the flood situation rather well. The NDMA released the following statistics in relation to government's relief efforts in 2010.

Table 17: Relief Items Provided through Government's Response

Item	Total	Item	Total
De-watering Pumps	45	Food Items (in tons)	406,678
Tents	489177	Medicines (in tons)	429
Tarpaulin Sheets	931,293	Hygiene Kits	160,470
Plastics Mats	126,731	Water Plants	4,864
Blankets	1,899,175	Water Purification Kits	10,841
Mosquito Nets	290,262	Water Purification Tablets	250 million
Shelter Kits	9,696	Jerry Cans	483,153
Kitchen Sets	412,384	Water Tanks	215
Kerosene Stoves	9,868	Water Bottles	147,497
Meals Ready to Eat (MREs)	10,756,569		

Source: National Disaster Management Authority (2010)

In such efforts, the NDMA also operated 316 air flights to transport relief items to the affected areas.

Moreover, to facilitate the affected people, the government also started the Watan card scheme. In this connection, ATM cards were provided to the beneficiaries to access/withdraw grants disbursed to their respective accounts in instalments. NDMA's Lessons Learnt report provided statistics about the Watan Cards until June 15, 2011.

Table 18: Watan Card and Cash Distribution

Province/Territory	Total Cards Processed	Total Cash Disbursed (PKR)
AJ&K	11,133	216,680,000
Gilgit-Baltistan	9,382	172,095,500
Khyber-Pakhtunkhwa	258,909	4,711,060,000
Balochistan	123,658	2,229,860,538
Punjab	608,825	12,145,067,677
Sindh	658,650	12,270,021,543
Overall	1,670,557	31,744,785,258

Source: National Disaster Management Authority (2010)

Under the Watan cards scheme, the affected households were provided with cash in two phases. In the first phase, PKR 20,000 was transferred to their accounts, and in the second phase PKR 40,000 was transferred in two instalments. While many civil society organizations had reservations regarding transparency, accountability and effectiveness of the Watan cards, a UN-OCHA report stated that the affected communities found ATM cards an extremely effective way to receive cash support.

With reference to the 2011 floods, the NDMA's annual report indicated that the authority responded to the emergency with funds of around PKR 10 billion. And 33 fixed and 22 mobile health care units were established; these provided health care services to nearly 1.53 million affected persons across the country. Fumigation was also carried out in the affected areas so as to avoid the spread of malaria.

In addition to this, the NDMA provided non-food items to the affected population which included:

Family Tents	105,333
Ration Packs	2,016,516(36,297 metric tons)
Water Purification Tablets	5,000,000
Mosquito Nets	100,000
Water Filters	5,100

According to the NDMA report, the UN and other humanitarian NGOs provided a large proportion of essential support to the affected people. The report indicated that until December 31, 2011, three million people received food assistance whereas 21,000 families were provided agricultural inputs. In terms of the health care, 379,000 consultations took place and 950,000 people received lifesaving and chronic disease medication. In terms of education services, 1,959 temporary learning centres were created to provide education to over 92,000 children. More than 1.2 million people were provided services of potable water, whereas sanitation facilities were provided to 480,000 people through health and hygiene sessions. The total outreach was 1.5 million.

c. Role of Civil Society

The local civil society actors were quite proactive in terms of evaluation of the affectees to the safer locations, setting-up and management of relief camps, providing relief goods and healthcare services and liaising with government line departments and humanitarian aid agencies. Hundreds of trained professionals and countless volunteers played pivotal role in assuaging miseries of millions of flood affectees. National Humanitarian Network (NHN) which comprises Pakistani humanitarian organizations assisted international aid agencies and government departments throughout the country to effectively deliver aid to the affectees. NHN's member organizations and other non-governmental organizations also undertook policy advocacy on the issues pertaining to international aid, corruption and malpractices, women's issues and lack of capacity at various levels. A number of seminars, discussion forums, press conferences and community forums were convened throughout the country to highlight the plight of disaster affectees. Media outfits, especially vernacular media played an impressive role in communicating information, sensitizing masses and creating awareness among various stakeholders. Some of the media houses mobilized resources for early recovery and rehabilitation of the flood affectees. Houses and schools were constructed through active support of some of the media houses. Professional associations e.g. doctors' organizations mobilized timely volunteer support in different corners of the country. Individual philanthropists and charity organizations e.g. Edhi Foundation mobilized much-needed support and resources for the affectees. Local communities hosted hundreds of thousands of disaster affectees providing shelter and food. . There were instances when Hindu communities in Sindh arranged fasting and un-fasting meals for hundreds of affectees during 2010 floods.

4. What Went Wrong

Damages inflicted by the recent disasters were not merely natural. There were numerous human interventions that intensified the disaster impact.

a. Administrative Failure

The incidents which occurred during the floods in the last three years were the outcome of compounded failure of state institutions and human induced malpractices.

One of the many failures identified by the experts as well as a Flood Inquiry Commission appointed by the Supreme Court of Pakistan was the Early Warning System that could have saved the country from the catastrophe or minimized the losses, had it been effective.

The Flood Inquiry Commission appointed by the Supreme Court of Pakistan to investigate causes of major breaches in the Indus River during the 2010 floods reported that:

“Seven Radar Stations established at different locations in the country include two Doppler radars with capacity to measure exact precipitation. However, no radar coverage was available in the upper reaches beyond Tarbela or upstream Khairabad or Hill torrents elsewhere; that in June 2010, the department had predicted “normal or slightly more than normal rainfall” for the 2010 Monsoon season. However, in the case of KPK, sudden changes in the system developed and flash floods took the people by surprise. The actual rainfall was many times higher than predicted, especially in the north-western areas. Record rainfall was received in Saidu Sharif and Mianwali in Punjab as well. The natural flow of water is being blocked due to massive encroachments in most water ways, private zamindari bunds and unplanned habitation by rising populations etc.”

This is the 4th year since the 2010 floods, and an effective early warning system is still not in place. The NDMA assessment shows that the floods in the last five years have proven more disastrous to the national economy than the combined calamities of the last 63 years. Due to the absence of a disaster management system to counter floods, Pakistan suffers a loss of around \$800 million each year. After the report of the Flood Inquiry Commission formed by the Supreme

Court, another report of a similar committee formed by the Punjab High Court also expressed the weakness of the flood management systems in the country. Key findings of both reports were identical. Administrative failure of provincial irrigation departments, rampant corruption, criminal negligence and omnipresent encroachments in the flood plains were identified as key causes of the disaster in Sindh and Punjab. A careful review of the Flood Inquiry Commission report reveals that in the absence of an integrated flood management system, scattered and disjointed measures may bring temporary relief but would not be enough to prevent a major disaster in the future. Disaster management includes three key components - risk reduction, preparedness and response. The first one hardly received any serious attention; the second one was inadequate, and the third one was inefficient and insufficient. Risk reduction is usually the most challenging yet the rewarding phase and should have been the first preference. While engineering structures are of utmost importance, yet the risk reduction should not be restricted to engineering marvels alone. The stereotypical frame of risk-reduction does not go beyond mere flood protection infrastructure, as it often neglects social, institutional and biological measures. Strengthening of disaster management institutions and their integration with other relevant bodies is of paramount importance. The Punjab Judicial Commission had underlined the importance of the need for an integrated flood management strategy.

While the Flood Inquiry Commissions' report substantially captured the gaps in administrative governance, it almost avoided the nexus of political governance. It is a well-recognized fact that after the police, the Irrigation Department is the second highly politicized department. Since power politics in Pakistan is dominated by a Byzantine alliance of landed aristocracy and urban oligarchy, water is the magic wand for political powers. The posting of Grade 17 and 18 officers in the department is directly governed by the Irrigation Minister and the Chief Minister respectively. This lucrative position is traded between Rs.1.5 to 2 million. If the custodians of the Torri Bund were of junior grade, their posting was not merely an administrative brushwork; rather it was a truest manifestation of the deeply entrenched ill will in the political decision-making milieu. Another example is the wilful negligence on the state of the Torri Bund. The Flood Inquiry Commission made a startling revelation that on 4th February 2010 i.e. six months before the breach, it was noted in a meeting of the Indus River Commission that unless the Torri Bund was strengthened well

before the expected flood season, a likelihood of colossal losses could not be ruled out. Can political leadership be exonerated that no proper monitoring was carried out to allocate the required resources to repair the rickety Bund before the flood?

Along with several factors responsible for making the disaster unbearable, the absence of a localized early warning system, ineffective disaster management mechanisms, virtually non-existent integrated flood management plans and a system devoid of proactive planning to mitigate disaster impacts, need to be reviewed and examined in detail. The recent disasters also revealed the limited capacity of the agencies responsible for disaster management, particularly at provincial and district level.

In Khyber Pakhtunkhwa, the Peshawar Meteorological office could not transmit the early warning of the predicted abnormal showers beforehand, only because the fax machines in the District Coordination Offices (DCOs) of Charsadda and Nowshehra were out of order. Likewise, the initial estimates of flood water at the Sukkur barrage were much less than the actual flows, which made the Sindh government decide to breach the bunds, railway tracks and roads to ease the barrage structures at certain strategic locations. The lack of a participatory decision making process sparked another controversy that may eventually lead to conflict. A comprehensive Geographic Information System (GIS) based flood management plan would have accurately determined the potential sites for breaches to prevent a major loss. However, media reports suggested that the internal decisions were taken at the spur of the moment, presumably influenced more by politics than any informed process or institutional mechanism. The breaches at Torri and Ghouspur Bunds in Sindh actually triggered the worst disaster, inundating vast areas in north Sindh and rendering several hundred thousand of people shelterless. As a result, the districts of Kashmore, Jacobabad, Shikarpur and Qambar-Shahdadkot witnessed the worst human crisis in their known history. And, even worse was the inadequate notice and unavailability of transport, which made evacuation extremely difficult. More than seven million people have lost their homes and sources of livelihood, and gone through a traumatic experience which will haunt them forever.

b. The Myth of Mega Dams

Ignoring the fact that a flow of 1.1 million cusecs would have spilled over any dam of the size of the proposed Kalabagh Dam, a narrative was developed arguing that it was the absence of large dams that caused the consecutive disasters of recent years to which no engineering or flood management science would subscribe. Sukkur, Gudu and Kotri barrages braced a flow of one million cusecs for nearly ten days. Any dam would not have the capacity to absorb this flow. Instead, such a mighty flow would have made the dam structure vulnerable to burst at its seams, hence, intensifying the outcomes of the catastrophe. Coinciding with floods in Pakistan, China also underwent an onslaught of floods. At one stage, hundreds of soldiers were deployed to avert a likely break-up of Wenquan reservoir that could have inundated Golmud city with a population of over 200,000, under four meters of deep water. In the same year, the north-east of Brazil, known for droughts, witnessed a devastating flood killing 50 people and leaving 150,000 homeless. Mainly, this devastation was caused by the bursting of dams on two rivers. In March 2009, a dam bursting near Jakarta killed scores of people. In fact, the damming of rivers has made drastic alterations in the natural flood plains of the Indus, and the contracted trachea of the Indus is also a major cause for the increased intensity of the flood. A series of dams and barrages have led to excessive siltation in the river bed, thus elevating the surge to dangerous levels.

In 2010, by the beginning of the last week of July, both dams (Tarbela and Mangla) were holding a massive 8.6 million acre feet water. Tarbela was at a level of 1,505 with 4.3 Million Acre Feet (MAF) of water while Mangla was at 1,195 feet with 4.1 MAF of water.

At this critical juncture, instead of lowering the level of the dams, WAPDA stored more water during the next four crucial days, with two catastrophic results: first, it compromised the dam's capacity to digest water afterwards and, second, it took the reservoirs closer to the levels where dam safety procedures take over, especially in the case of Tarbela. After attainment of 1,150 feet, Tarbela dam can take another 1.5 feet, before safety procedures come into effect. But by the time, the flood peak started hitting Tarbela dam on July 29, 2010; any room to manoeuvre had been lost by allowing the dam level to raise upto 1,515 feet. Unable to retain, the flood water was released downstream, which led to disaster.

The most crucial point here is that Tarbela dam, which stood at 1,505 feet on July 25, was 137 feet above its dead level and holding 4.3 MAF of water. On the same date, Mangla dam stood at 1,195 feet, 155 feet above its dead level. This means that the amount of manoeuvring capacity i.e. 137 feet for Tarbela and 155 feet for Mangla were available at that point in time. The water levels could have been lowered. Why this opportunity to manoeuvre was ignored? Who was responsible? Was it WAPDA, being the dam regulator or The Federal Flood Commission (FFC), being the federal body dealing with floods or The Ministry of Water and Power? It is equally crucial to pinpoint the responsibility as to who caused the loss of the four critical days between the meteorological warnings and the actual occurrence of floods. Who decided to keep filling the dams, when the Meteorological Office was already raising alarms?

After the dams had been filled, the floods had begun to ravage Pakistan, while at the same time the Meteorological Office warned of another reintroducing system. The FFC held a press conference on August 23, to tell the nation that the dams would have to be emptied, if there was another downpour of rain. The question arises: where was the commission when the first spell of rains hit the country? Why did it not force other departments to lower the dams' levels?

WAPDA must be questioned as to why it stuck to normal dam-filling criteria, when the situation was clearly abnormal. Why did it ignore all the warnings about the floods to fill the dams to the point of saturation?

c. Encroachments in River Beds

Unplanned human settlements have been another cause of large scale displacement. A mass exodus from the flood plains has validated the fact that unregulated human settlements have increased the likelihood of hazards. Rampant damming and diversions during the past decades have changed the flood regime entirely. Vast tracts previously part of the flood plain have been exposed as the dry land which encouraged new settlements. Before Tarbela dam, the katcha area of Sindh received a flood of 300,000 cusecs, almost every year and a flood of 500,000 cusecs for three out of four years. for 77% of years. Tarbela and other barrages completely altered the flood pattern, leaving large parts of flood plain barren, and thus paved the way for dense human settlements in the strips flanking the river course. According to a

report, some 50,000 acres of katcha area is under settlements, roads and government structures. The physical planning which had been ignored for decades in the rural areas and faulty development plans forced marginalized rural communities to settle along the river course. Dwellers of such areas were noticeably more resistant to evacuation, as their asset base was tied to the flood plains.

Unbridled deforestation owing to lack of regular flood flows and unscrupulous elements in politics and bureaucracy also aggravated the impact of the floods. The absence of thick forests that could have absorbed considerable wave energy compounded the ferocity of the flood.

Avoiding such disasters in the future need long term integrated planning along with committed and competent execution mechanism. Political will must be the cornerstone, if this is to be achieved. Such plans should be designed and executed with greater transparency and participation of various segments of society, especially civil society organizations and the private sector.

Similarly, the network of illegally erected dykes inside the floodplains was not a result of administrative negligence; rather it was a sordid plan patronized by local politics. Same reasons go for occupation of forest land in the flood plains as local feudals, government officials and politicians patronized such wrong doings. The Flood Inquiry Commission which recommended strict action against the Irrigation Department officials has largely ignored the negligence of feudal and political leadership, thus allowing the perpetrators to exploit perpetually. At least, the provincial governments should have been asked to disclose the list of people who occupied vast plots in the katcha area. Similarly, the reasons for postings of junior and inexperienced officials in the Irrigation Department could have been revealed to the public. This would have exposed the hidden agenda behind the flagrant nepotism that eventually inflicted tremendous suffering and damage on the poor. Another omission in the report was the faults in the engineering infrastructure. The enigmatic dimension of the 2010 flood was the abnormally long travel durations of peak flows between barrages.

The flow that normally required 24 hours from Guddu to Sukkur barrage took thirty three hours. Likewise the time-lag between Sukkur and Kotri was an astounding 408 hours as against the normal time-lag of 72 hours. This was partially because of the sustained inflows from

upstream rivers. Therefore, the role of newly built infrastructure e.g. bridges needed to be examined. There are structures on the Indus built without beforehand Environmental Impact Assessment (EIA) and there was a possibility that they might have aggravated the floods. The report also did not mention the failure of the RBOD structure, which was meshed with dozens of breaches and brought havoc to Dadu and Jamshoro districts. WAPDA constructed, and is managing the drain, but there was no mention of its role in the devastation.

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5. What We Can Learn?

There are a number of lessons that can be learnt from the three consecutive flood induced disasters in the country. This should be considered a shared responsibility of all the institutions, stakeholders and communities to equip themselves to deal with such natural disasters. Although, the onus of responsibility in any given situation falls on the government, however, it is equally obligatory on the citizens, the civil society, the donors and philanthropists to work with state institutions consistently, both in times of emergency as well as peace to internalize coping capacities to potential future hazards. Below are some of the key issues which need to be addressed to develop any effective response to future disasters.

a. The Capacity to Respond

The capacity to respond to natural calamities remains one of the major issues. The 2010 floods particularly exposed this lack of capacity. This was not only limited to the government that did not have the capacity to respond; but even the UN agencies and other humanitarian organizations fell short of capacity to meet the needs of the affected people. Responding to the emergency needs of 20 million affected people, spread across the country, was a daunting task.

There were gaps in the availability of trained human resources particularly in Sindh and Punjab. In Khyber-Pakhtunkhwa, the situation was relatively better, as after the 2005 Earthquake, the complex emergency management and frontline staff were available. But in the case of Sindh and Balochistan, where there was shortage of trained human resources to respond to a calamity of such an unprecedented scale. Although, this gap was reduced during the crucial phase of the relief, the lack of trained management and frontline staff had already compromised the relief, search and rescue work.

At the NDMA, before the 2010 disaster, there were only 21 trained staff members to respond to future potential hazards. At that time, the authority's annual budget was 65 million PKR or 0.74 million USD.

This seriously inhibited its ability to hire additional human resource or buy required equipment and material.

b. The Role of Institutions

There is a need to comprehend the role of institutions that are responsible for responding to the disasters. The recent disasters were a warning from the nature that there is an urgent need to realign our response mechanism to more effectively adapt to the unpredictability of climate change.

The recent experiences of disaster response illustrate the weaknesses of the administration. The institutional capacity of the disaster response system got exposed owing to its virtual paralysis in the times of crisis. The NDMA and its provincial and district extensions were unable to manage the situation finding themselves in complete chaos.

In disaster response, the lowest tier i.e. (DDMA) is of paramount importance, because it is the first and the last line of defence for communities. The DDMA, under Section 21 of the National Disaster Management Ordinance are responsible to develop disaster management plans for their respective districts; however, such plans were not in place in any of the affected districts. Certain international donor organisations provided technical and logistical support for capacity-building of selected DDMA, but provincial governments seldom considered institutionalisation of (PDMA) and DDMA as a critical need, hence a priority.

Though, the DDMA are under administrative control of the provincial government, yet there were instances, when they were reprimanded by the NDMA, if they approached any donors for support. During the peak time of the disasters, the PDMA in Sindh was manned by less than a dozen staff, without any outreach stations in the rest of the province.

Until recently, Punjab did not have PDMA, and those established in the remaining provinces were unprepared due to a dearth of human, technical and financial resources.

The three consecutive disasters are self-evident of the government's unwillingness to invest into disaster prevention and response systems. DMA at all levels need to take serious action to improve their systems, and internalize sufficient human, technical and financial resources.

Ideally, DDMA should also have extensions at Tehsil and Union Council level. These should be action-oriented, grassroots based, truly

participatory organisational structures that can respond instantly to the local calamities. Under the current arrangement, the District Coordination Officers (DCOs) are the embodiment of the DDMA.

The most important element that has not received adequate attention is the disorganised institutional web when any disaster occurs. PDMAs do not have sufficient trained and experienced human resources which merits urgent attention.

By virtue of their role, the most important ones, but equally ignored aspect of the administration, are the DDMA. Since the district administration is the first entity to reach people in the event of any disaster, their inefficiency would have serious impact for flood prone communities. In the absence of elected local bodies, DDMA have become the sole government face at the local level.

DDMA are synonymous with the District Coordination Officers (DCOs) for all practical purposes. Because of their administrative priorities, they can hardly offer any meaningful support to disaster victims. Usually, they react and respond after a disaster has stricken. , However, disaster management is a continuous process that may not be confined to post disaster relief and response activities. Although, the DDMA are good administrative departments, however, they are not institutionalised as disaster management entities. They lack the resources to manage disasters professionally. They are often manipulated by the local powerful individuals, which results in compounding rather than reducing the miseries of the affected people.

Recently, the government has established the Ministry of Climate Change that demonstrates commitment towards disaster management. However, hydro-climatic disasters need more concrete measures to ensure early warning, preparedness to forestall impacts, and well-coordinated mechanism to respond in a transparent and professional manner.

According to the Ministry's record, three pre-monsoon meetings were held in 2010, convened by the Defence Ministry, the National Disaster Management Authority and the General Headquarters respectively. All the meetings were held in June while the floods hit the country in the last week of July. During June, neither was there any flood warning, nor was anybody expecting floods to occur.

c. Mapping and Early Warning Systems

Disaster/hazard mapping would be the basis of a workable disaster response system. Regrettably, this fundamental requirement has been ignored, and in its absence, all the rest becomes a mixture of reactions in the times of disaster.

The creeping disasters like land degradation, top soil erosion, watershed deterioration due to rampant deforestation, pollution of shrinking water resources, threatened coastal eco-systems and cross-contaminating urban air pollution do not portray images of grief and misery, and so are not considered important. Unless, this country has an all-encompassing disaster map, planning and preparedness will remain a distant dream.

The lack of appropriate early warning system has been a major cause of preventable localised disasters. Timely warning is essential in any disaster response mechanism, as it can reduce the impact to a considerable degree. This is particularly critical in the flow areas of hill torrents, where high intensity flows can easily outpace evacuation efforts. During the recent floods, torrents from Koh-e-Suleman hit communities in South Punjab in the absence of beforehand warnings. In managed rivers, however, forecasting a flood becomes easier, although the prevalent system is too primitive by contemporary standards. A telemetry system could have offered some respite. However, it was not allowed to function by the unscrupulous elements that also tampered with the data. This was witnessed in the defective preparedness in Sindh where initial flood estimates of 0.8 million cusecs proved incorrect, leaving the province in a state of flux in 2010.

An initial relief breach at the Torri Bund wreaked havoc in the province, and the upper half of Sindh from Kashmore to Dadu and Jamshoro had to pay the price. The flood debacle in Sindh unmasked the fragility of governance structures where individuals dominate the rules of business.

d. Policies and Politics

Trust deficit between the federation and the federating units has always been the major source of unpleasant and uneasy relationship between the two as well as among the later. This trust deficit was eminent during the recent years of the floods. Only few days after

the floods ruled the canals, riparian provinces were in conflict on the opening of Chashma-Jehlum Link Canal.

According to a leading national daily, the FFC reports showed an increase of 331% in the number of flood affected people in Punjab by inflating the number from 1.9 million in its 20th August report to 8.2 million in the 1st September report. The data managers at FFC overlooked the fact that the number of affected villages, households and acreage remained unvaried in both reports. Likewise, the report inexplicably reduced the number of cattle head killed in Sindh from 129,416 to 24,788.

This numerical race stemmed from the lack of credibility in the system that allowed a particular stakeholder to inflate the figures to grab a larger share in resource allocation. The experience of this disaster can become an opportunity if it is utilized to strengthen the institutional systems in the future.

The issue of water management and the resultant disputes between the provinces constantly haunt Pakistan. Globally, the availability of 1000 m³ water per capita is the minimum threshold, even under water scarcity. Currently, 1038 m³ water is available per capita and it is expected to decrease to 751 m³ per capita by 2030. Being a water scarce country, there is tension between the provinces on the use and share of equitable water resources.

One of the key tasks of the disaster management departments was to develop coherent and cohesive disaster management plans at the federal, provincial and district levels. These were to be developed not only on paper, but also translated into practice.

e. Resource Mobilization

As discussed earlier, responding to large scale disasters is beyond the capacity of even stable and developed economies. However, in any given case, the role of coordination and mobilization of international and local response requires sustained objective and consistent effort.

Over the last three years, the challenge of mobilisation of resources was evident. The increasing cost of the security heightened the burden on the meagre financial resources of the state. According to newspaper reports, recently, the federal budget has been defaced through manipulation in defence and development allocations. The

former has been increased by PKR 110 billion, whereas the later has been reduced by PKR 73 billion. The Council of Common Interest (CCI) announced a compensation of PKR 100,000 for every disaster-stricken family, but the provinces found themselves financially too incapacitated to afford this. The international aid response had been slow due to various reasons. In 2010, the UN launched the Pakistan Floods Emergency Response Plan seeking US\$ 2 billion.

The low international response to the flood appeals indicated the need for a sustained home-grown budgetary solution to disaster response in general and floods in particular. There is no denying the fact that Pakistan is a disaster prone country. This is the fourth consecutive year that floods of varying degrees have occurred in various parts of the country. The weak response highlights the need to create regular internal funding mechanisms through proper budget and allocations for disaster management. Moreover, the international aid agencies and donors also need to make long term commitments to this, with explicit conditions to assure investments in disaster risk reduction by Pakistan. International community's reservation on aid effectiveness including accountability and transparency in humanitarian aid are well justified. This, however, does not qualify that those who are facing harsh conditions should be left to the mercy of catastrophe. It is not only the basic human right of affected communities, but a collective responsibility of everyone to help people in need. The local philanthropy organizations also need to pay more attention to disaster response as a priority area.

f. Coordination

Coordination among various tiers of disaster management authorities was conspicuously absent. The lack of coordination was also observed between the provincial and national authorities, between government and the UN and within and among the various INGOs and NGOs. Though, within the humanitarian sector, the use of cluster approach did help to some extent to bridge the coordination gap, however, more efforts were required to improve overall coordination. Likewise, coordination of the government with national and international humanitarian agencies was also chaotic, particularly in the provinces. Within UN agencies too, due to different leadership tiers etc., the coordination gap was reported, as discussed in NDMA's lesson learnt paper on the 2010 floods.

Despite these shortcomings, a range of stakeholders appreciated the efforts made under the auspices of the Strategic Leaders Forum. The forum comprised of NDMA, PDMAs, DDMAs, humanitarian organizations, UN agencies and other relevant stakeholders. NDMA's Lessons Learnt paper (2010) stressed the need for continuing and strengthening this forum with the role in strategic planning and networking in relation to disaster management, led by NDMA.

Moreover, to improve coordination and better advocate the shortcomings in the disaster response, around the time of the 2010 floods, various Pakistani NGOs came together and formed a National Humanitarian Network (NHN) to increase coordination of civil society in relief, early recovery and advocacy for Disaster Risk Reduction (DRR).

In the 18th Amendment to Pakistan's Constitution, disaster management was also devolved to the provinces along with other important ministries. Such devolution of powers was much needed and appreciated all around. It has now created opportunities to undertake contextually relevant, instant and more informed and local interventions in times of peace and disaster. However, as was observed during the 2010 floods, that there is a need for effective coordination among all the stakeholders; since the PDMAs would eventually come under the provincial government therefore there would always remain need for institutional mechanisms to develop meaningful coordination between the PDMA and NDMAs.

g. Aid Effectiveness

Since the floods in 2010 and also in Pakistan's previous record of dealing with disasters, the effectiveness of international and domestic aid has always remained in question. There were reported cases in relation to the accountability of fund utilization vis-a-vis achievement of the desired results. In March 2011, when the 6.9 billion rupees of the donations collected in the Prime Minister's Relief Fund were still unutilised, the World Bank lent Pakistan \$125 million (Rupees 10.8 billion) to help pay aid amounts to the victims. The government obtained this loan to provide the second tranche of cash hand-outs of PKR 40,000 each to over one million households under the Citizen's Damage Compensation Programme, which was expected to cost a total of PKR 39.5 billion (\$460 million).

The reports during that time cited the reason for not spending these amounts in time as the National Oversight Disaster Management

Council's (NODMC) failure to implement a mechanism for the transparent use of funds.

h. Local Governments and Disaster Response

A Local government can play an effective role in helping to respond to any natural or man-made calamities. In this purview, a range of the stakeholders have been advocating all over the world for the involvement of local governments in disaster risk reduction. In Pakistan this tier of governance is absent for several years. Despite the constitutional provision under the 18th Amendment, none of the provinces conducted local government elections. Local community led disaster initiatives are more long term and could prove effective in inculcating disaster resilience at the grassroots.

The absence of the local governments impacted the effectiveness of aid work during the recent floods. As per an Oxfam GB paper, the District Coordination Officers (DCOs) were responsible for coordinating the relief and recovery work at the district level. This was in addition to the regular management responsibilities of the DCOs who in most cases did not belong to the local areas. The paper argues with few expectations that the DCO led disaster response initiatives were not very effective. It is argued that having elected local government could improve the disaster response work because, the onus of responsibility remains on the local elected governments. They are well aware of the local realities, hence their ownership, understanding and accountability remains higher. The local governance system ensures increased participation of local communities as compared to a bureaucracy led disaster response.

i. Absence of Disaster Risk Reduction Systems

Despite staunch advocacy, an integrated system of Disaster Risk Mitigation doesn't seem to be a political priority, requiring essential legislation at national and sub-national levels. Under the Hyogo Framework for Action (HFA), Pakistan has international obligations to establish an elaborate disaster risk reduction system to levels of union councils and villages. 'The safer cities, schools and hospitals' is a global campaign. Pakistan should implement the campaign to improve its disaster risk resilience capacity.

In 2013, the Government of Pakistan formulated 'National Disaster Risk Reduction Policy'. Effective implementation of this policy will pave the way for a much-needed disaster risk reduction system in the country to mitigate the impacts of future potential hazards.

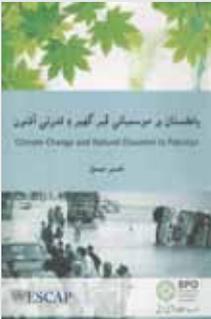
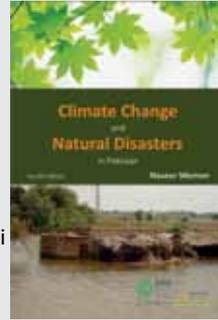
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- Paper No. 286, Integrated Water Resource Management in Pakistan, Symposium on Changing Environmental Pattern and its impact with Special Focus on Pakistan <http://pecongress.org.pk/images/upload/books/4-Intergrated%20Water%20Resource%20Management%20in%20Pakistan%20%284%29.pdf>

Naseer Memon's other books

Climate Change and Natural Disasters in Pakistan

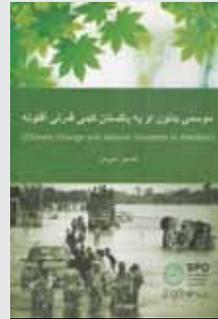
The book authored by Mr. Naseer Memon is a compendium of his articles published in leading newspapers of Pakistan. These articles also discuss various issues pertaining to recent floods of Pakistan. The book was widely appreciated by the readers and later on translated in Urdu, Sindhi and Pashtu as well. Recently, fourth edition of the book has been published. The book can be downloaded from the following link <http://www.spopk.org/spo/index.php/publications/climate-change-disasters>



Sindhi



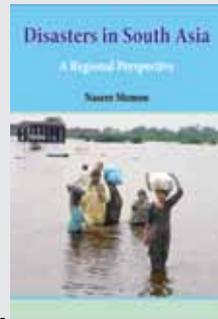
Urdu



Pashtu

Disasters in South Asia – A regional Perspective

South Asia is facing the wrath of natural disasters with greater frequency and intensity. During the recent years, countries in the region have endured series of catastrophic disasters, such as, devastating earthquakes, floods, cyclones and droughts playing havoc with poor communities. This widely read book by Mr. Naseer Memon is a desk review of disasters and their impacts in various countries of the region. The book provides insight into policy and institutional responses in different countries. The book is also available in Urdu language. It can be downloaded from the following link <http://www.piler.org.pk/images/pdf/Disasters%20in%20South%20Asia%20-%20A%20Regional%20Perspective.pdf>



Strengthening Participatory Organization (SPO)

SPO is a leading rights-based civil society organization with its Citizens Voice and Accountability (CVA) initiative being implemented in over 75 districts of the country. SPO's focus mainly being on state and citizens engagement for strengthening democratic norms, systems and institutions to secure social justice and peace and harmony, and eradicate conflicts, poverty and gender-inequalities, works with over 3500 countrywide civil society entities comprising human rights, women, minority and youth activists, organizations and networks, mainstream political parties, labour organizations, trade unions, teachers and media associations, intelligentsia, and policy-makers at provincial and national levels.

Understanding the gravity of critical emergency situations that target communities have to live in intermittently, SPO also deals with humanitarian emergencies resulting from natural and human-induced hazards such as the earthquakes, rain-fed floods and cyclones and internal displacement of communities triggered by conflicts.

UDHR and other international human rights covenants are central to SPO's program philosophy.

Currently, major components of SPO's CVA initiative are supported by BHC and DFID. SPO acknowledges other donors support as well.



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