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Monographic issue

The profile of disaster risk
of Pakistan and institutional
response

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Letter from the editors

The *Emergency and Disaster Reports* is a journal edited by the Unit for Research in Emergency and Disaster of the Department of Medicine of the University of Oviedo aimed to introduce research papers, monographic reviews and technical reports related to the fields of Medicine and Public Health in the contexts of emergency and disaster. Both situations are events that can deeply affect the health, the economy, the environment and the development of the affected populations.

The topics covered by the journal include a wide range of issues related to the different dimensions of the phenomena of emergency and disaster, ranging from the study of the risk factors, patterns of frequency and distribution, characteristics, impacts, prevention, preparedness, mitigation, response, humanitarian aid, standards of intervention, operative research, recovery, rehabilitation, resilience and policies, strategies and actions to address these phenomena from a risk reduction approach. In the last thirty years has been substantial progress in the above mentioned areas in part thanks to a better scientific knowledge of the subject. The aim of the journal is to contribute to this progress facilitating the dissemination of the results of research in this field.

This firsts 2015 monographic issue of *Emergency and Disaster Reports* prepared by Dra. Javeria Majeed Swathi is dedicated to Pakistan a disaster-prone country due to climatic and geo-physical conditions and also to high degrees of exposure and vulnerability. A range of hydro-meteorological, geo-physical and biological hazards including avalanches, cyclones and storms, droughts, floods, glacial lake outburst floods, earthquakes, landslides, tsunamis and epidemic pose risks to Pakistani society. Some of these hazards (e.g. floods, landslides etc.) are predominantly seasonal and occur on an annual basis, whereas other hazards such as earthquakes and tsunamis are rare events but potentially highly destructive.

In addition to natural hazards a variety of human-induced hazards threaten Pakistani society, economy and environment. They include industrial and transport disasters including oil spills, nuclear hazards, urban and forest fires as well as civil unrest. Natural disasters cause and effect, extreme natural disasters.

Pakistan is undergoing rapid changes turning from a predominantly rural and agrarian to an industrial, service-based and urban economy. Communities that have been living in hazard-prone areas for centuries often have mechanisms that allow them to recognize and mitigate the threats that surround them. As people migrate or are forced to migrate within the country increasing numbers of - predominantly poor - people live in areas that are exposed to hazards they have little familiarity with. A high rate of population growth further feeds into this trend, and leads to environmentally damaging practices such as uncontrolled logging or overgrazing, that may intensify and modify existing hazards. Climate Change threatens to alter monsoon and rainfall patterns further and is predicted to lead to more severe and less predictable flooding and drought episodes. Rapid urbanization with little attention to spatial planning and construction norms exposes higher numbers of people to highly damaging events such as cyclones and earthquakes.

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Monographic issue

The profile of disaster risk of Pakistan

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LIST OF ABBREVIATIONS

IDP	Internally Displaced People
NDMA	National Disaster Management Authority
NDMC	National Disaster Management Commission
NDMO	National Disaster Management Ordinance, 2006
AJ & K	Azad Jammu and Kashmir
CBO	Community Based Organizations
CCB	Citizen Community Boards
DCO	District Coordination Officer
DRR	Disaster Risk Reduction
DDM	A District Disaster Management Authority
DRM	Disaster Risk Management
FATA	Federally Administrated Tribal Areas
FAO	Food and Agriculture Organization
FFC	Federal Flood Commission
EDO	Executive District Officer
KPK	Khyber pakhtunkhawa
EOC	Emergency Operations Centre
ERC	Emergency Relief Cell
GSP	Geological Survey of Pakistan
GOP	Government of Pakistan
HFA	Hyogo Framework for Action 2005-2015
IASC	Inter-Agency Standing Committee
IOM	International Organization for Migration
IRP	International Recovery Platform
NEOC	National Emergency Operations Centre
NGOs	Non-governmental Organizations

1. INTRODUCTION

Pakistan lies between Latitudes of 24°N and 37°N and Longitudes of 62°E and 75°E, covering a total land area of 796,095 sq km. The country shares its borders with Iran to the west, India in the Southeast, Afghanistan in the north-west, and China in the north. The Arabian Sea lies to its south. Pakistan is a land of great topographic and climatic contrasts. The country is geographically divided into three areas: the northern highlands, the Indus river plains and the Baluchistan plateau(1).



The Islamic Republic of Pakistan is one of the important member countries of South Asia Association for Regional Cooperation (SAARC) since its inception in 1987. The Muslim state that emerged from partition of British India on 14 August 1947 has initially included an eastern wing comprising mainly the eastern half of Bengal province and parts of Assam (60 years of independence).

Pakistan comprises the four provinces of Sind, Baluchistan, Punjab and the NW Frontier Province, plus the Federal capital and 'tribal areas' under federal administration. The tribal areas (Khyber, Kurram, Malakand, Mohmand, North Waziristan, and South Waziristan) are administered by political agents responsible to the federal government. Pakistan controls the northern and western portions of Kashmir, an area of about 84,160 sq km with a population of about 17m (2) The Pak-occupied Kashmir has its own Assembly, its own Council, High Court and Supreme Court. There is a Parliamentary form of Government with a Prime Minister as the executive head and the President as the constitutional head. The seat of government is Muzaffarabad. The Pakistan Government is directly responsible for Gilgit and Baltistan (the north)(3).

The National Language of Pakistan is Urdu but English is the official language. It has a beautiful mix of different traditions and many different languages. Pushto, Hindko and Punjabi are spoken all over the country (4).

Agriculture (including forestry and fishing) is the mainstay of Pakistan's economy, employing about 50% of the working population and providing about 25% of the country's gross domestic product (GDP). The entire area in the north and west is covered by great mountain range (5). The rest of the country consists of a fertile plain watered by five big rivers and their tributaries. Agriculture is dependent almost entirely on the irrigation system based on these rivers. The main crops are wheat, cotton, maize, sugar cane and rice, while the Quetta and Kalat divisions (Baluchistan) are known for their fruits and dates. Pakistan is self-sufficient in wheat, rice and sugar. Industry employs about 10% of the population. Manufacturing contributes about 20% to GNP (5) (6) (5) (7).

2 DISASTERS IN PAKISTAN

2.1 BACKGROUND

Due to geo-physical conditions, climatic extremes, and high degrees of exposure and vulnerability, Pakistan is a disaster-prone country. A range of hydro-meteorological, geo-physical and biological hazards including avalanches, cyclones and storms, droughts, floods, glacial lake outburst floods (GLOF), earthquakes, landslides, tsunamis and epidemic pose risks to Pakistani society (1)(8)(9)(10). Some of these hazards (e.g. floods, landslides etc.) are predominantly seasonal and occur on an annual basis, whereas other hazards such as earthquakes and tsunamis are rare events but potentially highly destructive. In addition to natural hazards a variety of human-induced hazards threaten Pakistani society, economy and environment. They include industrial and transport disasters including oil spills, nuclear hazards, urban and forest fires as well as civil unrest (8). Natural disasters cause and effect, extreme natural disasters.

Pakistan is undergoing rapid changes turning from a predominantly rural and agrarian to an industrial, service-based and urban economy (11). Communities that have been living in hazard-prone areas for centuries often have mechanisms that allow them to recognize and mitigate the threats that surround them. As people migrate or are forced to migrate within the country increasing numbers of - predominantly poor - people live in areas that are exposed to hazards they have little familiarity with. A high rate of population growth further feeds into this trend, and leads to environmentally damaging practices such as uncontrolled logging or overgrazing, that may intensify and modify existing hazards (8)(12). Climate Change threatens to alter monsoon and rainfall patterns further and is predicted to lead to more severe and less predictable flooding and drought episodes. Rapid urbanization with little attention to spatial planning and construction norms exposes higher numbers of people to highly damaging events such as cyclones and earthquakes (8)(13).

2.1 HISTORY OF DISASTERS IN PAKISTAN

Pakistan has been at risk to various types of natural disasters of which cyclones, flooding, landslides, earthquakes and drought are more common. Apart from natural disasters Pakistan is facing a many technological and manmade disasters .Over the last 50 years the disasters have adversely affected the country (14)(15). Broadly the disasters that happened in the last 50 years can be divided into the following main groups

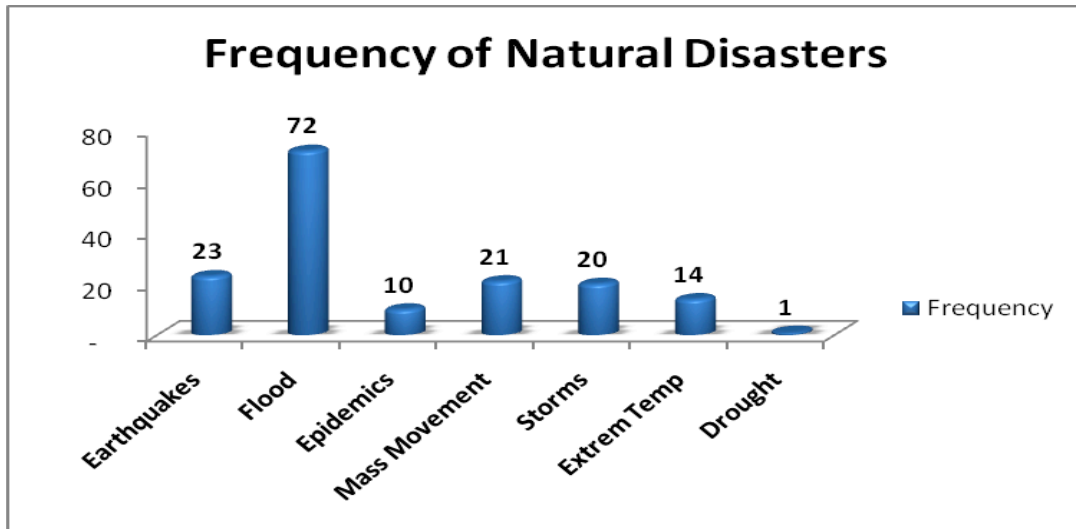
Groups	Sub Groups
Natural Disasters	Earthquake Floods Storms Extreme Temperature Mass movement
Technological disasters	Road Traffic Accidents Industrial Accidents
Man Made Disasters	Terrorism

2.2 FREQUENCY OF DISASTERS IN LAST 50 YEARS

Disaster profile of Pakistan made us understand that Pakistan has a multiple disaster statistics as it is a disaster-prone country of South Asia in which huge loss of property, flora and faunas generally occurs every year in the country. Frequent occurrence of flood causes severe disaster in Pakistan, followed by tropical cyclone, infrequent strong earthquakes and landslide in the country. Government of Pakistan involves various stake holders of country and overseas to deal with disasters on massive scale to mitigate hazards caused due to various types of natural calamities. Recent occurrence of the 2005 earthquake and the 2010 Pakistan flood have broken all disaster records of Pakistan in terms of loss of lives and damage to property that occurred in total so far in Pakistan (16)(1)(17).

2.3 NATURAL DISASTERS IN PAKISTAN

Natural disasters interfere with economy and destroy infrastructure, resulting in a disruption of livelihoods, normal services and health care. In the last 50 years about 162 events of natural disasters happened in the country with the following distribution

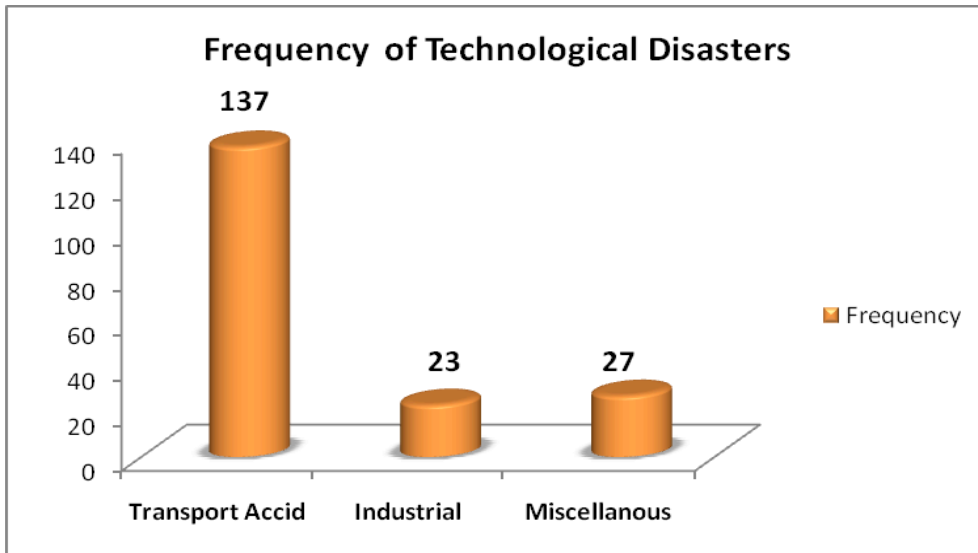


Most frequently natural disaster is the flood resulting in disruption and leading to widespread collapse of infrastructure. They are the leading cause of deaths from natural disaster worldwide, with 6.8 million deaths in the 20th century Earthquakes are the worst geological disaster in the world. Pakistan faced 23 earthquakes in the last 50 years killing thousands of people, while leaving many more injured/disabled and homeless and the nation suffered from a worse economy loss (16).

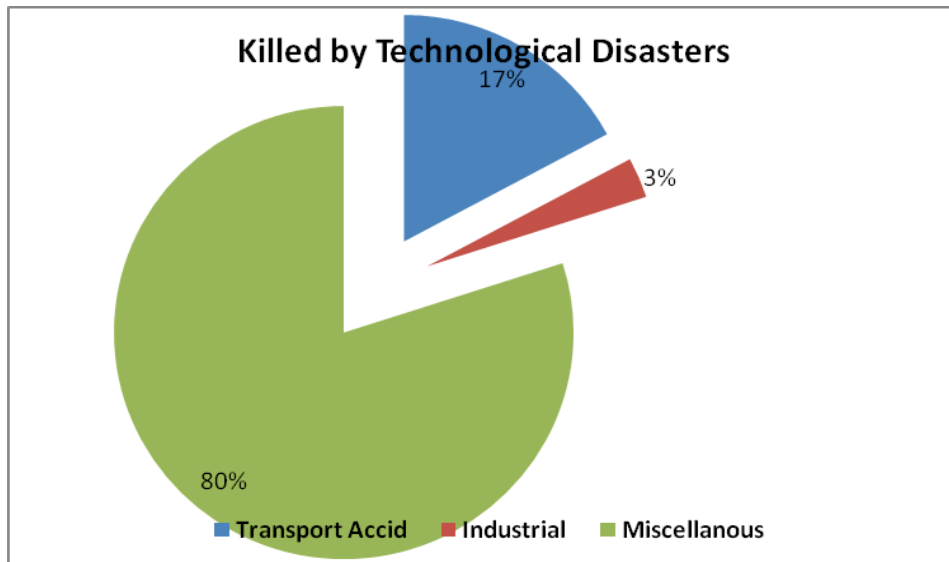
Although Pakistan faced only one drought in the last 50 years but due to the risk factors present and the continuous de forestation there is a danger of the country being struck by more droughts in future (16).

2.4 TECHNOLOGICAL DISASTERS

Technological disasters in Pakistan have contributed many deaths and economical losses(18). Major technological disasters in Pakistan can be classified as Industrial, Transport and Miscellaneous. According to the Cred Data base Pakistan suffered from a total of 187 accidents in last 50 years. Out of these 23 were Industrial Accidents, 137 Transport and 27 were due to Miscellaneous causes (16).



Source(16)



Source(16)

2.5 TOP TEN NATURAL DISASTERS

Top 10-disasters of Pakistan during the year last 50 years are shown in following Tables in terms of people killed, people affected and damages to property during different disasters in Pakistan. Disaster profile of Pakistan made us understand that Pakistan has a multiple disaster statistics as it is a disaster-prone country of South Asia in which huge loss of property, flora and faunas generally occurs every year in the country.

Frequent occurrence of flood causes severe disaster in Pakistan, followed by tropical cyclone, infrequent strong earthquakes and landslide in the country.

Top 10 Natural Disasters in Pakistan 1900 to 2013 sorted by numbers of killed

Disaster	Date	Killed
Earthquake	8-Oct-05	73,338
Earthquake	31-May-35	60,000
Storm	15-Dec-65	10,000
Earthquake	28-Dec-74	4,700
Earthquake	27-Nov-45	4,000
Flood	1950	2,900
Flood	28-Jul-10	1,985
Flood	8-Sep-92	1,334
Flood	2-Mar-98	1,000
Flood	Jun-77	848

Source (16)

Government of Pakistan involves various stake holders of country and overseas to deal with disasters on massive scale to mitigate hazards caused due to various types of natural calamities. Recent occurrence of the 2005 earthquake and the 2010 Pakistan flood have broken all disaster records of Pakistan in terms of loss of lives and damage to property that occurred in total so far in Pakistan (1)(16).

Top 10 Natural Disasters in Pakistan 1900 to 2013 in numbers of affected people

Disaster	Date	No Total Affected
Flood	28/07/2010	20359496
Flood	9/2/2005	7000450
Flood	8/9/1992	6655450
Flood	15/07/1992	6184418
Flood	2/8/1976	5566000
Flood	12/8/2011	5400755
Earthquake	8/10/2005	5128309
Flood	Aug-12	5049364
Flood	Aug-73	4800000
Flood	Jul-78	2246000

Source(16)

Top 10 Natural Disasters in Pakistan 1900 to 2013 sorted by economic damage costs

Disaster	Date	Damage (000 US\$)
Flood	28/07/2010	9500000
Earthquake (seismic activity)	8/10/2005	5200000
Flood	12/8/2011	2500000
Flood	Aug-12	2500000
Flood	7/8/2013	1900000
Storm	26/06/2007	1620000
Flood	8/9/1992	1000000
Flood	Aug-73	661500
Flood	2/8/1976	505000
Flood	10/8/2007	327118

Source (16)

2.6 IMPACT OF DISASTERS

Disasters effect the whole development and progress in a country. It is evident by the poor indicators in terms of Human Development index, low GDP and poor health indicators (19).

During the last 50 years of the disasters millions of people are affected by natural disasters every year, and the impact can be calamitous. From the destruction of buildings to the spread of disease, natural disasters can devastate entire countries overnight. Tsunamis, earthquakes and typhoons do not just wreak havoc on land; they also disrupt people's lives, especially for those living in remote regions (19).

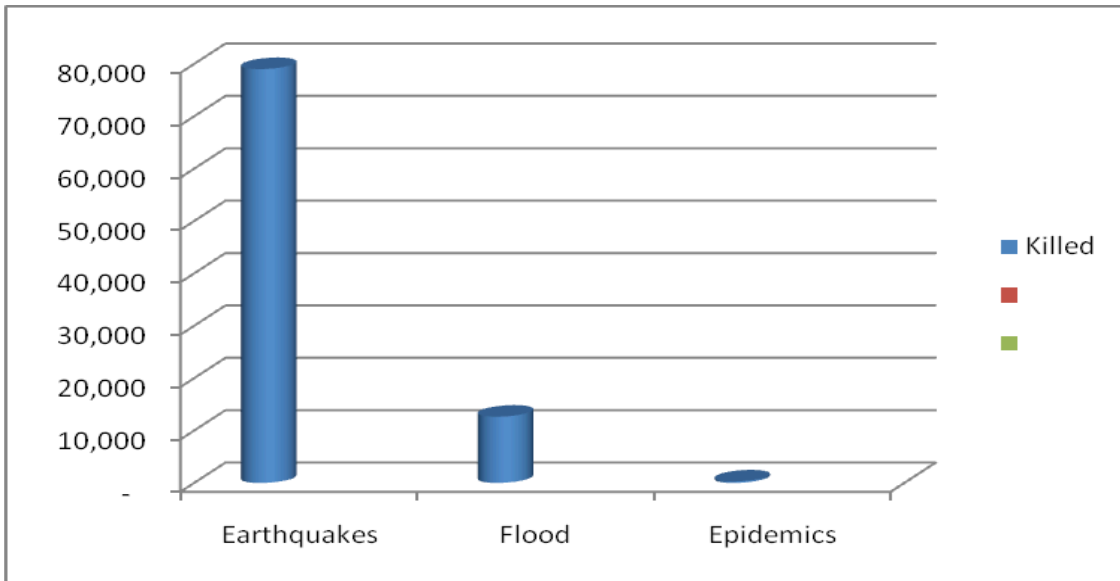
In Pakistan also the disasters impacted the country in terms of its overall development. The war on terrorism has adversely impacted the economy of the country. Pakistan had faced the added burden of 200,000 Afghan Refugees in the country due to Afghanistan war (20)(21). This combined with the natural and technological disasters has impacted the health and economy of the country adversely.

IMPACT ON HEALTH

NATURAL DISASTER

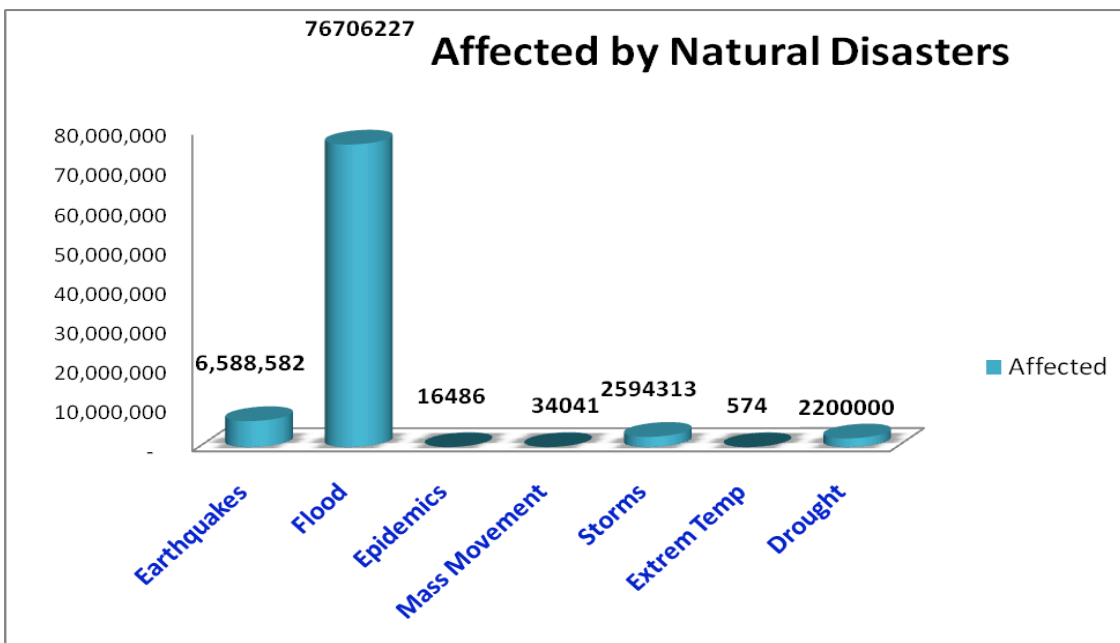
During the last 50 years 106,306 people were killed by the natural disasters Earthquakes was the major killer disaster killing 790, 16 that makes 74 percent of the total deaths by natural disaster in history of Pakistan.

No of people killed by Natural Disaster



Source(16)

The natural disasters affected large population resulting in displacement, injury or disease to large number of people. A total of 88,140,223 people were affected .Floods were the major contributor affecting about 76706227 followed by the earthquake that affected 6588582 people.

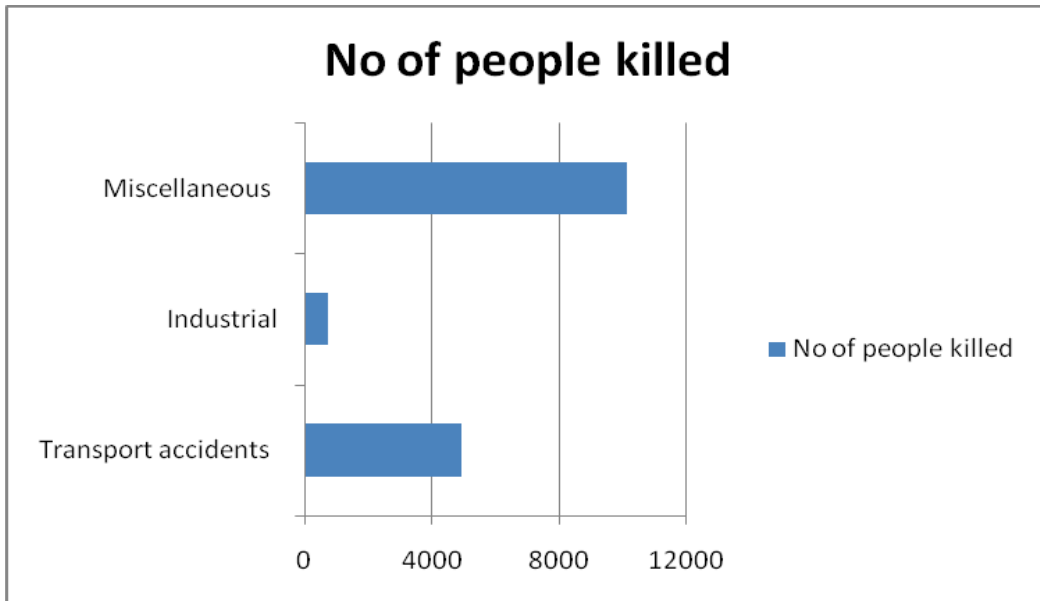


Source (16)

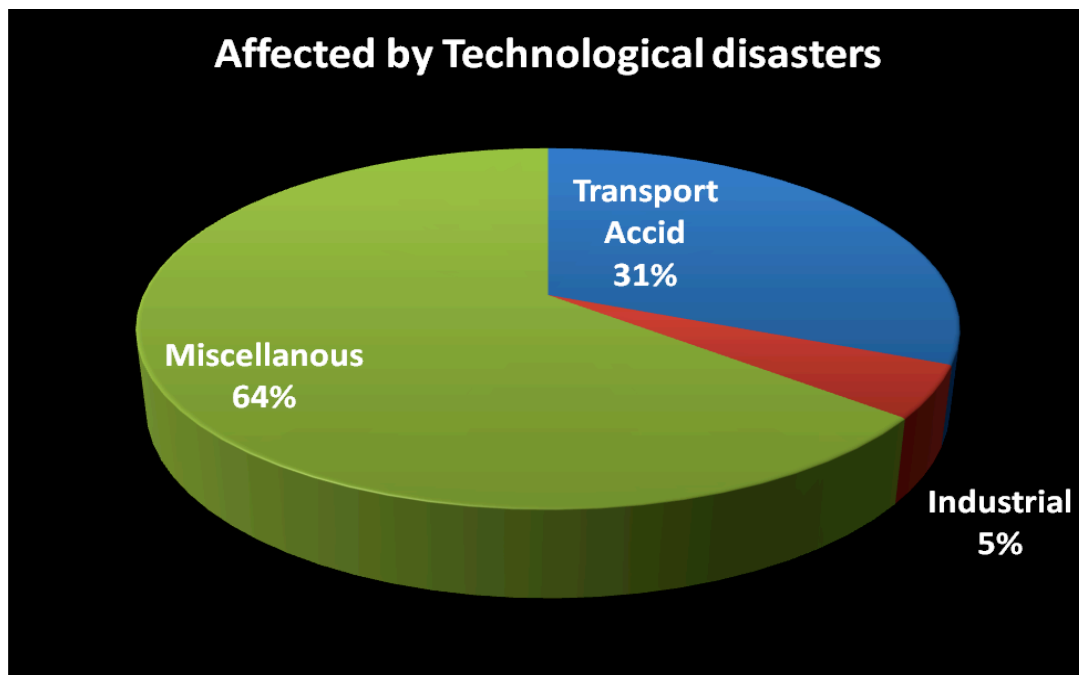
TECHNOLOGICAL DISASTERS

The technological disasters are a major contributor of the killing and affecting the lives of the people. According to WHO Road Traffic accidents lead to about 1.58 percent of the total deaths in Pakistan per year and the number is growing every day.

According to the Cred database the total 182 technological disasters in the last 50 years of Pakistan History have killed 799 and affected 15790 people.



Total No of people killed by Natural Disaster Source (16)



Source (16)

IMPACT ON ECONOMY

On the other hand disasters also affected the economy of the country very badly. Until now the country suffered a large number of economic losses that has affected the GDP of the country .As most of the buildings in Pakistan are not insured there is a rough estimate after every disaster but no reliable data can be found. The socio economical impacts of both the natural and technological disasters can be seen in the country in terms of lower GDP, Human development index and other indicators.

Pakistan is in transition from a predominantly rural and agrarian to an industrial, service based and urban economy. The economy has been growing at an impressive average of more than 6 % over the past few years due to macro-economic policy directions pursued by the government (22)(23)(24).

Natural disasters threaten sustained economic growth by causing shocks, as the October 2005 earthquake did. The quake caused a loss of 5.2 billion USD which is staggering when compared to national budget for 2006-07 which was about USD 25 billion. This amount was much higher than the total allocations for social sector development. Similarly, the economic damages suffered from 14 major floods, since 1947, have been estimated as USD 6 billion¹ (23).

The **drought** of 1998-2001 demonstrated that this phenomenon could have serious political, economic and social repercussions. Sustainable development in agriculture, livestock, water resources, food security and environment sectors is seriously threatened by droughts, particularly in Baluchistan, Southern Punjab, Tharparkar and D.I.Khan in NWFP. The drought of 2001 reduced economic growth rate to 2.6 % as compared to an average growth rate of over 6 % (23).

Therefore, it is not a coincidence that areas which experience disasters frequently, are amongst the poorest regions; e.g. Balochistan, Tharparker, Cholistan and Northern areas. In order for Pakistan to ensure continuity of current economic growth in the medium to longer terms, it must address risks posed by natural disasters.

3. EARTHQUAKE IN THE HISTORY OF PAKISTAN

3.1 FREQUENCY OF EARTHQUAKES AND TOP FIVE EARTHQUAKES IN HISTORY

A total of 23 earthquakes hit Pakistan in the last 50 years (25)(26)(31)(CRED Annual Disaster Satitical Review)The following table shows the top five in terms of number of people killed and affected and economic damages in terms of number of people killed.

Date	Area	Type	Magnitude	Epicenter	No Killed	Affected
8/10/2008	Bagh, Muzaffarabad, Poonch Manshera	Earthquake (seismic activity)	7.6	.	73338	5128309
28/12/1974	North Indus R. Valley	Earthquake (seismic activity)	6.2	35.1 degrees north and 72.9 degrees east	4700	50200
31/01/1991	Malakand, Chitral, Peshaw	Earthquake (seismic activity)	6.6	300 Km NE OF KABUL. EPICENTRE WAS LATITUDE 36.7 DEGREES NORTH AND LONGITUDE 70.9 DEGREES EAST.	300	204794
12/9/1981	Karakoram, Darel, Tangir, ...	Earthquake (seismic activity)	NA	Baluchistan	250	2000
29/10/2008	Khanozai, Rod Mulazai, Di ...	Earthquake (seismic activity)	6.4	Baluchistan province, near Quetta	166	75320

Source(16)

3.2 SEISMOTECTONICS

Seismic activity in South Asia is a direct result of the collision of the Indian and the Eurasian plates, which results from the northwestern motion of the Indian Plate at the rate of 4-5 cm per year. The resulting collision has fractured the Indian plate into several slices beneath the Kashmir Basin and is known as the Indus-Kohistan seismic zone. The October 8 2005 earthquake occurred within the Hazara-Kashmir syntaxis of the Himalayan fold belt. The main identified feature in this zone is the Balakot- Bagh fault, which is the likely source of the earthquake. The fault plane solution shows a strike of 338 degrees, dipping about 50 degrees in the N-NE direction near the surface with a more gentle dip at depth (27)(26).

3.3 IMPACT OF EARTHQUAKES

The devastating effects of the earthquakes depended on the vulnerability factors. Many earthquakes of very high magnitude did not do any significant damages in the area where there was very scarce population. On the other hand the earthquakes as the one on October 8 2005 and the one in Baluchistan in 2013 led to significant

casualties and destruction (24) Grossly the impacts due to the earthquake can be classified into the following main categories:

- short-term (immediate) impacts
- long-term impacts
- social impacts (the impact on people)
- economic impacts (the impact on the wealth of an area)
- environmental impacts (the impact on the landscape)

3.3.1 IMPACT ON HEALTH

Earthquake are the geological disasters that brings the most devastating impacts on health .The 23 earthquake in the last 53 years in Pakistan killed 79016 people and affected 6588582 people .Out of this total number effected the earthquake of October 8 killed a and affected more than 95 % percentage of people .This was due t the increased vulnerability in the region

3.3.2 IMPACT ON ECONOMY

The earthquakes adversely deteriorated the economy of the country. Only the earthquake on 8 the October 2005 caused a loss of 5.2 billion USD which is staggering when compared to national budget for 2006-07 which was about USD 25 billion. This amount was much higher than the total allocations for social sector development.

As almost all of the infrastructure damaged was not insured so he cost of the damages is not reported properly and rough estimates are being reported and we expect the real figure to be very high .Following is the economic losses due to the earth quakes as mentioned by cred data base .

Total No of Earthquake in 53 years	Total people killed	Total Affected	Economic Losses
23	79016	6588582	5229.755 USD

3.4 Overview of Earthquake on October 8 2005-Major Earthquake in Pakistan History

On October 8, 2005, at 08:50 am local time, a 7.6 scale earthquake struck the Kashmiri region of Pakiistan and India, causing widespread destruction in Pakistan’s Azad Jummu and Kashmir (AJK) and North-west Frontier Provinces (NWFP), and in India’s western and southern Kashmir—an area of 30,000 km2. This was the deadliest earthquake in the recent history of the sub-continent, with more than 73,000 fatalities, 200,000 people injured, and more than 4 million people left homeless.

The epicenter of the main earthquake was located at latitude 34° 29' 35" N and longitude 73° 37' 44" E, and the focal depth was determined to be 26 km (USGS). The main shock was followed by more than 978 aftershocks of magnitude Mw 4.0 and above, until October 27, 2005. This earthquake is associated with the known subduction zone of an active thrust fault in the area where the Eurasian and Indian tectonic plates are colliding and moving northward at a rate of 40 mm/yr, giving rise to the Himalayan mountain ranges. Almost all the buildings—mainly stone and block masonry laid in cement sand mortar collapsed in areas close to the epicenter. Up to 25 km from the epicenter, nearly 25% of the buildings collapsed, and 50% of the buildings were severely damaged (26)(28).

The major affected towns in Pakistan were Muzaffarabad, Bagh, Rawlakot and Balakot. In addition, Islamabad, Shinkiari, Batagram, Mansehra, Abbotabad, and Murree were damaged. Initial rescue and relief efforts were hampered by the mountainous terrain, bad weather, and damaged or collapsed infrastructure (26).

For the first 24 hours the world did not really know about the extent of devastation and after that Army Government agencies and NGOs provided emergency repose and relief. A huge local response for the nation was witnessed. UN introduced the cluster approach for the first time to coordinate the efforts in an effective way.

There were numerous landslides, generally minor to moderate but massive in some instances, causing some deaths and injuries and blocking roads. A dramatic but superficial landslide occurred on the mountainside to the north of Muzaffarabad. It should be noted there was evidence of similar pre-earthquake slides in the same area. A massive landslide about 40 km SE of the epicenter appears to be a failure of an entire valley wall perhaps 5,000 feet high. Debris flowed down and across the valley, damming it with a crest approximately 2 km in length (29).

The structures in the affected region consisted of earthen wall unreinforced stone, concrete block and brick masonry, and reinforced concrete frames with concrete block or brick masonry infill panels. A significant number of casualties and injuries in the rural areas were associated with the total collapse of single-story unreinforced earthen wall stone masonry buildings. The stone masonry walls consisted of irregularly placed un-dressed stones, mostly rounded, that were laid in cement sand, mud mortar, or even dry in some cases. A number of features seem to be responsible for widespread collapse of buildings.

Stone masonry buildings are more common in the villages than in the cities. The quality of mortar and stones used and the level of workmanship are poor, due to the economic constraints on the people. Stone masonry set in plain earth (i.e., mud) is not unusual.

We thought the tsunami was the worst we could get. This is worse."

-Jan Egeland, UN emergency relief chief (about the earthquake in Pakistan)

3.5 Earthquake Reconstruction and Rehabilitation Authority (ERRA)

The Government of Pakistan established the Earthquake Reconstruction and Rehabilitation Authority (ERRA) on October 24, 2005 to take up the mammoth task of rebuilding in the earthquake affected regions spread over 30,000 square kilometers of nine districts of Khyber Pakhtunkhwa and AJ&K. The nucleus staff of ERRA comprises a hybrid of civil servants, armed forces personnel and international consultants.

The idea behind the creation of ERRA was to bring all efforts and activities, pertaining to post disaster damage assessment, reconstruction and rehabilitation in the affected areas under one umbrella, with a view to providing a fast track and seismically safe reconstruction regimes and solutions. ERRA's mission is to "Convert this Adversity into an Opportunity" by reconstructing the lost and destroyed facilities, while following highest standards of reconstruction and rehabilitation(30).

With the obligation to Build Back Better. The main role of ERRA is macro planning, developing selected strategies, financing, project approval and monitoring and evaluation. Additionally, it ensures the required coordination and provides facilitation to implementing partners, whereas physical implementation of the projects is the responsibility of respective governments. ERRA has intervened in 12 different sectors, 3 cross-cutting programmes, and is required to reconstruct over 13,000 projects, (at the cost of over US \$ 5 billion) located over more than 30,000 sq km of nine districts of AJK and Khyber Pakhtunkhwa.

4. HAZARDS AND VULNERABILITIES

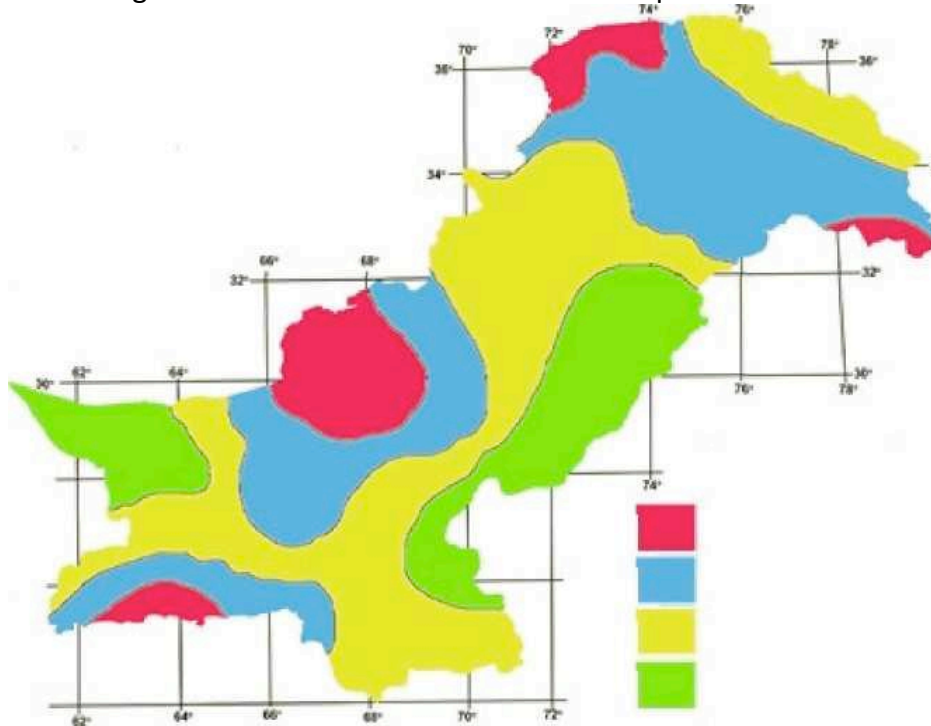
Pakistan continues to suffer from a plethora of natural and human induced hazards that threaten to affect the lives and livelihood of its citizens - natural disasters including floods, earthquakes, landslides, cyclones, and drought to human induced disasters such as fires, civil unrest and terrorism, refugees and internally displaced people, health epidemics, transport accidents, industrial accidents and war (32 & 23). The human impact of natural disasters in Pakistan can be judged by the fact that 6,037 people were killed and 8,989,631 affected in the period between 1993 and 2002 (41). Vulnerability refers the way a hazard or disaster will affect human life and property Vulnerability to a given hazard depends on (1):

- Proximity to a possible hazardous event
- Population density in the area proximal to the event
- Scientific understanding of the hazard
- Public education and awareness of the hazard
- Existence or non-existence of early-warning systems and lines of communication
- Availability and readiness of emergency infrastructure
- Construction styles and building codes
- Cultural factors that influence public response to warnings

4.1 EARTHQUAKES

Pakistan lies in a seismic belt and therefore suffers from frequent earthquakes of moderate to strong magnitudes. Mountain ranges of Koh-e-Sulieman, Indo – Kohistan, Hindu Kush and Korakuram are significantly vulnerable (33). The devastation can be immense because of the poor quality of buildings and exposure of larger population to earthquake risks (1). Seismic Hazard zonation map has been prepared for the entire country as shown in Figure 2-2 (1 & 33). There was a major earthquake in Quetta, Balochistan, in 1935 when the entire city was destroyed (34 &35). From 1974 to 1990, approximately 5669 people were killed due to earthquakes in the Northern Areas (NA), NWFP and Balochistan (1 & 36). The most recent significant earthquake occurred in February 2004, in NWFP resulting in 24 deaths and over 129,000 becoming affected (1, 37). Some of past damaging earthquakes of Pakistan and its adjoining regions are shown in (1) Table 2-1

Figure 2 -2: A Seismic Hazard zonation Map for Pakistan



Zones Category	Seismic Factor	Ground Acceleration	Possible Damage
I	Very High Hazard	$g/5$ to $g/10$	Major
II	High Hazard	$g/10$ to $g/15$	Moderate
III	Moderate Hazard	$g/15$ to $g/20$	Minor
IV	Low Hazard	$g/20$ or less	Negligible

There are a number of underlying risk factors that increase vulnerability and contribute to the severity of disasters during Pakistan (38 &39). These include:

- Poor construction practices and limited enforcement of existing building codes
- Weak early warning systems
- lack of awareness and education on disasters and response
- limited capacity and coordination between various government disaster response agencies
- Disaster susceptibility of large number of impoverished communities

4.2 FLOODS

Pakistan is one of the five South Asian countries with the highest annual average number of people physically exposed to floods, which occur normally due to storm systems that originate from Bay of Bengal during the monsoon from July to September. The storms originating in Bay of Bengal passing over lower Central India and Rajputana, enter Pakistan and continue towards North into Kashmir. The mountain ranges in the extreme north of Pakistan provide a perennial source of inflow into the rivers. Floods particularly hit Punjab and Sindh while hill torrents tend to affect the hilly areas of North Western Frontier Province, Baluchistan and the northern federally administered areas. Flood events of 1950, 1992 and 1998 caused many deaths and huge losses to the national economy. According to official sources, floods in Pakistan during the decade 1991 to 2001 caused an estimated damage of over Pak Rs 78,000 million to property (1,36,40 & 42).

4.1.1 Types of floods in Pakistan:

There are many types of flood that occur in the country almost every year (43).

- Monsoon floods are common in Pakistan. Monsoon rain can fill river basins with much water coupled with melting snows. Torrential rains from decaying monsoon low pressure area can also produce river flooding.
- Flash floods also occur in Pakistan, these are common in the northern areas of the country and cause great loss of life there.
- Floods due to the breaches of river embankments and canal breaches are a frequent occurrence in all the districts of Pakistan.
- Urban floods occur in the major cities of Pakistan, they are also common in the monsoon season.
- Coastal floods occur when a tropical storm makes landfall in the coastal areas of the country. The Makran coast and south eastern Sindh bear the brunt of such floods.

List of historical Flood in Pakistan

From 1950 till 2010		
Year	Fatalities	Villages affected
1950	2,190	10,000
1956	160	11,609
1957	83	4,498
1973	474	9,719
1976	425	18,390
1978	393	9,199
1988	508	1,000
1992	1,008	13,208
1995	591	6,85
2001	219	50
2003	484	4,376
2004	85	47
2005	59	1,931
2007	918	2 million
2010	1,781+	20 million

The 2010 Pakistan floods start in July 2010 following heavy monsoon rains in the Khyber Pakhtunkhwa, Sindh, Punjab and Balochistan regions of Pakistan and affected the Indus River basin. Approximately one-fifth of Pakistan's total land area was underwater. According to Pakistani government data the floods directly affected about 20 million people, mostly by destruction of property, livelihood and infrastructure, with a death toll of closer to 2,000 people (40).

4.3 DROUGHT

Drought has become an intermittent problem of the country. In recent years drought is reported to have brought extensive damages to Balochistan, Sindh and Southern Punjab where average rainfall is as low as 200-250 mm (1 & 36). Severe drought periods in years 2000 and 2002 affected livelihoods, resulted in human deaths, pushed tens of thousands people to migrate, and killed large numbers of cattle. This drought led to 120 deaths and affected 2,200,000 people. The main arid rangelands are Thar, Cholistan, Dera Ghazi Khan, Tharparkar, Kohistan, and western Balochistan. Except Balochistan, all of these areas are within the range of monsoon rainfall, which, however, is erratic and scattered. Hence, 2 to 3 years in every 10 years in these areas are drought years. Pakistan Meteorological Department (PMD) has prepared a comprehensive drought map for the country.

4.4 CYCLONES

The occurrence of cyclone in Pakistan is not a frequent phenomenon, but it has history of causing a large-scale damage to coastal areas of Sindh and Balochistan due to past disastrous cyclone in the region. The cyclone of 1999 in Thatta and Badin districts wiped out 73 settlements, and resulted in loss of 168 lives. Nearly 0.6 Million of people got affected, besides killing of 11,000 cattles during the 1999 cyclone. It destroyed 1,800 small and big boats and partially damaged 642 boats that caused of a loss of about 380 Million PKR. The losses to infrastructure were estimated of about Rs.750 Million PKR. The period 1971-2001 records 14 cyclones. Latest study revealed that the coastal areas of Sindh are most vulnerable and exposed to cyclones.

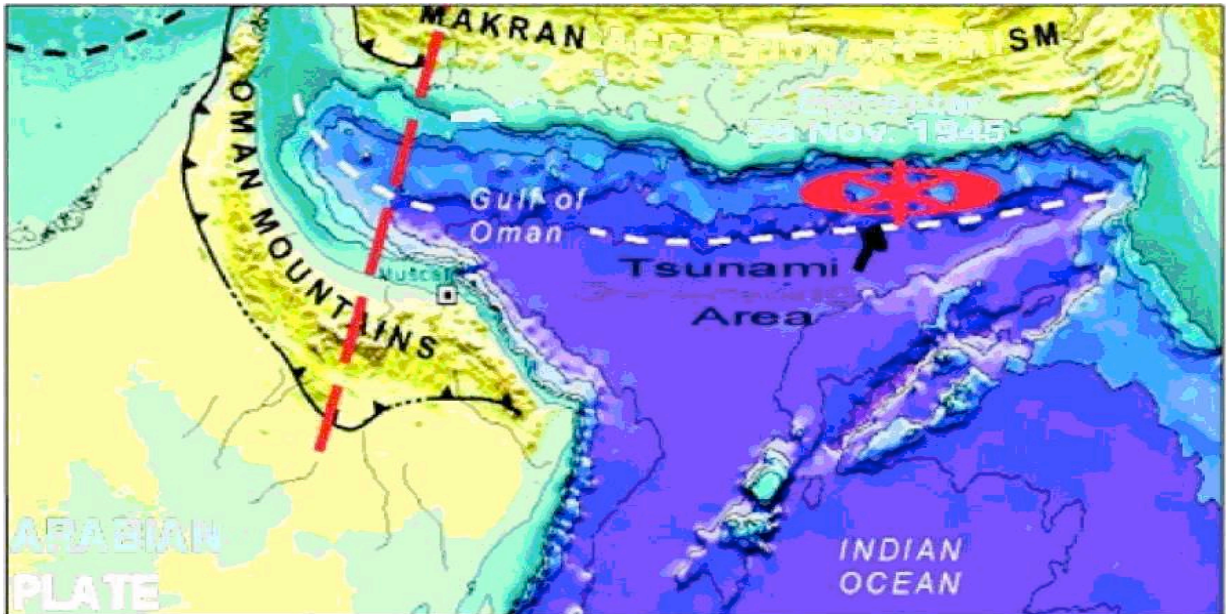
The tropical cyclones and tornadoes in Pakistan include the deadliest cyclone to hit the country and the deadliest tornado struck the country as shown in Figures 2 – 3 & 2 – 4. Pakistan lies in the temperate zone. The climate is generally arid, characterized by hot summers and cool or cold winters, and there are wide variations between extremes of temperature. The upper parts of Pakistan sometimes get rain from the Western Disturbance almost every month and from June till September almost whole country is lashed by South West Monsoon rain. Pakistan is a country where extreme weather events are not a yearly event therefore tornadoes are highly uncommon in the country but cyclones are not uncommon. Each year before the onset of monsoon that is 15 April to 15 July and also after its withdrawal that is 15 September to 15 December, there is always a distinct possibility of the cyclonic storm to develop in the north Arabian Sea (1,36, & 44).

There were several past damaging tropical cyclones reported from Pakistan that caused a huge loss of both property and people of the region. Among which are the June Indus valley cyclone of Tharparkar and Hyderabad districts in Sindh province in Pakistan that killed about 450 people and rendered about 400,000 people homeless; the December 1965 Karachi cyclone that caused 10, 000 casualties; the 1993 Pak – Indo Cyclone associated with a category 1 Hurricane near Sindh – Gujarat border due to high wind shear that led to massive rainfalls and flooding in Karachi in which Thatta and Badin districts were the worst affected areas of Pakistan where the cyclone killed 609 people and displaced about 200,000 people from the area; the 1999 Pakistan cyclone was the strongest and most intense tropical storm in the history of Pakistan.

A category 3 hurricane killed about 6400 people in the country and made landfall in Keti Bandar at peak intensity on 20th May 1999 near Karachi city in Sindh province; the 2007 Cyclone Yemyin was a mere tropical storm that developed over the Bay of Bengal as a tropical depression and intensified into a cyclone over the Arabian Sea. It killed 200 people alone in Karachi city on 23rd June 2007 due to heavy rainfall and intense windstorms. It made landfall near the towns of Ormara and Pasni in the Balochistan province on 26th June 1999 where it killed 300 people. Overall it killed 730 people and

affected the lives of 2 Million people in Pakistan making it the third deadliest cyclone in the history of the country.

Figure 2-4: A map showing the storm zone of Pakistan (Source: Pakistan Meteorological Department)



4.5 LANDSLIDES

The regions of Kashmir, Northern Areas and parts of the NWFP province are particularly vulnerable to landslide hazard. Aside from the young geology and fragile soil type of mountain ranges, accelerated deforestation is a major cause behind increased incidences of landslides. Small scale isolated landslide hazards happen frequently in the above mentioned regions. Frequency of landslides may increase in future since the forest cover is shrinking by 3.1% (7000 - 9000 Hectare of land taken away annually) (45).

Due to topographical structure, most part of Pakistan has high vulnerability towards landslide. Attabad Lake (also Gojal Lake) is a landslide dam lake in the Hunza Valley of northern Pakistan created in January 2010 as shown in Figure 2 -5. The lake was formed due to a massive landslide at Attabad village in Gilgit-Baltistan, 9 miles (14 km) upstream (east) of Karimabad that occurred on January 4, 2010.

The landslide killed twenty people, buried and inundated the Karakoram Highway and blocked the flow of the Hunza River for five months. The lake flooding has displaced 6,000 people from upstream villages, stranded (from land transportation routes) a further 25,000, and inundated over 12 miles (19 km) of the Karakoram Highway (23).

4.7 EXPOSURE AND VULNERABILITY –GEOGRAPHICAL DISTRIBUTION IN PAKISTAN

Disasters are unevenly distributed among Pakistan’s 139 districts as a result of at least some of the factors listed above

The table below illustrates that several areas and provinces suffer a disproportionate share of either very high or high risk disasters or both. In particular, in the northern Areas 33 percent of the districts face a very high risk of disasters while none of the districts in Punjab Province face a very high risk for disasters. This is particularly noteworthy since Punjab Province is the wealthiest province in Pakistan while the people who live in the northern Areas are among the poorest.

Clearly there is some relationship between economic prosperity and the incidence of disasters. In total, 50 percent of the provinces in the northern Areas face either a high or very high risk of disasters followed by 30 percent of the districts in Baluchistan and only 3 percent in Punjab Province. The provinces and regions also face a wide range of different disaster threats. For example, southern **Punjab** is mostly impacted by the threat of droughts and flooding, **Baluchistan** is confronted by the risk of drought, earthquakes and flash floods, **sindh** province is faced with the possibility of drought and floods, while the **NWFP** is faced with earthquakes, landslides, avalanches and glacial lake flooding.¹

Percentage of Districts in Each Province or Area Potentially impacted by Very High or High risk Disasters

Provinces	High Disaster Risk	Very High Disaster Risk	Total Disaster Risk
BALUCHISTAN	21	17	38
NWFP	17	13	30
NORTHERN AREAS	33	17	50
AJK	13	13	26
SINDH	4	30	34
PUNJAB	0	3	3

4.7 INDUSTRIAL DISASTERS

Out of 6435 total industrial units of all types in Punjab, about 6400 units have been identified as using hazardous chemicals and rendered as major polluting units (EPA, 1995). In the Province Punjab, Pakistan, emergence of residential and industrial areas, lack of zoning, and non-utilization of modern industrial location techniques have led to failure of industrial location policy and render it ineffective to track industrial sector for sustainable development.

Baja Line, Garhi Shahoo, Lahore incidence caused by leakage of Chlorine killed 18 persons and injured many more. The relief agencies were unable to identify the nature of the gas for day long. Many people left their house without planning and preparedness (EPA, 1995).

Improperly maintained and weakened 24 years old oil tanker **Tasma Spirit** grounded and spilled about 31,000 tons of the oil into coastal waters of the Karachi Coast. It was estimated that about 11,000 tons of Volatile Organic Compounds (VOCs) were released in the air which effected residential areas, navy installation, ecologically sensitive creek areas with mangrove forests, turtle nesting sites, salt ponds, and harbor.

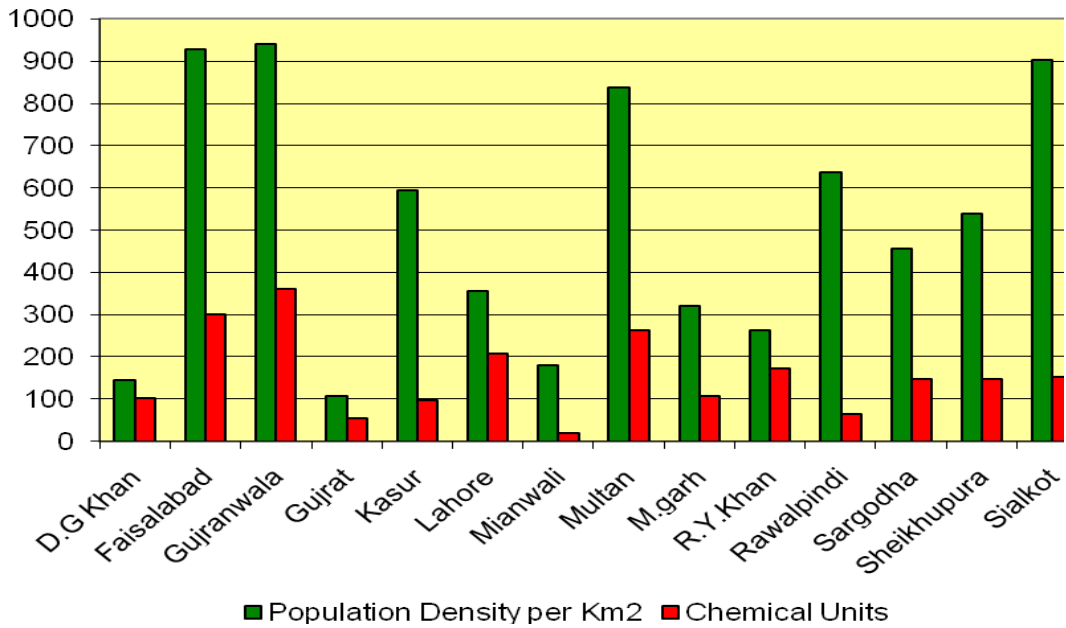
There exist **no guidelines for transportation, handling and storage of chemical including Liquefied Petroleum Gas (LPG) cylinder**. The fact claimed 29 lives in fruit market of Lahore.

A similar incidence due to illegal trade of LPG cylinder in industrialized city of Faisalabad caused death of 8 persons The rescue staff was unable to identify the gas leaked in fruit market of Lahore (Jeved, 2006).

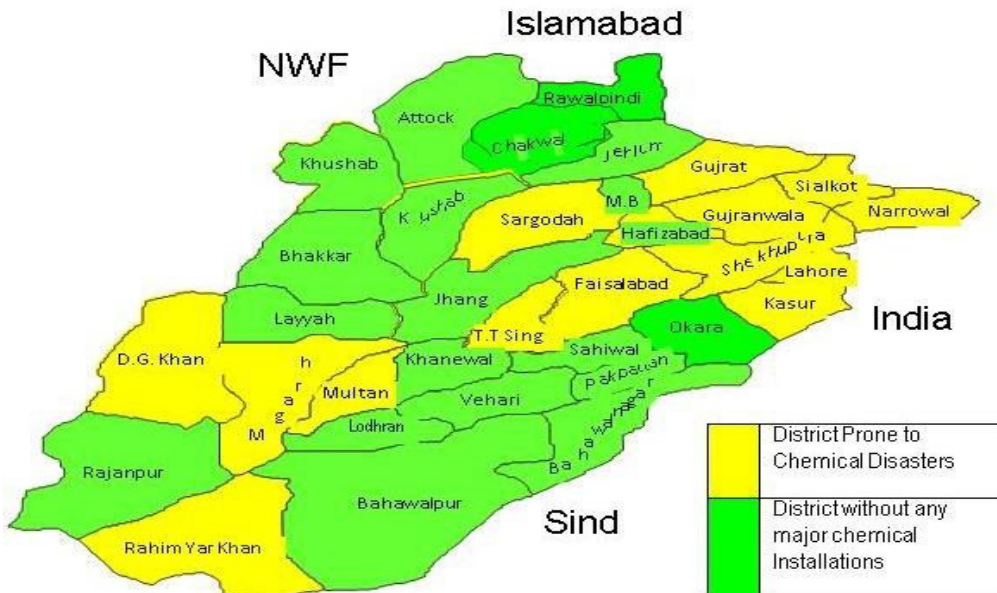
Even Province of Punjab, like many other industrial developing countries of the world as well as Pakistan, **does not have comprehensive laws and regulation to report on chemical accidents and its causes**. The regulatory agencies do not have an effective enforcement policy nor strict requirements for reporting injuries and illness at workplaces.

Although, several occupational diseases, are covered under the Social Security Ordinance and Workmen's Compensation Act but the reporting mechanism is so poor that very few get the benefits The industrial chemical accidents may results massive fires, explosions, releases of toxic gases, spillages and run off of toxic chemicals etc. and endanger life, damages total ecosystem and properties. If the hazard assessment system for sources of chemical disaster is prepared and strictly enforced and revised, the disaster management agencies would be in a position, to a large extent, to prevent chemical disasters.

The following table shows that the population density and number of chemical units in 14 major districts of Punjab. Punjab's share in production of major chemicals and chemicals based products by using local as well as imported chemicals namely caustic soda, soda ash, sulfuric acid, fertilizers and papers during year 2006-07 was 95.2%, 100 %, 46%, 70% and 96.3% respectively.



Faisalabad, Gujranwala, Lahore, Kasur, Multan, Sialkot, Sheikhupura, Rawalpindi, Sargodha, Gujrat, Muzafargarh, Rahim Yar Khan, Minawali and D.G.Khan are 14 major districts which possess, major chemical processing units and have potential of industrial development can likely be affected by technological disasters. There are about 91 human settlements and commercial areas in 14 major districts of Punjab having potential to be effected by Technological Disaster and road accidents involving releases of toxic chemicals and gases. Figure-3 illustrates districts having potential of industrial development and can likely be affected by technological disasters.



Chemical Disaster Prone Districts in Punjab Province in Pakistan

5. DISASTER PREVENTION STRATEGIES

Institutional and Legal Arrangements

Appropriate systems, procedures and plans would be developed to facilitate effective working of the NDMA. This would also include acquiring staff and resources. Subsequently the formation of provincial/regional Commissions and Authorities will be encouraged in four provinces, the AJK, FATA and NA. Efforts will be particularly undertaken to form DM Authorities in prioritized hazard prone districts, municipalities and cantonments. The local level DM Authorities would include Nazims, DCOs, police chiefs, civil defence, fire services, EDOs for agriculture, education, health, and works and rural development sectors. They would also include representatives of local Red Crescent societies, NGOs, civil society, private sector and media.

Detailed functions of Commissions and Authorities have been discussed in Section 7: Structure for Disaster Risk Management. However, the Commissions and Authorities can further detail out their functions after their establishment. Initiatives will be undertaken to develop guidelines, standards and procedures. This may include updating of existing building codes and development of land use plans etc. Implementation of building codes is a major challenge.

A consultation process will be undertaken with relevant agencies to develop strategies to promote implementation of building codes particularly in major urban centres; e.g. Karachi, Lahore, Islamabad, Peshawar, Quetta, Muzafarabad, Faisalabad, Gujranwala, Sialkot etc. National Institute of Disaster Management will be established to promote training and education in the government and non-government sectors at all levels. (23) (21).

Outputs

- National Disaster Management Authority is functioning effectively; and National Disaster Management Framework established
- Provincial/ Regional DM Commissions and Authorities are established and functioning;
- About 50 District/Municipal DM Authorities are functional in highly hazard prone districts, municipalities and cantonments;
- Locally appropriate building codes available for hazard resilient construction;
- A report on issues and strategies related to implementation of building codes available;
- Land use plans are available for at-risk cities and districts;
- NIDM functional and offering course on disaster risk management.

National Hazard and Vulnerability Assessment

Objective

Risks and vulnerabilities are dynamic and they change over time and space. Therefore, it is essential to develop mechanisms and systems for continuous monitoring of hazard risks, and vulnerabilities. This instrument would enable decision makers at all levels to take effective decisions to develop risk reduction policies, strategies and programmes (8)(15)(1).

Outputs

- Information on spatial distribution of selected natural hazards and vulnerable areas made available in digitized form as a decision making tool for risk reduction programming.
- An online open-source database will be available for use of local, provincial and national decision makers and practitioners interested in developing programmes for risk reduction or conducting research on risk and vulnerability patterns.
- A study on the impact of climate change on glaciers and ice caps in the North available

Training, Education and Awareness

Objective

Enhancing knowledge and skills of decision makers and at-risk- in order to promote a culture of safety and prevention.

The Purpose of training, education and awareness raising activities would be to develop a cadre of experts at national, provincial and local levels that is able to analyze risks and develop and implement disaster risk management activities. DRM education, training and awareness is required in multiple sectors; e.g. civil servants, development ministries at provincial and national levels, staff of district, provincial and national DM authorities, staff of technical agencies, UN staff, NGOs, media, politicians and most importantly communities. Enhancement of knowledge and skills of students would also be pertinent in order to enable future generations to deal with disaster risk problems.

Training and education would involve orientation about disaster risks and vulnerabilities, skill development on risk assessment, vulnerability reduction, hazard mitigation and emergency response management. Specialized training in areas of response would also be needed; e.g. search and rescue, first aid, fire fighting, evacuation, camp management and relief distribution. Considering the importance of media the NDMA and PDMA's will establish partnerships with electronic and print media and develop awareness of media personnel.

Outputs

- Technical skills and knowledge of district and municipal officials in hazard prone areas enhanced on disaster risk reduction and preparedness,

- Curriculum on disaster risk management available for training of district, municipal, and provincial and national officials available,
- Curriculum for media orientation on disaster risk reduction and preparedness available;
- Awareness of parliamentarians, senators, members of political parties, members of bureaucracy, chambers of commerce & industry enhanced about disaster risk reduction strategies;
- Curriculum for training of civil servants available and incorporated in the syllabus of civil service academy and other civil and military training institutions; and
- Short term courses on disaster risk management offered in schools, colleges and universities; (1)(11)(8)

Promoting Disaster Risk Management Planning

Objectives

To minimize adverse effects of hazard/s through effective disaster risk reduction, preparedness and adequate, timely and coordinated response. The plans would include strategies for disaster risk reduction and measures for disaster preparedness. Disaster risk reduction actions may include; dykes, dams, safer construction, retrofitting, rainwater harvesting, relocation, community organizing, training, awareness raising, and provision of safer sources of livelihoods etc. Preparedness involves development and regular testing of warning systems and plans for evacuation and other precautionary measures to be taken during a disaster alert period.

It also entails education and training of officials, intervention teams and communities in search and rescue, fire fighting, evacuation, mass casualty management etc. Establishment of policies, standards, organizational arrangements and operational plans to be executed following a disaster is also crucial. Effective plans also consider securing resources; e.g. stockpiling supplies and earmarking funds. It is important to clearly define roles of stakeholders and to strengthen coordination amongst concerned agencies. It is also essential to ensure reliable lines of communication as well as arranging alternative lines for emergency communications; and sensitize the media about importance of correct information and alternative information mechanisms.

Outputs

- National Disaster Response Plan available, which clearly defines roles and responsibilities of federal, provincial and local stakeholders in case of disaster response,
- Disaster risk management plans of Provincial/Regional Disaster Management Authorities available,
- Disaster risk management plans of selected federal ministries at federal and provincial levels available,
- Disaster risk management plans of 50 hazard-prone districts and municipalities (from various provinces and regions) available,

Community and Local Level Risk Reduction Programming

Objective

Community and local level programme implementation is the heart of disaster risk reduction strategies. Mega-disasters happen rarely, requiring extraordinary response from provincial and national authorities; e.g. the earthquake of October 2005. Considering this characteristic of disaster risks, it is imperative that risk reduction programmes are implemented at local level for capacity development of local officials, communities, civil society organizations and other players; e.g. builders, contractors, masons, teachers and doctors.

The utilization of resources and energies at this level will have a lasting impact. Effective local authorities, local research institutions, educational institutions, NGOs and community groups can play an important role in this work. Additionally, it is essential to recognize women as equal stakeholders in all decision-making processes (like development of disaster risk management plans at village, UC and District level) and an essential resource in response, recovery, reconstruction and preparedness (8)(1)(23)(30).

Multi-hazard Early Warning System

Objective

The primary objective of a multi-hazard early warning system (EWS) is to generate advance warnings and thus improve capacity of decision makers and communities to take appropriate action prior to occurrence of a hazard. It consists of collection, consolidation, analysis and dissemination of risk information. An effective EWS involves availability of technology for hazard monitoring, technical capacity of scientific institutions to analyze observation data and make decisions regarding issuance of warning, application of multiple channels to communicate warning messages, and mechanisms for community action. EW has the potential to contribute significantly to reducing disaster losses. It is a proactive political process in which various institutions collect, analyze and generate information to help prevent likely negative consequences of hazards by taking precautionary actions.

Pakistan needs to strengthen its early warning capacities for droughts and flooding which occur frequently and cause high impact. EWS will need to be developed for cyclones and tsunamis, which although are low in frequency but could have high impact. Strengthening of monitoring and analysis capabilities with relation to seismic risks and landslides would also be a priority.

Outputs

A study group on prediction of earthquake and research on seismicity of

- Pakistan established, Network of rain gauges of the National Centre for Drought/Environment
- Monitoring and Early Warning expanded,
- Technical capacity of staff of the National Centre for Drought Monitoring enhanced in data-collection, analysis and prediction of drought phenomenon,
- Flood forecasting and warning systems established in NWFP and Balochistan,
- Technical and operational capacity of the PMD and other stakeholders developed to monitor and predict tsunamis in the Arabian sea,
- Multi-sectoral forums exist regarding issuance of early warning and strategies to improve warning communication,
- Media personnel's awareness enhanced about scientific aspects of early warning and the role of media in communicating early warning messages.

Mainstreaming Disaster Risk Reduction into Development

Objective

An important priority of NDMA will be to promote the adoption of a risk sensitive approach in development planning and programming in all sectors. The purpose of this effort would be to ensure that all development infrastructures in hazard-prone areas is built to higher standards of hazard resiliency; e.g. schools, hospitals, roads, bridges, dams and telecommunications infrastructure etc. This can be done by incorporating risk and vulnerability assessment into project planning stage, and including vulnerability reduction measures in project implementation in case the proposed projects are found vulnerable to hazard risks.

Outputs

- A section on integrating disaster risk reduction included in the National Development Plan and in the National Poverty Reduction Strategy.
- A set of sectoral guidelines on mainstreaming DRR, and criteria on assessment of development projects from a risk reduction perspective available for the use of development ministries and the Ministry of Planning and Development.
- Curriculum of national and provincial workshops on mainstreaming DRR available;
- Technical capacity of selected federal line ministries increased on integrating risk reduction into development plans and programmes
- ☐ Case studies on previous experience of line ministries on mainstreaming DRR available;
- Lessons learnt from pilot projects on mainstreaming DRM available;
- Cost-benefit analysis of integrating risk reduction into development sectors available.

Emergency Response System

Objective

The inability of Pakistan's existing emergency response system to deal with large scale catastrophes was highlighted in the aftermath of October 2005 earthquake. The government had to appoint a Federal Relief Commissioner (FRC) to organize emergency response. However, this was a stop-gap arrangement. It is imperative to develop a system under the management of the NDMA to organize effective disaster response at national, provincial and district levels. This would imply development of institutional mechanisms and technical and operational capacity of involved agencies.

Outputs

- Emergency operation centres established at national, provincial and district levels in 50 districts;
- Standard operating procedures available for emergency response at national, provincial and district levels;
- A common assessment methodology available for the use of multiple stakeholders;
- A database about district level resources for emergency response available;
- Two search and rescue teams functional for quick and safer rescue of trapped individuals in case of a disaster;
- Search and rescue teams for dealing with multiple hazards established in provincial and regional capitals and key industrial cities;
- Training institutions of the Pakistan Civil Defence upgraded with latest facilities to train emergency responders;
- A National Disaster Management Fund established and managed by the NDMA.

Capacity Development for Post Disaster Recovery

Objectives

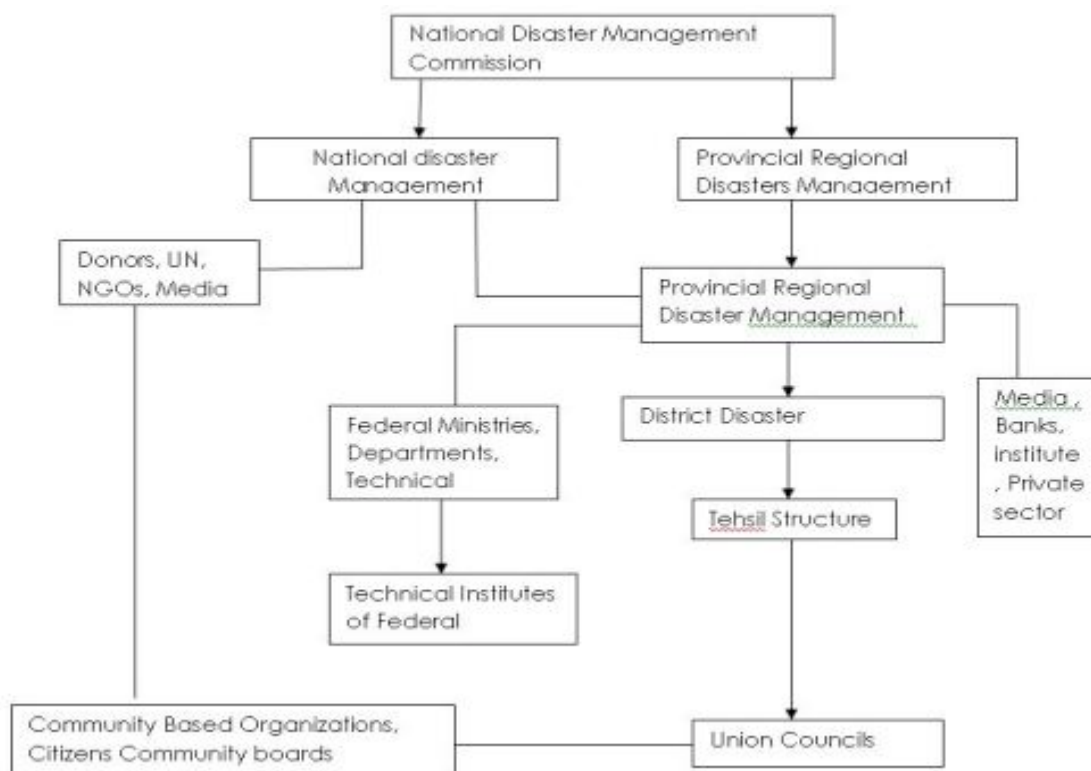
Government of Pakistan established Earthquake Reconstruction and Rehabilitation Authority (ERRA) to manage the recovery effort in the aftermath of October 2005 earthquake, however, ERRA would accomplish its mission in few years time. In order to manage future recovery programmes in an effective manner, it is essential to put in place institutional arrangements and systems. Therefore, NDMA will work on capacity building for post disaster recovery. NDMA would strive to benefit from the experiences being gained by ERRA in disaster recovery and lessons learnt from the earthquake recovery. In this regard NDMA would closely coordinate with ERRA to ensure that experiences gained by ERRA over the next few years are integrated into the working of NDMA for better recovery management.

Outputs

- A system on recovery needs assessment and programme planning established,
- Methodology on recovery needs' assessment and guidelines on recovery programme planning developed,
- A roster on recovery capacity of various agencies available,

- A booklet on lessons learnt in recovery programming produced that would comprise of experiences of Pakistan earthquake
- Curriculum on training of recovery programme managers available.
-

5.1 Structures for Disaster Risk Management



National Disaster Management Commission

Government of Pakistan has established the National Disaster Management Commission (NDMC) as the highest policy and decision making body for disaster risk management (8)(1)(23)(30)

NDMC is responsible to ensure coordination in its broadest sense; to oversee the Integration of disaster risk management issues into sectoral development plans, and to Oversee the implementation of this policy through the NDMA. The Commission consists of:

- i. Prime Minister, who is the chairperson, ex officio;
- ii. Leader of the Opposition in the Senate,
- iii. Leader of the Opposition in the National Assembly,
- iv. Minister for Communications,
- v. Minister for Defense,
- vi. Minister for Finance,
- vii. Minister for Foreign Affairs,
- viii. Minister for Health,
- ix. Minister for Interior,

- x. Minister for Social Welfare and Special Education,
- xi. Governor NWFP (for FATA),
- xii. Chief Ministers of all provinces,
- xiii. Prime Minister AJ&K,
- xiv. Chief Executive Northern Areas,
- xv. Chairman JCSC or his nominee,
- xvi. Representative (s) of Civil Society,
- xvii. Any other person appointed or co-opted by the Chairperson
- xviii. Chairman of NDMA will be the secretary to the Commission

The National Commission would perform following functions:

- Lay down policies on disaster risk management,
- Approve the National DRM Framework and Emergency Response Plan,
- Approve plans prepared by Ministries or Divisions of the federal government in accordance with National Framework and Plan,
- Lay down guidelines to be followed by Federal and Provincial Authorities,
- Arrange for, and oversee, the provision of funds for risk reduction, preparedness and response and recovery measures, and
- Provide support to other countries affected by major disasters as may be determined by the federal government.
- Take such other measures for risk reduction, preparedness and capacity building as it may consider necessary,
- In addition, NDMC may constitute an advisory committee or committees of experts in disaster risk management,
- Meetings: NDMC will meet twice a year (before the start of monsoon and winter seasons, during which seasonal hazards may occur), when early warning thresholds indicate need, and when a disaster strikes.

National Disaster Management Authority

Disaster Risk Management is a multi-sectoral, multi-discipline and timely response Undertaking. National Disaster Management Authority (NDMA) has been established to serve as the focal point and coordinating body to facilitate implementation of disaster risk management strategies. NDMA aims to develop sustainable operational capacity and professional competence to undertake the following tasks:

- Coordinate complete spectrum of disaster risk management at national level, Act as Secretariat of the NDMC to facilitate implementation of DRM strategies, Map all hazards in the country and conduct risk analyses on a regular basis,
- Develop guidelines and standards for national and provincial stakeholders regarding their role in disaster risk management,
- Ensure establishment of DM Authorities and Emergency Operations Centers at provincial, district, and municipal levels in hazard-prone areas,
- Provide technical assistance to federal ministries, departments and provincial DM authorities for disaster risk management initiatives, Organize training and

awareness raising activities for capacity development of stakeholders, particularly in hazard-prone areas,

- Collect, analyze, process, and disseminate inter-sectoral information required in an all hazards management approach
- _ Ensure appropriate regulations are framed to develop disaster response volunteer teams,
- Serve as the lead agency for NGOs to ensure their performance matches accepted international standards, e.g the SPHERE standards.
- Serve as the lead agency for international cooperation in disaster risk management. This will particularly include, information sharing, early warning, surveillance, joint training, and common standards and protocols required for regional and international cooperation,
- Coordinate emergency response of federal government in the event of a national level disaster through the National Emergency Operations Centre (NEOC),
- Declare a National Disaster Awareness Day (to commemorate 08 October Earthquake) and conduct awareness raising activities at the occasion,
- Establish a National Disaster Management Fund, and
- Perform any other function as may be required by the NDMC.

Technical Committees

The NDMA, PDMA and DDMA's may establish Technical Committees in order to facilitate coordination and enable optimum use of available skills and resources. Technical Committees will focus on specific disaster threats and issues, which may not have been covered as part of the stakeholder responsibilities in the Framework. Technical Committees could assist local, provincial or national authorities in identifying issues and problems and devising solutions.

Provincial (Regional) Disaster Management Commissions

Since Disaster Risk Management is a provincial subject, the provincial/regional governments will have crucial role in implementation of disaster risk management policies, strategies and programmes. Each provincial/regional government will form a Provincial (regional) Disaster Management Commission (PDMC) which will be chaired by the Chief Minister. Leader of the opposition and a member to be nominated by him will also form part of the PDMC. Other members will be appointed by the Chief Minister. They may include stakeholders from provincial/regional ministries and departments, civil defence, Red Crescent, police, fire services, university faculty, research institutions, civil society organizations, representatives from commerce, industry and insurance sectors, and other technical experts in the province/region.

Provincial/Regional

The Provincial (Regional) Disaster Management Commission shall:

- Lay down the provincial/regional disaster risk management policy,
- Develop provincial/regional disaster risk management plan in accordance with guidelines laid down by the National Commission,

- Ensure that disaster risk management plans are formulated by all ministries, departments, and district/municipal authorities;
- Review the sectoral development plans of provincial departments and ensure that risk reduction measures are integrated therein,
- Approve disaster risk management plans prepared by provincial/regional departments,
- Review implementation of the plans, and Oversee the provision of funds for risk reduction and preparedness measures.

Provincial (Regional) Disaster Management Authorities

The Authority will serve as secretariat of the Provincial/Regional Commission. It will work upon development, implementation and monitoring and evaluation of disaster risk management activities in vulnerable areas and sectors in the province. The provincial/regional authority will have responsibilities for the following.

- Coordinate complete spectrum of disasters in the province/region,
- Formulate provincial/regional disaster risk management plan,
- Continuously monitor hazards, risks and vulnerable conditions within the province/region,
- Develop guidelines and standards for provincial/regional and local stakeholder regarding their role in disaster risk management
- Ensure preparation of disaster risk management plans by all districts
- Coordinate implementation of provincial disaster risk management plan in accordance with the National Framework,
- Promote education, awareness and training on disaster risk reduction and response,
- Provide necessary technical assistance and advice to local authorities for carrying out their functions effectively,

Provincial/Regional Emergency Operations Centre (PEOC),

District Disaster Management Authorities shall be established by the provincial government in hazard prone areas on a priority basis. The District Authority will comprise of the Nazim, District Coordination Officer (DCO), Police Officer, ex-officio, EDO health and Tehsil Nazims. The local government can nominate other officers as members of the DDMA or MDMA. They may include EDOs for education and agriculture, Red Crescent, NGOs, media, private sector, fire services, or any other local stakeholders. Municipal Disaster Management Authorities (MDMA) will be established in urban areas and cities on similar lines. The DDMA and MDMA will:

- Formulate district disaster risk management plan, based upon local risk assessment, and coordinate its implementation
- Review development plans of government departments and provide guidance on mainstreaming disaster risk reduction measures in these plans,
- Continuously monitor hazards, risks and vulnerable conditions within the district, municipality, or cantonment areas,

- Prepare guidelines and standards for local stakeholders on disaster risk reduction,
- Conduct education, training and public awareness programmes for local officials, stakeholders and communities,
- Encourage involvement of community groups in disaster risk reduction and response by providing them necessary financial and technical assistance for implementing community level initiatives,
- Examine construction in the area and if hazard safety standards have not been followed, direct the relevant entities to secure compliance of such standards,
- Invest in specific capabilities according the requirement to manage all types of threats peculiar to local area,
- Undertake appropriate preparedness measures at district level; e.g. maintain an early warning system, identify buildings to be used as evacuation sites, stockpile relief and rescue materials and identify alternative means for emergency communications, In the event of a disaster, organize emergency response through the District Emergency Operations Centre (DEOC),
- Maintain linkages with the Provincial Disaster Management Authority and the Relief Department, and
- Perform such other functions as the Provincial Authority may assign to it.

Tehsil and Town Authorities

Tehsil and town Nazims will lead the risk reduction and response operations with the help of Tehsil or Town Municipal Officer in consultation with the DDMA. Other key players include; extension workers, police, fire services, community organizations (COs), traditional leaders and NGOs. Appropriate local structures would be established for risk reduction and preparedness.

Union Councils

Union Councils are the lowest tier in the governance structure. Elected representatives from village and ward levels form these bodies. These bodies have an important role in allocation of resources for local development works.

Community Based Organizations

In order to promote community level disaster risk management activities, the capacity of existing community organizations will be developed and enhanced by district and tehsil authorities.

Roles and Responsibilities of Key Stakeholders

Disaster Risk Management is a multi-sectoral, multi-disciplinary and timely response undertaking. This necessitates NDMA to directly interact/ communicate with all stakeholders, including Ministries, Divisions, and Departments in relaxation to normal communication channel. All ministries , divisions and agencies which are likely to participate in disaster risk management shall procure all relevant items, stock them if necessary and supply them as directed by the NDMA for meeting any calamity or

disaster. Being an intricate and time sensitive activity disaster risk management requires to be conducted as a one window operation through the NDMA. For this purpose to institutionalize the operations, all stake holders including government departments / agencies and armed forces will work through and form part of NDMA in all stages of Disaster Risk Management.

It is expected that each stakeholder would develop their own organizational/sectoral strategies and plans for disaster risk reduction, preparedness, response and recovery.. Each stakeholder must nominate a focal point for disaster risk management, who would be responsible for coordinating with the DDMA, PDMA and NDMA respectively.

The respective DM Authorities would provide technical guidance and support to stakeholders in carrying out their functions. Stakeholders must develop technical capacities in order to perform their functions. NDMA, PDMA and DDMA would launch capacity building initiatives in this regard. In case of disaster, the DDMA, PDMA or NDMA (as needed) will be the lead agencies to organize emergency response with the help of relevant stakeholders.

Ministries

Defence

Develop a disaster preparedness and response plan for involvement of Pakistan armed forces in response operations in close coordination with and according to specific requirements of local civil authorities;

- Assess vulnerability of assets, infrastructure and personnel of the Pakistan Armed
- Equip military response teams to perform various tasks; e.g. search and rescue, evacuation, fire fighting, first aid;
- Integrate disaster risk management education into the syllabus of National Defence College, Staff College, Regimental centres and Armed Forces training institutions;
- Conduct drills/simulations with army personnel and other stakeholders about disaster response operations;
- Deploy armed forces for disaster response upon receipt of instructions from the NDMC;
- Assist communities in evacuation, and rescue the trapped groups and individuals during disasters;
- Undertake aerial and field assessment in collaboration with other stakeholders to identify needs of survivors;
- Assist civilian authorities in reconstruction and rehabilitation of infrastructure as needed;

Education

Develop a disaster risk management plan for the Ministry covering aspects of risk reduction, preparedness and response and curriculum development on disaster risk

education; Identify and inventory vulnerable educational institutions and infrastructure of the Ministry in hazard-prone areas;

- Implement actions to reduce vulnerability of built infrastructure in education sector in hazard-prone areas, e.g. retrofitting, renovation, rebuilding etc;
- Develop capacities in schools of hazard prone areas to cater for additional water, sanitation and other administrative chores to house affected populations in the event of disaster;
- Conduct orientation programmes to raise awareness of education authorities, professors and teachers about disaster risks in hazard-prone areas;
- Develop curriculum for schools, colleges and universities on disaster risk management, particularly in hazard-prone areas;
- Implement school, college and university level activities to enhance awareness of students and to promote overall preparedness in educational institutions through conducting drills, reducing vulnerability etc;

Ministry of Environment

- Develop disaster risk management plan with relation to Ministry's mandate; Incorporate Natural Disaster Risk Assessment in the Environmental Impact Assessment (EIA) guidelines;
- Develop technical capacities of the staff of ministry to undertake disaster risk assessment and disaster risk reduction activities in the environment sector;;
- Implement programme for conservation and rehabilitation of natural resources in order to reduce risks of natural hazards; e.g. reforestation, mangrove plantation, combating desertification, conservation of special natural resources; e.g. wetlands, lakes, reefs, mangroves, and coastal areas;

Ministry of Finance and Revenue

- Coordinate with NDMA about needs for financial resources to promote disaster risk management programmes in hazard-prone areas;
- Allocate financial resources to NDMA and other line ministries and departments for implementation of disaster risk management activities and for the establishment of a National Disaster Management Fund;
- Encourage financial service sectors and local capital markets to develop schemes for financing disaster risk reduction measures by families and community organizations;
- Incorporate provisions in micro-finance schemes to have flexible repayment schedules for recipients who have been affected by a disaster;

Ministry of Food, Agriculture and Livestock

- Develop disaster risk management plan to deal with hazards and disasters with relation to ministry's mandate and assets; and allocate funds in annual budget for implementation of disaster risk management activities ;

- Develop capacity and raise awareness of ministries on disaster preparedness for food, agriculture and livestock sectors;
- Promote contingency crop planning to deal with year to year climate variations and crop diversification including use of hazard resistant crops, to deal with shifts in climate patterns;;

Ministry of Foreign Affairs

- Develop operating procedures to fast track requests for aid and to facilitate deployment of international response teams, and receive relief goods in case of a large scale disaster in the country;
- Develop and maintain inventory of Embassy focal points and other aid giving organizations in order to quickly organize requests for assistance in case of disaster;

Ministry of Health

- Act as focal point for managing all aspect of healthcare preparedness, response and recovery in a disaster situation in close coordination with the NDMA;
- Prepare disaster risk management plans for each level of health care facilities,;
- Provide technical support in all health related areas to NDMA through the newly established Emergency Preparedness and Response Centre of the Ministry;
- Conduct hazard based mapping of all health care facilities, including vulnerability assessment (infrastructure and organizational setup) and integrate hazard resilience measures;
- Develop a disease surveillance system; and prepare protocols and guidelines to address all priority public health issues
- Integrate disaster preparedness and response capacities into all existing and future health programs
- Establish emergency health operation to ensure better coordination and mobilization in emergency/ disaster situation at all levels;

Ministry of Housing and Works

- Prepare a disaster risk management plan with relation to Ministry's programs, infrastructure and mandate;
- Develop national building codes for safer construction of houses, buildings and infrastructure in hazard-prone
- Promote compliance and enforcement of local building laws and conduct training of builders, contractors and masons on safer construction methods;
- Incorporate disaster risk assessment in the planning process for construction of new roads and bridges;
- Promote use of hazard risk information in land-use planning and zoning programmes;

Ministry of Information and Broadcasting

- Develop a communication action plan to ensure the availability of communication services in case of the occurrence of a disaster;
- Coordinate with the NDMA to receive information about the disaster risks and preparedness strategies, particularly about community preparedness;
- Implement programmes on awareness raising of vulnerable communities in high risk areas of the country;

Ministry of Information Technology

- Ensure safety of telecommunication infrastructure in hazard-prone areas;
- Develop alternative technologies to facilitate telecommunication during disaster in affected areas, in case of the collapse of mainstream communication systems;
- Develop trained manpower working in subordinate organizations like NTC and SCO and could be called in emergency for restoration purposes;

Ministry of Interior

- Prepare Ministry's plan for disaster preparedness and response in order to deal with any eventualities caused by natural or man-induced hazards; e.g. floods, droughts, earthquakes, conflicts, nuclear accidents etc;;
- Maintain peace and security in affected areas;
- Ensure safety of relief goods being sent to affected areas from other parts of the country;
- Provide security to volunteers, government officials, and staff of international NGOs and UN agencies working in affected areas;
- Train the police personnel in emergency response skills;
- Operate through Police Telecommunication, the wireless and tele-printer network for disaster information and messages to all concerned departments and agencies;
- Enhance capacities of the National Crisis Management Cell to deal with crisis situations created by terrorist and criminal activities in accordance with the mandate of the NCMC;;
- Coordinate with NDMA regarding the development and implementation of strategies for revamping of the Civil Defence department and Fire Services;

National Crisis Management Cell (NCMC), Ministry of Interior

- Manage a round the clock Operational Control Room;
- Collect information on emergencies of all sorts in the country;
- Coordinate with Provincial Crisis Management Cells (PCMCs) and other agencies to gather relevant information; e.g. casualty figures etc

Law, Justice and Human Rights

- Develop appropriate laws and regulations to ensure the provision of relief and recovery packages to disaster survivors;

- Monitor the situation of human rights in affected areas and take action on human rights violations of disaster survivors; e.g. denial of aid, capturing of property, kidnapping of children or women, and harm to elderly;
- Implement programmes to raise awareness of the staff of ministry on human rights and disasters;

Local Government and Rural Development

- Undertake vulnerability analysis of the local government property and infrastructure located in hazard-prone areas;
- Incorporate disaster risk assessment in planning of projects for construction of local government and rural development infrastructure
- Allocate additional funds for disaster risk assessment and vulnerability reduction for local government infrastructure;

Petroleum and Natural Resources

- Develop guidelines for safety in oil/gas, fire and mining sectors;
- Develop SOPs for emergency response to disasters in the above sectors;
- With assistance from the Geological Survey of Pakistan (GSP) conduct research on hazard mapping and produce user friendly maps;

Planning and Development

- Develop guidelines on incorporation of disaster risk assessment (and vulnerability analysis) in project identification, design and planning;
- Issue policy directive to all line ministries about incorporating disaster risk assessment (and vulnerability analysis) in project design and planning;
- Make mandatory the inclusion of vulnerability reduction measures in implementation of development projects, if located in hazard-prone areas;
- Monitor the progress on implementation of vulnerability reduction measures in all development projects in hazard-prone areas;

Ministry of Population Welfare

- Conduct research on population growth, settlement trends and vulnerability patterns in hazard-prone areas;
- In collaboration with relevant stakeholders, launch programmes for awareness raising of people about linkages between population density, growth and vulnerability to disasters;

Ministry of Ports and Shipping

- Assess vulnerability of port facilities, infrastructure and services to natural disasters; e.g. cyclones, tsunami, oil spills, coastal flooding, fire etc;
- 'Develop disaster risk management plan and acquire specific capabilities to reduce losses to infrastructure and services of the ports and shipping industry;

- Develop plans to carryout services of shipping transportation through alternative means in case of disaster impact upon port facilities;

Ministry of Railways

- Develop disaster risk management plan with regards to the mandate of the Ministry;
- Identify vulnerabilities of train infrastructure to natural disasters in hazard-prone areas;
- Develop strategies to reduce vulnerabilities of train network and infrastructure to
- Develop guidelines and procedures to receive and transport relief goods to disaster-affected areas in a quick manner;
- Coordinate transportation of relief goods with the NDMA and relevant local authorities;
- Allocate trains for on-time and safe transportation of relief goods to affected areas; Develop technical capacities of the Ministry staff to undertake risk assessments and risk reduction in railways network with relation to natural and human-induced disasters;

Ministry of Science and Technology

- Assess vulnerability of infrastructure and facilities of the Ministry in hazard-prone areas;
- Implement strategies to reduce vulnerabilities of infrastructure and facilities to disasters;
- Develop guidelines for disaster risk assessment and vulnerability reduction for the infrastructure and facilities of the Ministry in hazard-prone areas;
- Develop awareness of the staff of ministry on the role of science and technology in disaster risk management;

Ministry of Social Welfare and Special Education

- Prepare ministry's plan to address disaster vulnerabilities of most vulnerable social groups; e.g. minorities, women, disabled, children before, during and after disasters;
- Allocate funds in the annual budget of the Ministry for disaster preparedness activities for most vulnerable social groups;
- Conduct research to identify most vulnerable social groups in hazard- prone areas;

Ministry of Tourism

- Develop disaster risk management plan with regards to the mandate of the Ministry;
- Coordinate with the NDMA and other scientific agencies to gather information about hazards and risks prevalent in tourist areas;

- Enhance awareness of tour operators, hotel management, transporters and other stakeholders in tourism industry about high risk areas and the need for disaster preparedness strategies in tourism industry;
- Publish materials for tourists about seasonality of hazards and risks in areas of tourist attraction and print details of agencies from which they could seek help;
- Put up evacuation route maps in tourist areas and in hotels in case of a disaster

Ministry of Youth Affairs

- Establish teams of volunteers to work in post disaster situations for provision of relief and organizing response;
- Develop capacities of youth volunteers on first aid, fire fighting, camp management, tenting, information management, and security, and search and rescue

Ministry of Water and Power

- Assess disaster vulnerability of existing dams, reservoirs and power sector infrastructure in hazard-prone areas;
- Provide telemetric data from rain gauge stations and flood data from Indus River Basin to the Flood Forecasting Division of the Pakistan Meteorological Department;
- Conduct studies on possibilities of dam failures and develop contingency plans; WAPDA (Dams Safety Council);

Ministry of Women Development

- Make institutional arrangements for involvement of women in disaster risk management;
- Promote awareness amongst women in hazard-prone areas
- Ensure that needs of women survivors are addressed in post disaster situations during the relief, rehabilitation and reconstruction phases

Departments

Civil Defence

- Assist local administration / armed forces in rescue, evacuation and relief measures;
- Save lives by rapid extrication of persons trapped beneath debris or in buildings damaged by a natural or manmade disaster;
- Render first aid to injured persons and transport them to nearest hospitals;
- Ensure evacuation of damaged buildings/structures including demolition of damaged structures to avoid further loss of life and properties;
- Provide quick and effective search and rescue coverage, protection and operation in case of any disaster; Build public confidence by introduction of more effective measures for their protection and ensure adoption of requisite preventive measures by the community;

- Assist in restoration of essential traffic so as to carry out rescue work without any hindrance or obstruction;
- Develop capacities in emergency response; e.g. evacuations, rescue, first aid etc;

Emergency Relief Cell (Cabinet Division)

- Develop policies and arrangements for procuring relief items on a fast track basis;
- Procure relief items, when needed;
- Stockpile relief items in collaboration with national and provincial EOCs, Civil Defence, Red Crescent, and other stakeholders;
- Make arrangements for receipt of international assistance;
- Make arrangements for receipt of international response teams;

Fire Services

- Purchase and maintain fire fighting machinery and equipment;
- Develop fire risk monitoring systems in urban localities;;

Federal Flood Commission (FFC)

- Prepare flood protection plans for the country;
- Review and approve flood protection schemes prepared by provincial governments and concerned federal agencies;
- Implement measures to improve flood forecasting and warning system;
- Prepare a research program for flood control and protection;
- Standardize designs and specifications for flood protection works;
- Evaluate and monitor progress of the National Flood Protection Plan implementation;

KANA Division

- Handle disaster risk management related issues in Northern Areas and the AJK; National Logistics Cell (NLC)
- Prepare contingency plans and SOPs of the NLC regarding its responsibilities in transportation of emergency relief supplies;
- Act as coordinator of road, rail, air and sea transport during a disaster for relief supplies;

Provincial Irrigation Departments

- Develop capacities of the irrigation department to mitigate floods and droughts;
- Complete repairs of flood protection works in the pre-flood season;
- Assist local authorities and communities in building rainwater harvesting tanks

Provincial Relief Departments

- Provide adequate support to local administration through co-ordination with provincial departments and agencies;
- Provide necessary funds to the area administration for relief work;

Pakistan Meteorological Department

- Observe hazards and generate meteorological, geophysical and phonological data;
- Analyze data for issuing forecasts and warnings for aviation, agriculture, shipping, ports, irrigation etc
- Issue forecasts and warnings for any approaching events that might cause damage and loss to life and property;
- Disseminate warning about hazards to relevant users through speedy communication in coordination with NDMA; Scrutinize, compare and publish data for appraisal of long term weather trends and earthquakes;

8.3 Technical agencies

- The technical agencies listed below have a very important role of research, training/education, early warning and technology development for disaster risk reduction and response. These agencies have technical know how about hazards and disasters and they can help in identification and implementation of solutions. NDMA and line ministries would work closely with these and other technical organizations in order to develop and implement disaster risk management programmes.

8.4 Other key stakeholders

- Banks
- Insurance sector
- Media
- Pakistan Red Crescent Society
- Private sector
- United Nations agencies FAO (Food and Agriculture Organization)
- ISDR (International Strategy for Disaster Reduction)
- OCHA (Office for Coordination of Humanitarian Response)
- UNDP (United Nations Development Programme)
- UNHCR (United Nations High Commissioner for Refugees)
- UNICEF (United Nations Children's Fund),
- WFP (World Food Programme)
- WHO (World Health Organization)

Donors

The donors could be divided into multi-lateral and bilateral donors.

- It include the World Bank, Asian Development Bank (ADB) and Islamic Bank etc. The bilateral donors include the governments of economically developed countries, who provide development assistance to Pakistan. Considering their influence on the recipient governments, the donors can play a very important role in promoting disaster risk reduction in the country through following strategies and actions
- Non-governmental organizations(23)

5.2 DISASTER RISK REDUCTION POLICY CHALLENGES

The overarching policy challenges the policy deals with are as follows:

Low levels of risk awareness and knowledge

The risk to be affected by disasters is basically a function of the degree of vulnerability to exposure to damaging hazard events and the frequency, and severity of hazards. Risk atlases and indices help to establish a comparative picture within a country identifying geographical “hot spots” or areas that are at relatively higher levels of risk from one or multiple hazards.

Risk assessments are needed to establish the probability and possible impact of hazard events on people, livelihoods and sectors. At a lower scale risk assessments are used to diagnose causes and identify technically, environmentally and socially sound options for risk prevention and mitigation.

Risk knowledge is as of yet low in Pakistan. This applies both to the mapping and understanding of a number of key hazards and the underlying dynamics and causes (including climate change), and to the lack of sound data and analysis of vulnerability. Only a small number of risk assessments have been undertaken covering limited territory and hazards. There is no national standard methodology or institutionalized capacity to conduct multi-hazard risk or vulnerability analysis. This includes the absence of a standard for geo-spatial mapping which is an essential prerequisite for a national risk atlas. Hazard-data is spread out over several institutions at national and provincial levels.

The same applies to data on disaster losses and damages that is not yet systematically brought together and analyzed to monitor vulnerability and hazard trends. At the community level risk awareness is usually higher in those areas that have been recently affected by disasters and involved in subsequent Community Based Disaster Risk Management (CBDRM) activities. In other disaster-prone areas communities have often extremely limited information and understanding of the hazards that surround them. Access to information can be especially difficult for women and children (8).

Development not “risk conscious” and DRR not yet effectively integrated

The integration of DRR into development is at its initial stage. This applies to all levels of development planning i.e. a) national development plans and poverty reduction strategy papers; b) development programs and sector-specific projects and c) the application of building codes for construction and land-use and zoning regulations for settlement planning. This can be attributed to a mix of both technical and institutional factors; namely the need to raise awareness and commitment at policy- and decision-making levels; the need to build dedicated capacity and resources; a lack of institutional and legal mechanisms to promote enforcement; and a lack of monitoring, evaluation and accountability. As a consequence development currently exacerbates rather than reduces disaster risks (8)

Insufficient DRR capacity at all levels of society.

An important aspect of the current DRR legislation is the decentralization of core responsibilities to provincial and district levels. However this decentralization is not yet matched by institutionalized capacity, in particular at the district level that is closest to high-risk communities under its jurisdiction. Capacities at community, union council and tehsil levels are overall low. At the national level the National Disaster Management Authority (NDMA) needs to acquire the capacity to act as the main facilitator of DRR in the country and provide overall support and technical guidance to line agencies, FATA/GB/State/Provincial Disaster Management Authorities (F/G/S/PDMAs) and District Disaster Management Authorities (DDMAs). In many other national-level ministries and agencies as well as provincial-level departments capacity is also lacking to apply DRR to specific sector policies, plans and interventions. Outside government Civil Society Organizations (CSOs) have played an important role in promoting DRR at the community level, however these efforts have largely depended upon external funding and are patchy. The involvement of the private sector in DRR is as of yet negligible.

In view of these challenges the policy suggests a number of key objectives

- i. Targeting risk awareness and knowledge, DRR mainstreaming and
- ii. Capacity building within the context of preparedness, prevention and mitigation

6. CONCLUSION

Disaster profile of Pakistan clearly indicates that Pakistan has a multiple disaster statistics as it is a disaster-prone country of South Asia in which huge loss of property, flora and faunas generally occurs every year in the country. Frequent occurrence of flood causes severe disaster in Pakistan, followed by tropical cyclone, infrequent strong earthquakes and landslide in the country. Government of Pakistan involves various stake holders of country and overseas to deal with disasters on massive scale to mitigate hazards caused due to various types of natural calamities

During the last 50 years about 162 Natural disasters and 187 Technological disasters have killed 106,036 and 799 people respectively while affected 88,140,223 and 15790 people respectively This is a very large number and has major implications on growth and development of the country . Pakistan has a GDP (2870 USD) and the HDI(.572) .It lags behind in achieving the Millennium Development goals than the

other countries in the region . Apart from various other reasons the conflict and the disasters continued to be a major contributing factor

There are a number of underlying risk factors that increase vulnerability and contribute to the severity of disasters especially to earthquakes in Pakistan. These include:

- Poor construction practices and limited enforcement of existing building codes
- Non existant or Weak early warning systems
- Lack of awareness and education on disasters and response
- Limited capacity and coordination between various government disaster response agencies
- Non availability and readiness of emergency infrastructure
- Cultural factors that influence public response to warning
- Lack of desired technical skills and Scientific understanding of the hazard in the country are still lacking
- Corruption and non commitment of the political leaders to the subject

Earthquake has been the lead killing geological disasters in the country. Out of the 23 earthquakes in the history the October 8, 2005 earthquake was the most deadly and is responsible for more than 92 percent of the total deaths due to all 23 earthquakes . The analysis of hazard risks, vulnerabilities and dynamic pressures bring home a scenario of more people living in and around hazard-prone areas. New settlements would continue to spring-up with expanding population in hazard prone areas. This trend may worsen over the years since population of Pakistan is expected to be doubled in another 25-30 years.

At the other end, the frequency, severity and intensity of certain hazards is on the rise; e.g. droughts, flooding, soil erosion and landslides, resulting from environmental degradation and climate change. From these scenarios it could be concluded that disasters in future would be more frequent and their social, economic and environmental impacts higher than before. Regions that previously was not prone to certain hazards (e.g. Droughts, flooding), may experience them in future(8)(1)(23)(31)(30)(31)(26)(25).

7.RECOMMENDATIONS

- There is a need of strong advocacy to raise awareness and commitment at policy- and decision-making levels for Disaster Risk Reduction
- Capacity building of the technical experts maybe done for of risk assessment enabling them to prepare multi-hazard risk and vulnerability analysis, geo-spatial mapping and to be able to analyze data to monitor vulnerability and hazard trends.
- Although different cadres of Disaster Management structure have been made but they lack the capacity and the resources and there is a strong need to fill these gaps
- A strong institutional and legal mechanisms is needed to promote enforcement of the DRR policy

- One of the major challenges to be addressed by the Governments is lack of monitoring, evaluation and accountability. As a consequence development currently exacerbates rather than reduces disaster risks.
- The government shall ensure that DRR is incorporated in all development programs in the country
- Currently disaster management relies on the external funding which is patchy and not very consistent .A regular amount of money shall be dedicated from the government to ensure regular sustainable efforts
- Although DRR strategy emphasizes the need of incorporating into the development sector program but it is still a very weak area and needs special attention. Some of the plans and procedures are there but reinforcement is needed for successive implementation is required
- A strong monitoring system is needed to ensure that the building codes and standards are being followed
- School Earthquake safety programs shall be encouraged and advocacy is needed to add disaster preparedness as part of the curriculum
- Capacity building of the Community based organization shall be done to promote the awareness at the community level
- Media can play a strong role in disseminating messages and promoting awareness

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