3rd GEOSS AP Water & AWCI

4-6 February 2009, Kyoto, Japan

Recent Water-Related Disasters

in

Pakistan

Presented by

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Chronology of Major Water-Related Disasters

Five Years Prolonged Drought (1998-03)

Record Heavy Downpour in Capital (July 2001)

Heaviest Fall in Arid Zone (July 2003)

Snowmelt Flood (June 2005)

Tropical Cyclones Gonu & Yemyin (2007)

Two GLOF Events (2008)

The Worst Drought (1998-2003)

The Worst Drought

- Triggered by the El~Nino 1997-98
- Persisted for five consecutive years
- 60% Area Affected
- 3469 cattle and wildlife died
- 14056 Hectare Orchards Dried-up
- Thousands of families migrated

The Worst Drought- its progression

September 1998

September 1999





The Worst Drought-some glimps









- 620mm rainfall in 10 hours in Islamabad-Rawalpindi twin cities (23rd July 2001)
- Previous Record of 24hrs = 207mm 7th Sep, 1992
- Total Monsoon Season Rainfall =632mm
- Normal July Precipitation = 300mm







207 Human-beings lost their lives

3005 cattle died

4150 houses collapsed or damaged

Huge loss to personal assets & infrastructure

The Heaviest Fall in Arid Zone

The Heaviest fall in Arid Zone

- 120mm rain in 14hrs in Karachi (23rd Jul 2003)
- Annual total Precipitation = 175mm
- Monsoon (Jul-Sep) precipitation = 150mm
- July Total Precipitation = 78mm
- Thousands of hectare cropped land inundated
- Huge damage to infrastructure & Civic life paralysed

Roads of Karachi after Rain



Snowmelt Flood

Snowmelt Flood

- Heat Wave persisted over southern slopes of HKH Region during second fortnight of June 2005.
- Accelerated snowmelt resulted into flooding in upper Indus & Kabul Rivers.
- Both the peaks converged downstream in the Indus.
- Damage to field crops and riverine settlements

Indus River Flow



FIOOD IN INDUS RIVER (AT TARBELA) DURING 15TH JUNE TO 30TH JUNE

Kabul River Flow



Tropical Cyclones 2007

Tropical Cyclones 2007

<u>Gonu</u>

 First Supper Cyclone in North Arabian Sea

•Life Time=6 days

Track: Western Indian
Coast to Oman

Landfall: Oman

Yemyin • First Cyclone to hit Pakistan Coast

•Life Time = 10 days

•Track: Western Indian Coast to Pakistan Coast

 Blochistan Province worst affected

Post-Cyclone Scene



GLOF Events 2008 & Deleting Glacial Resources

GLOF Events 2008

- Glacial Lake of Passu Glacier discharged in February 2008
- Glacial Lake of Hussaini Glacier burst out bringing lot of mud and debris on Karakoram Highway.

Siachen Glacier Past & Present



Response of Glacial Resources to CC (IPCC 4AR)



Impact of Climate Change and Glacier retreat on UIB Flows

Assumed Climate Change Scenario (CCS) *∆* Temp: +3 °C, *∆* Glacier Area: - 50%

Mean Monthly Flows for the Period of Record 1995-2004



2. Intra-Annual flow pattern considerably changed

Melting of Glaciers in Pakistan

- Accelerated Melting of Glaciers is a great threat to the sustainable water supply. Melt water from Glaciers contributes more than 60% to the flows from Upper Indus Basin.
- "Glaciers in Himalayas are receding faster than in any other part of the world and, if the present rate continues, the likelihood of their disappearing by the year 2035 is very high" .(Report of International Commission for Snow and Ice,1999)
- In 2005, Hewitt reported widespread evidence of glacier expansion in the late 1990s in the Central Karakoram, in contrast to a worldwide decline of mountain glaciers.

Present Situation

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<u>SEASON</u>	<u>WATER</u> AVAILABLE	<u>WATER</u> REQUIRED	
Summer (KHARIF)	85 %	60 %	
Winter (RABI)	15 %	40 %	

FUTURE WATER REQUIREMENT

<u>DETAILS</u>	<u>YEAR 2025</u> (MAF)	
Water Availability	237	
Water Requirement	271	
Shortage	34	

Projections of Population Growth & Water Availability in Pakistan



Severe Water Shortages Likely

