ADB Side Event:

"Enhancing Adaption & Resilience in Pakistan Through Integrated Flood Risk Management"


National Flood Protecion Plan -IV
&
Master Plan on Flood Telemetry
(Challenges and Opportunities)


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Sequence

- National Flood Protection Plan – I, II, III
- Effects of Climate Change, Economic Impact
- Future Temperature/Climate Projections
- National Flood Protection Plan-IV, Umbrella Project
- Floods - 2022, Plan & Umbrella Project Updation
- National Master Plan on Flood Telemetry
- Issues, Challenges, Opportunities

National Flood Protection Plan (I,II, III)

- Since **1977**, three 10- Year each National Flood Protection Plans (NFPPs) stand implemented;

  - National Flood Protection Plan-I **(NFPP-I)** for the period **(1978-1987);**
  - National Flood Protection Plan-II **(NFPP-II)** for the period **(1988-1997);** &
  - National Flood Protection Plan-III **(NFPP-III)** for the period **(1998-2008).**

Effects of Climate Change - Pakistan

Increased temperatures - Period 2016-2035 (IPCC AR5)

- **Global versus Pakistan – Decadal Mean Temperature Trends**

Period	Global	Pakistan
1901-2000	0.06 °C	0.06°C
1956-2005	0.12 °C	0.16°C
1971-2005	0.15 °C	0.26°C
1981-2005	0.17 °C	0.39°C
1991-2005	0.33 °C	0.74°C
2010-2039	0.7°C	1°C

- **The mean temperature rise after 1950s over Pakistan is twice as fast as the global mean change**

Effects of Climate Change - Pakistan

Pakistani Glaciers Effects of Black Carbon

Name of Glacier	Length (km)	Aspect	Carbon (ng/m2)	Diameter (micron)
Hinarchi	17	S	224	131
Hisper	53	NW	161	212
Minapin	16	N	192	401
Gutumi	14	W	105	203
Bualtar	20	NW	63	116

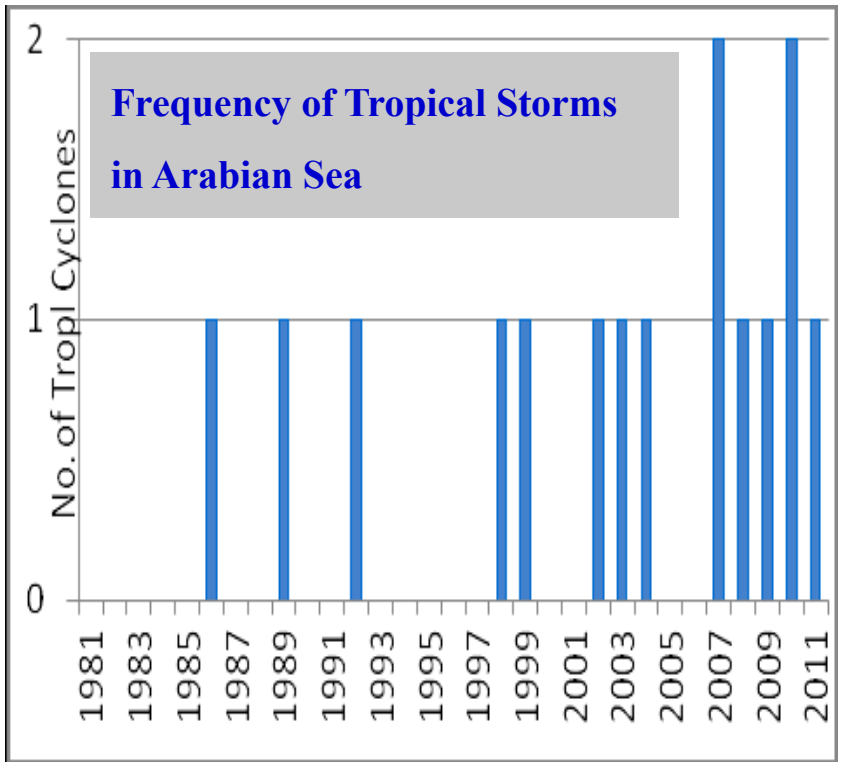
Blackening of Glaciers result into heat absorption and hence increase in rate of melting

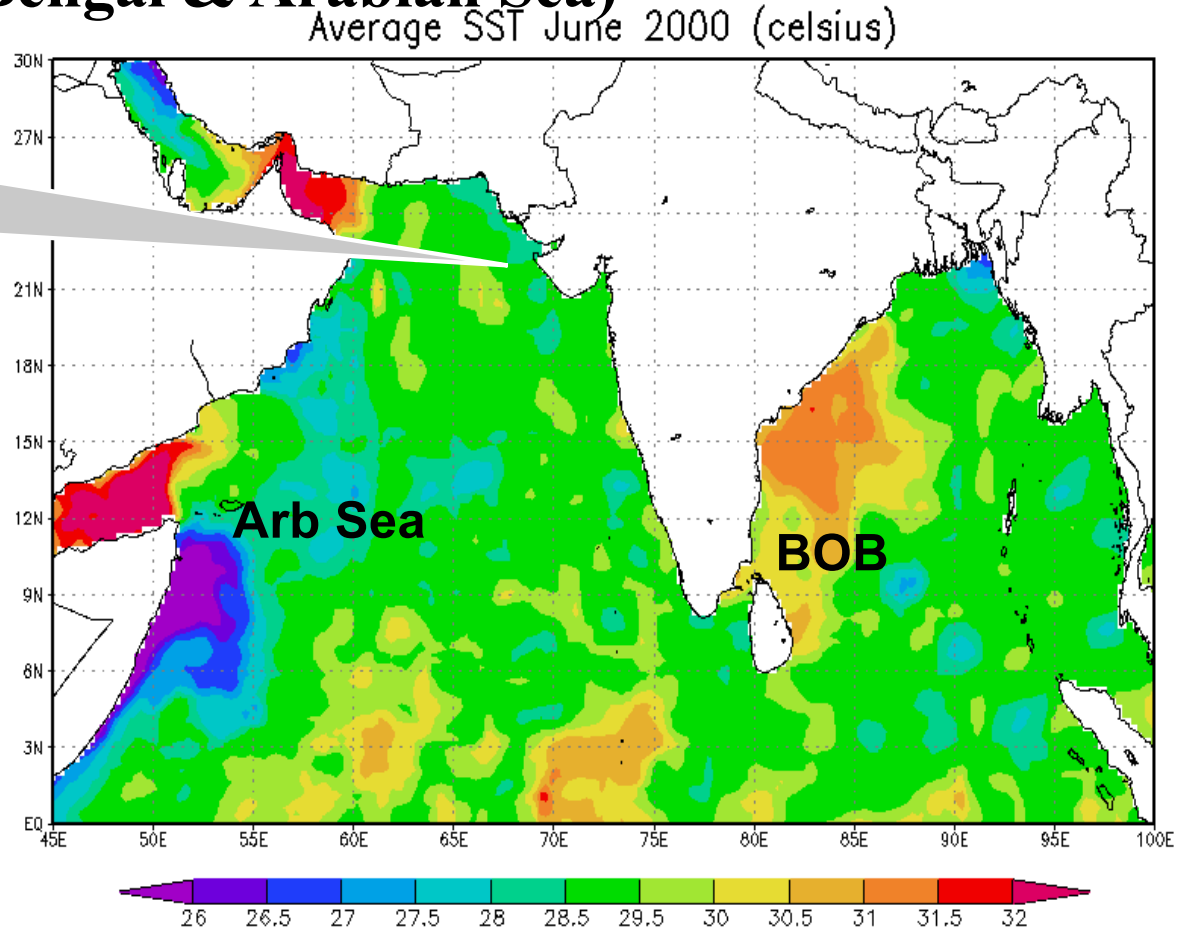
Effects of Climate Change - Pakistan

Comparison of Sea Surface Temperature

(Bay of Bengal & Arabian Sea)

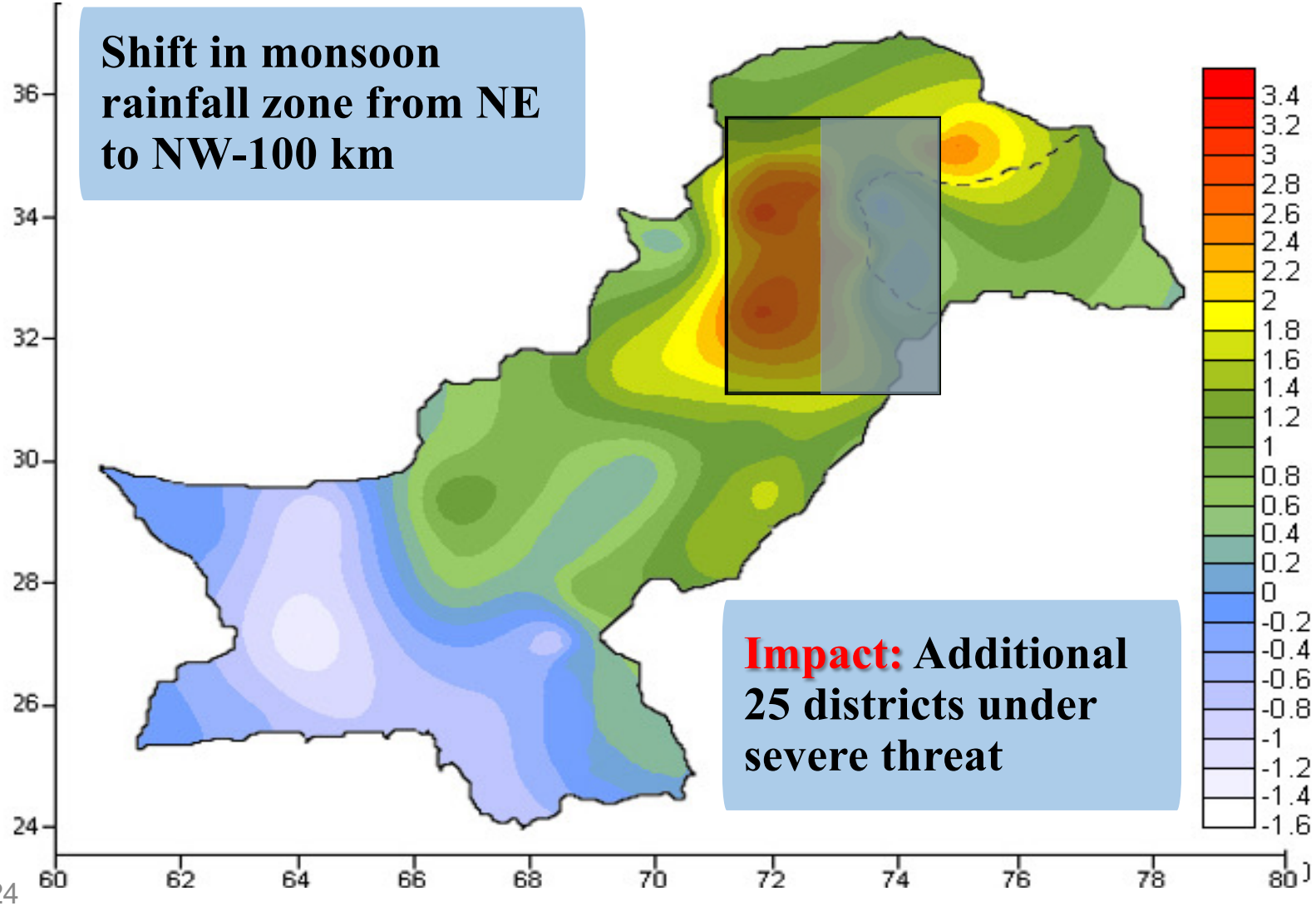
Arabian sea is showing higher SST values compared to Bay of Bengal since 2000





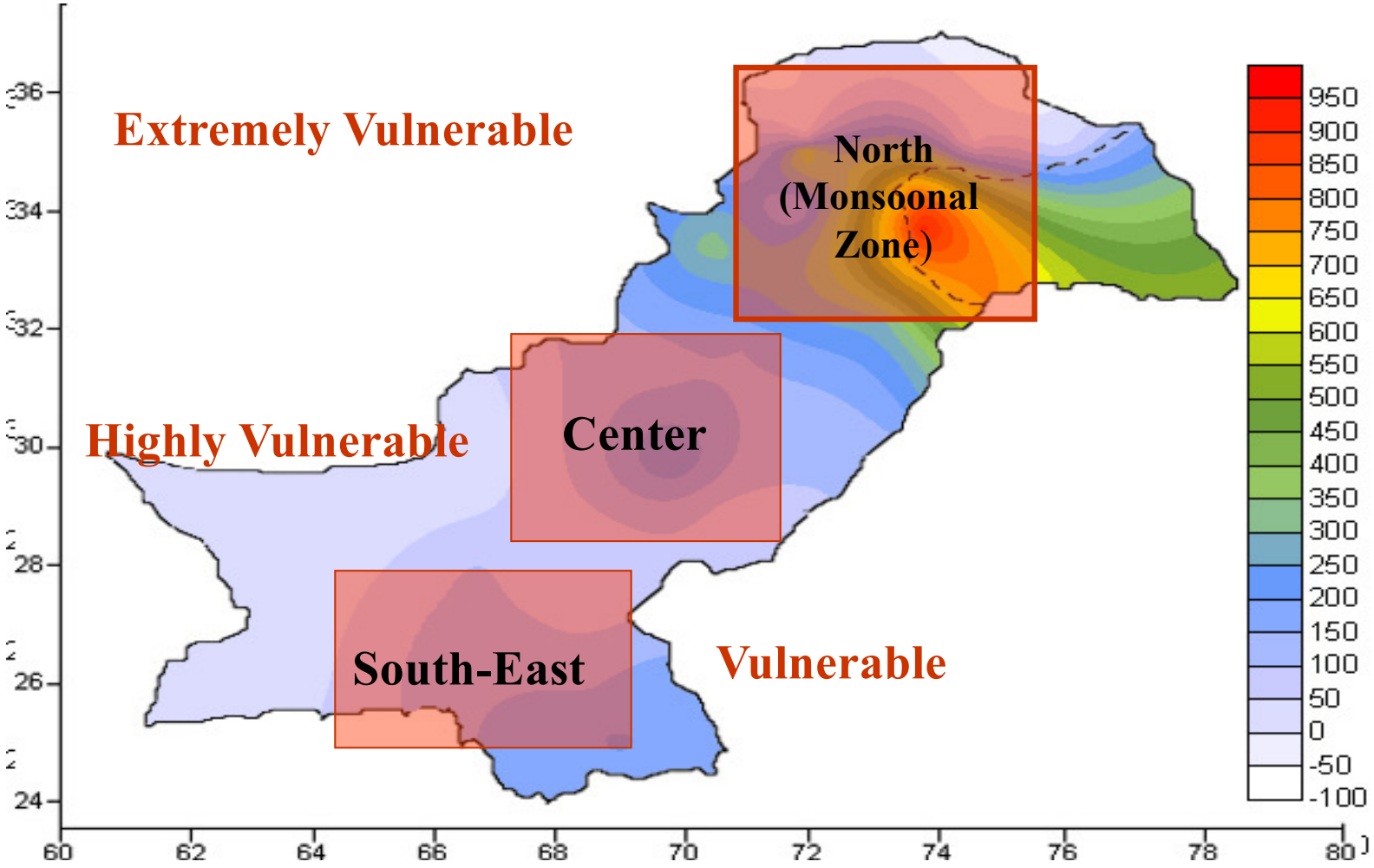
Effects of Climate Change - Pakistan

Post 2010 - Floods

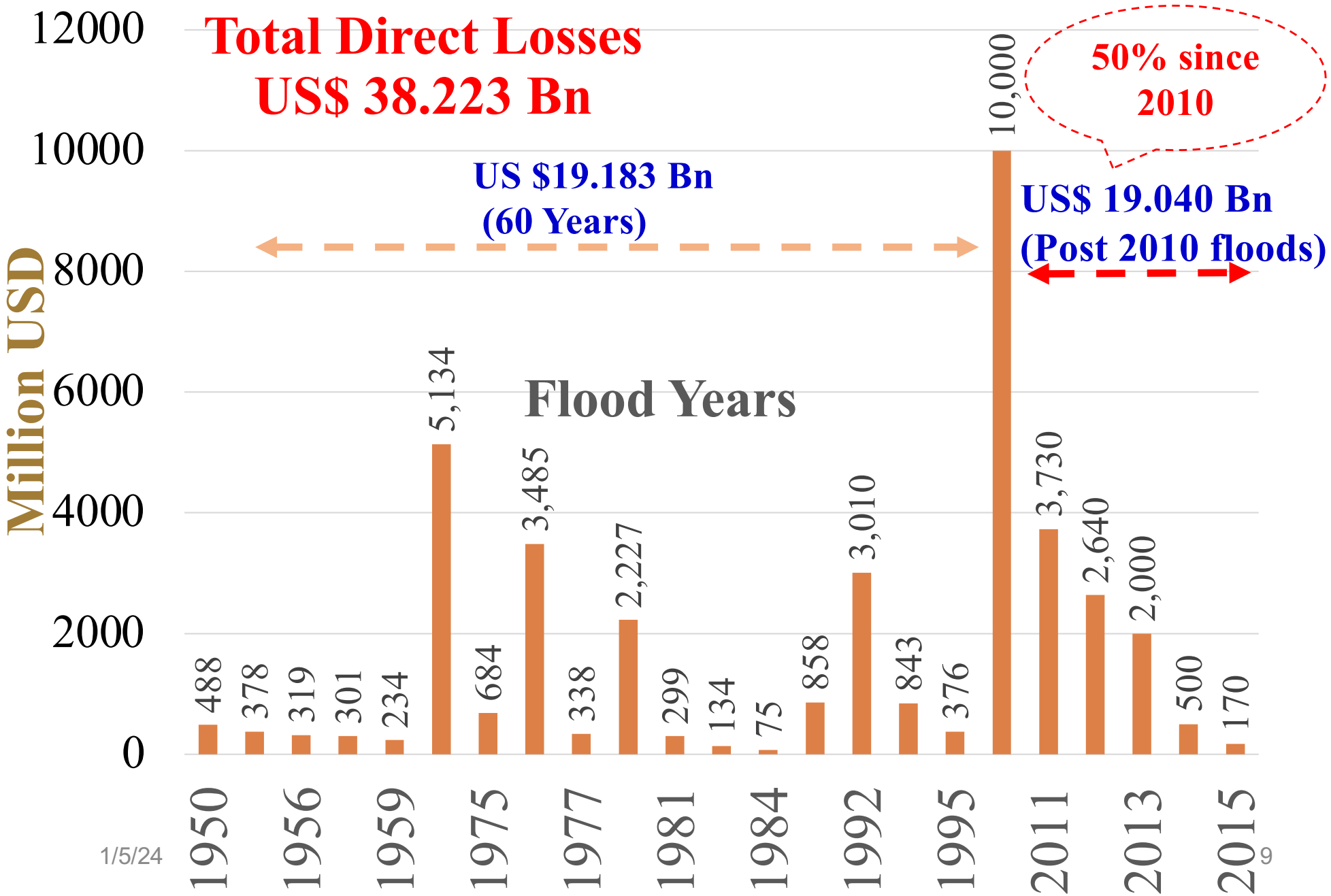


Post 2010 – Floods Analysis

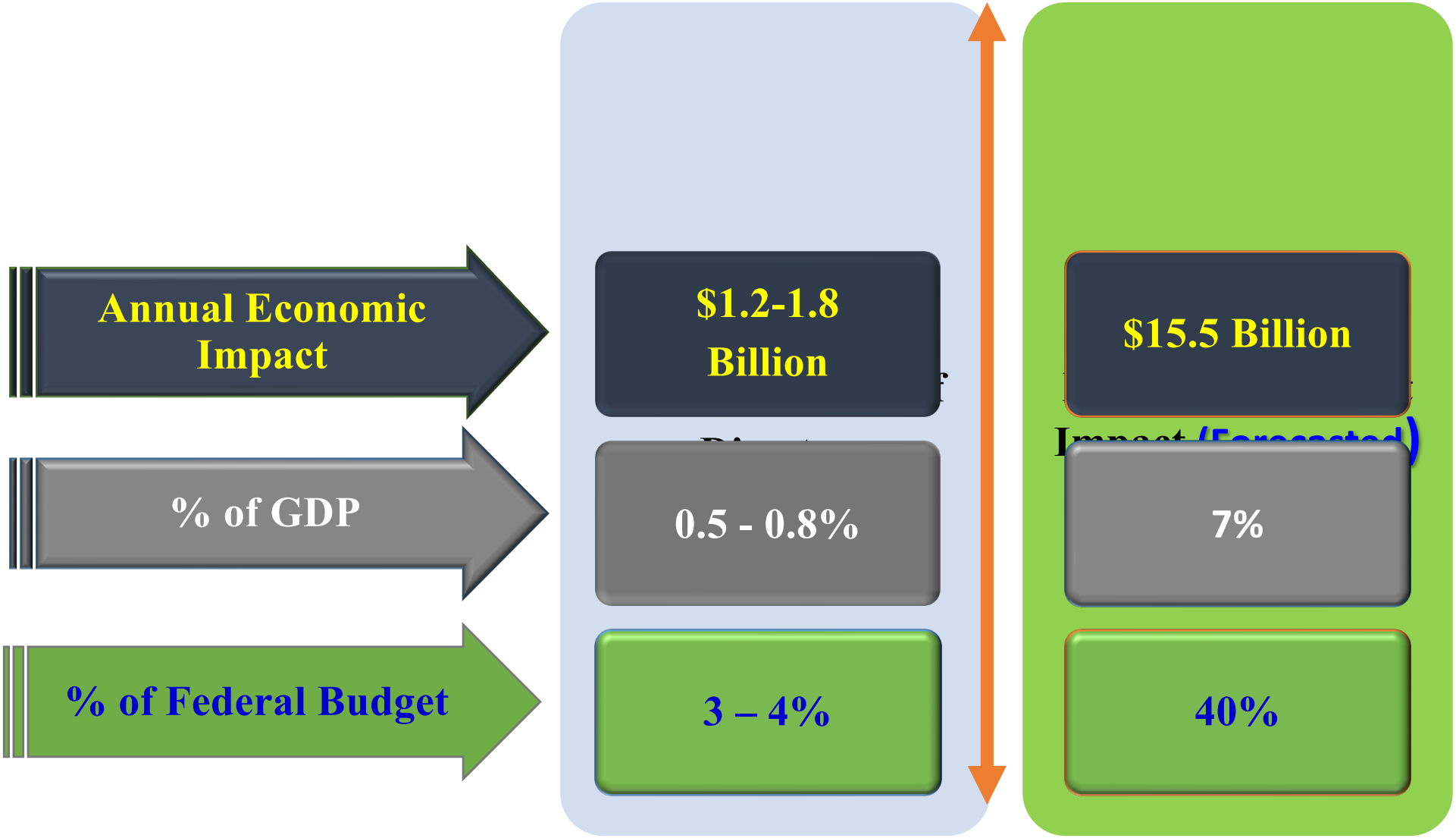
Challenges - Monsoon Prediction



Losses by Floods

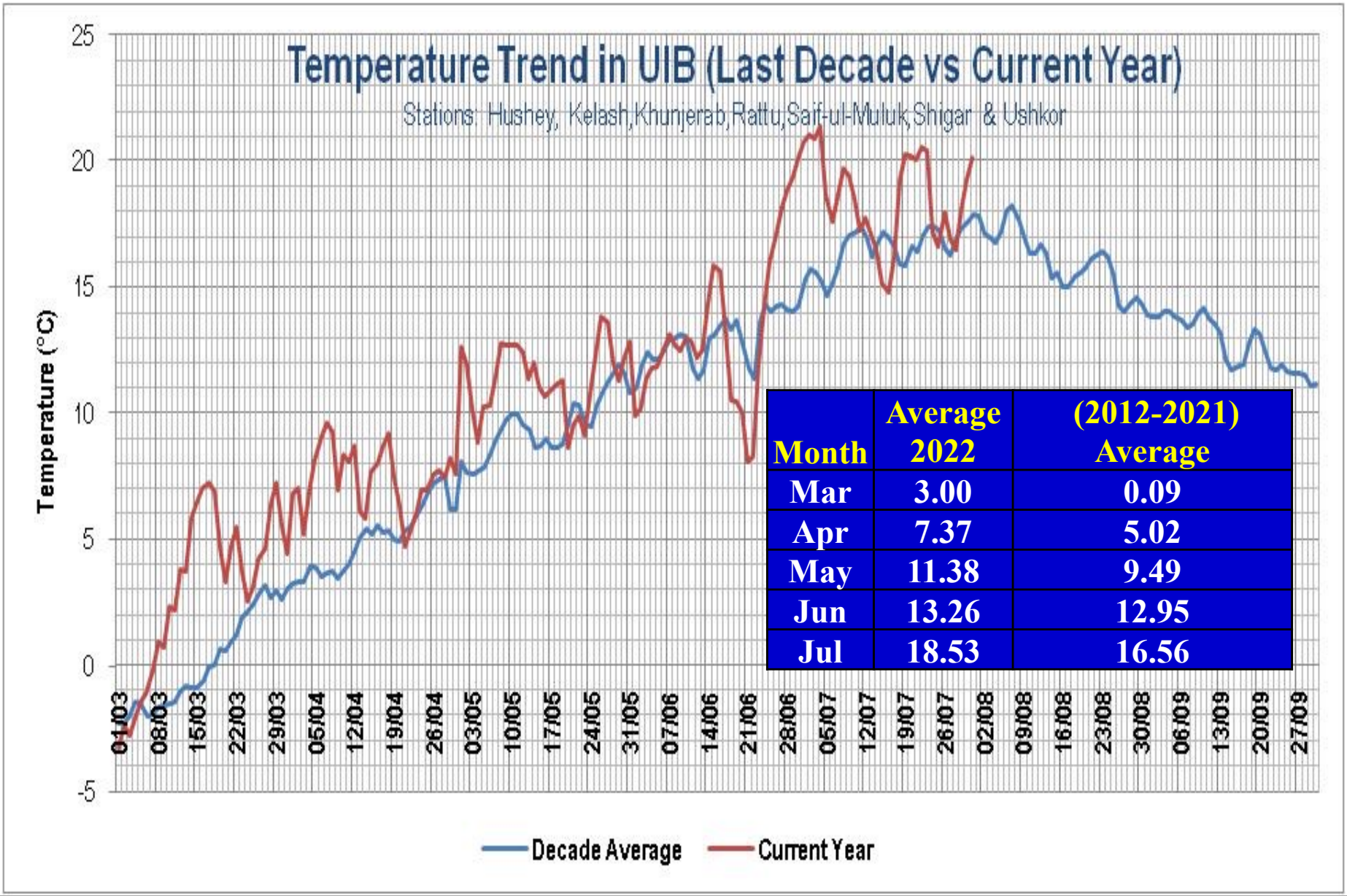


Pakistan Floods - Economic Impact



Source: Fiscal Risk Assessment Options for Consideration, A Study by World Bank and GFDRR, 2015 **(Based on 2015 USD)**

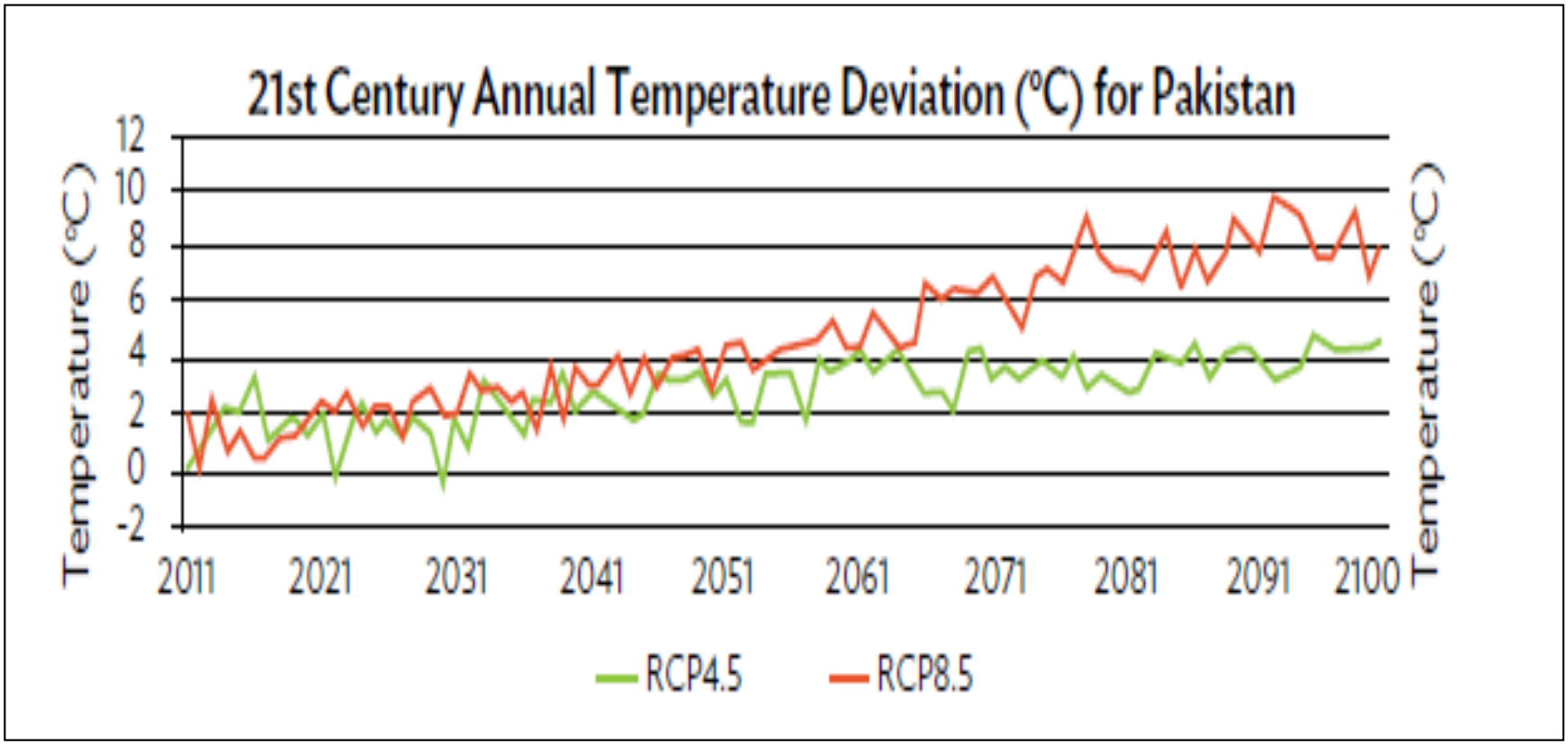
Temperature Trends In Upper Indus Basin



Month	Average 2022	(2012-2021) Average
Mar	3.00	0.09
Apr	7.37	5.02
May	11.38	9.49
Jun	13.26	12.95
Jul	18.53	16.56

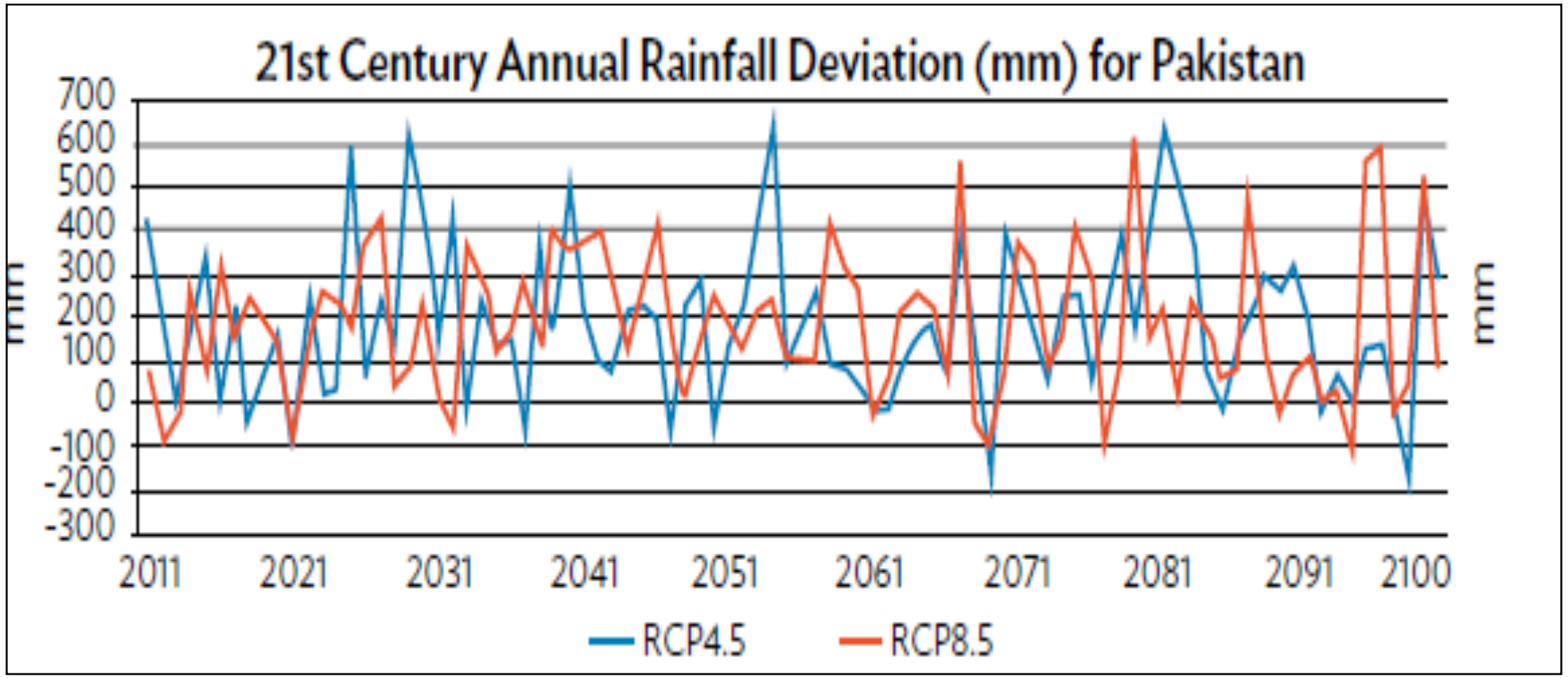
The climate data shows the temperatures are increasing at a drastic rate

Future Temperature Projections



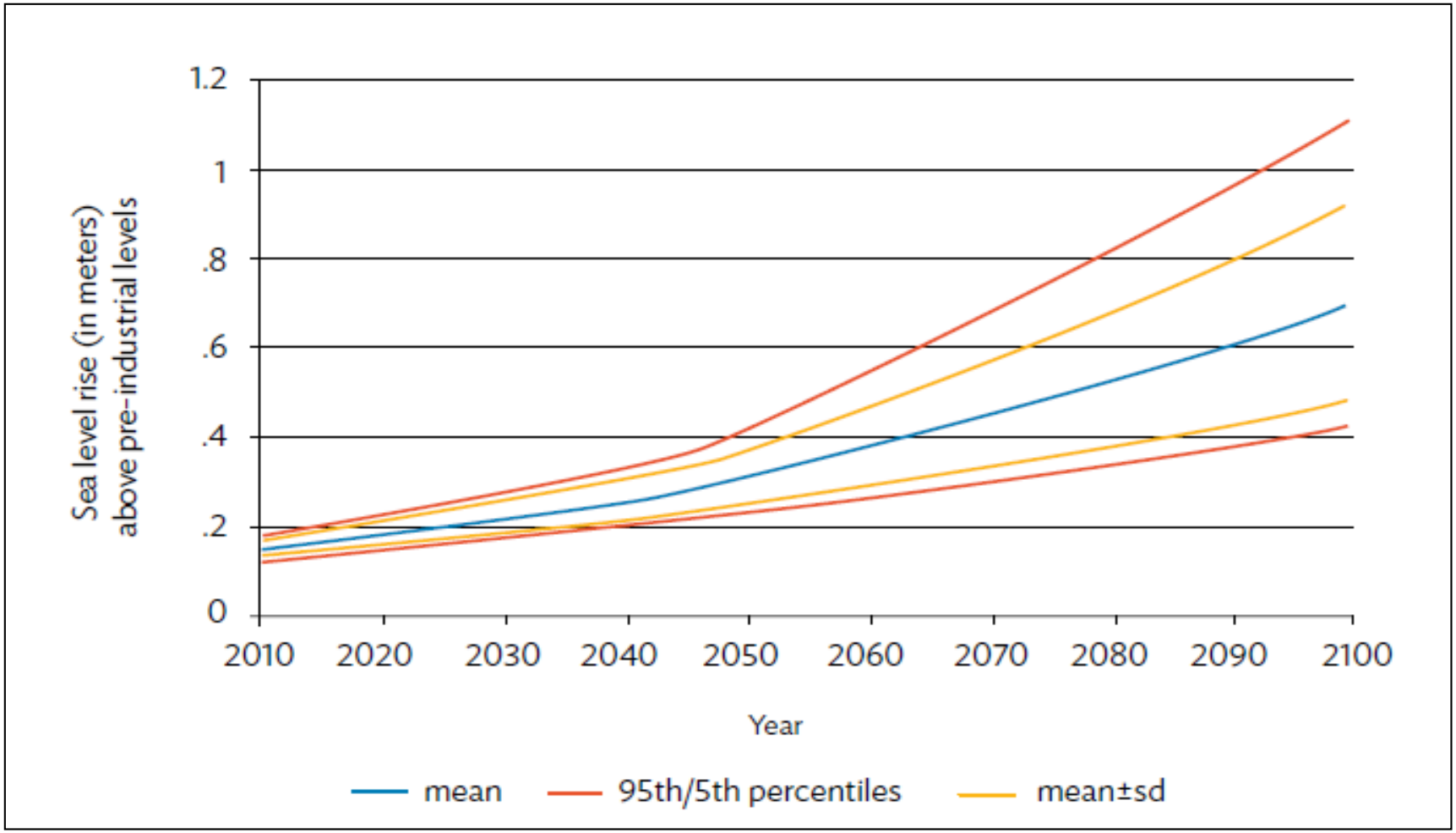
Average annual temperature may rise upto 3°C–5°C especially in Northern Pakistan at the end of 21st Century

Extreme Weather Events
Increase in Frequency & Intensity



- Area average rainfall over Pakistan shows a large inter-annual variability.
- Sharp rising peaks give indication of extreme precipitation events while negative peaks indicate droughts.

Climate Change – Pakistan Sea Level Rise



By the End of Century (IPCC Projections)
Global Mean Sea Level may rise from 0.2–0.6 m
Pakistan's coast is part of South Asia may rise 0.7 m

National Flood Protection Plan-IV

- Super Flood of **2010** followed by **2011** & **2012** floods warranted need of NFPP-IV on integrated and holistic approach;

- Prepared through reputable National & International Consultants (**M/S NESPAK** & **Deltares-NL);**

- Based on extensive consultations with all stakeholders at Provincial & Federal Government levels.

National Flood Protection Plan-IV
(USD 1.5bn)

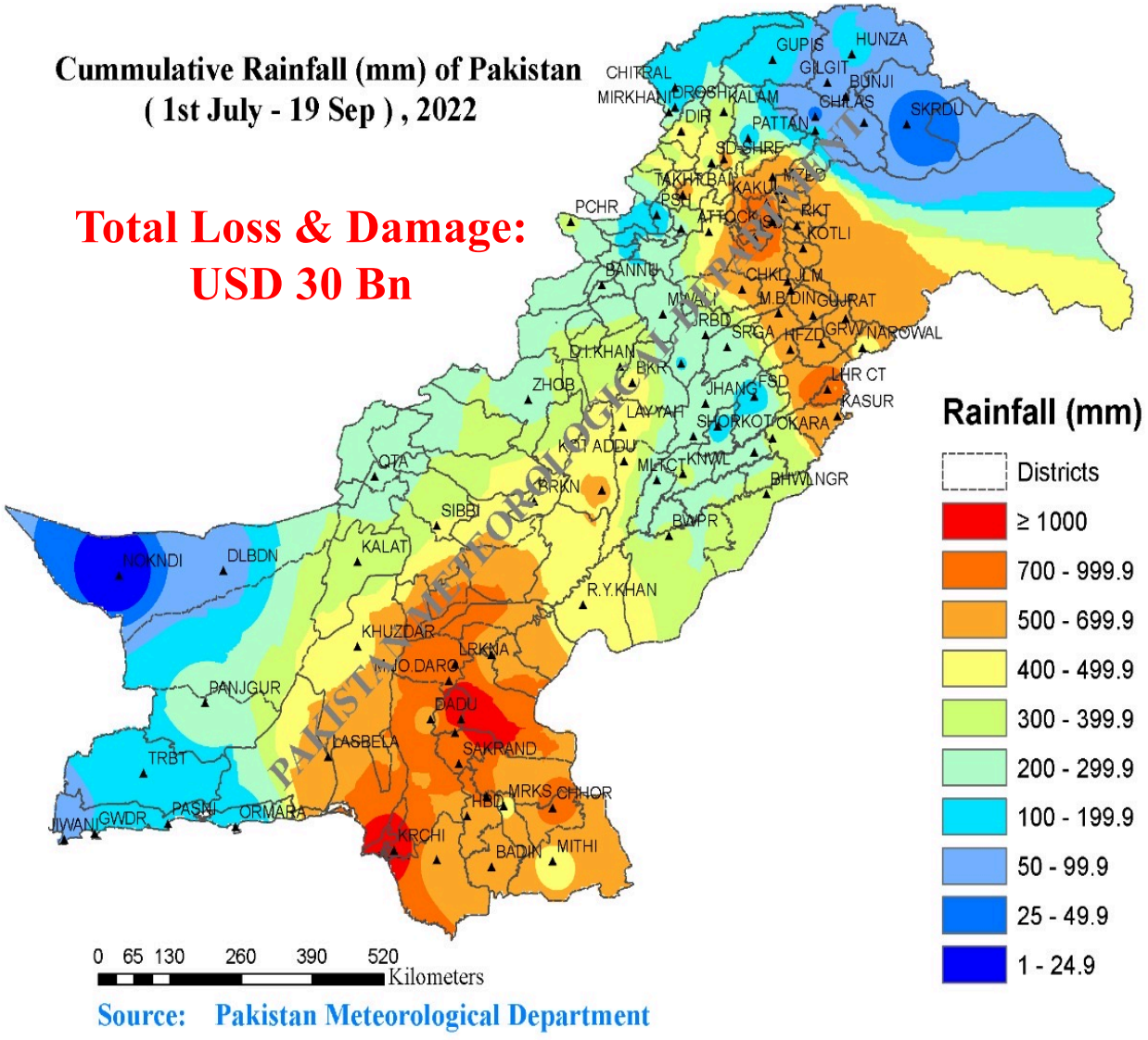
- **Phase-I (First 5 Year)** — **Rs 177.661 Billion**
  (Priority-I Works, USD 0.81bn)

- **Phase-II (Next 5 Year)** — **Rs 154.585 Billion**
  (Additional works, 0.70bn)

NFPP – IV: Umbrella Project

- The **Umbrella Project** did not get through due to no **funding window** available till **July 2022** when the historically unprecedented rains and floods **hit Pakistan.**

Cumulative Rainfall - Monsoon 2022



MONSOON 2022 RAINFALL (mm)

	01 Jul to 30 Sep, 2022 Rainfall		
	normal (mm)	actual (mm)	Deviation (%)
Pakistan	140.9	387.2	175
Azad J&K	389.5	382.6	-2
Balochistan	58.3	320.7	450
Gilgit-B	39.7	81.1	104
Khyber-PK	256.3	341.1	33
Punjab	231.9	393.5	70
Sindh	133.7	703.1	426

National Flood Protection Plan-IV (Updation)

- **Total cumulative** economic impact of floods : **USD 68Bn**

- The **Prime Minister** directed **updation** of NFPP-IV duly incorporating the **lessons learnt** from Floods-2022;

- Planning Commission directed **updation** of **Umbrella Project** (Part of Plan-IV) duly incorporating the **lessons learnt** from Floods-2022;

- Updated Umbrella Project **(Rs 195bn/USD 0.9bn)** under stands approved by the highest approving forum of Pakistan (ECNEC, Planning Commission); &

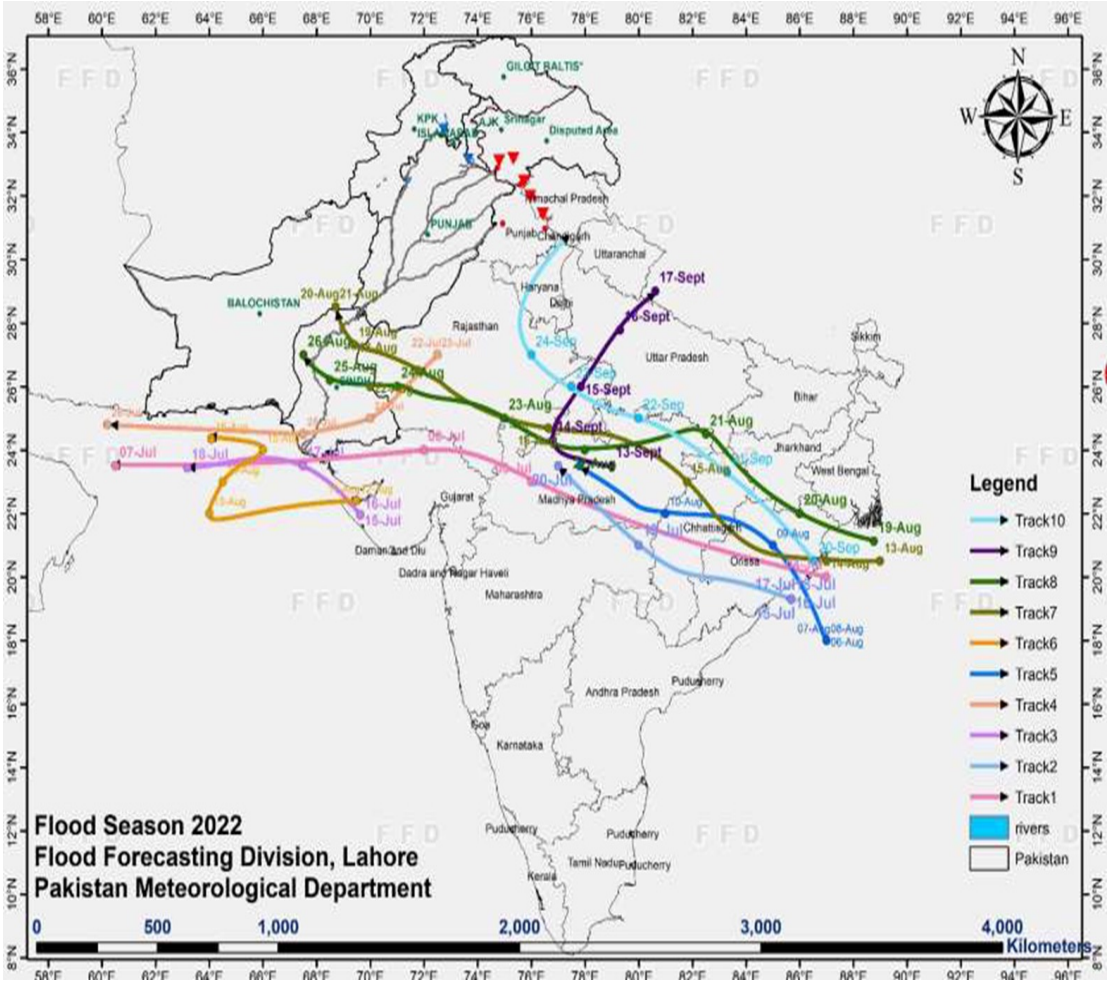
- Stands presented to **international donors** for financing

Expected Future Climate Change Impact

- The 2022 like flood may **happen more often** in the future

- **Excessive rainfall** is likely to occur **more often** in the semi-arid river basins **(hill torrents)**

- **Attention** should **shift** from **purely riverine** (Indus & tributaries) floods to a **more** comprehensive approach **including** the hill torrents



National Flood Protection Plan-IV (Updation)

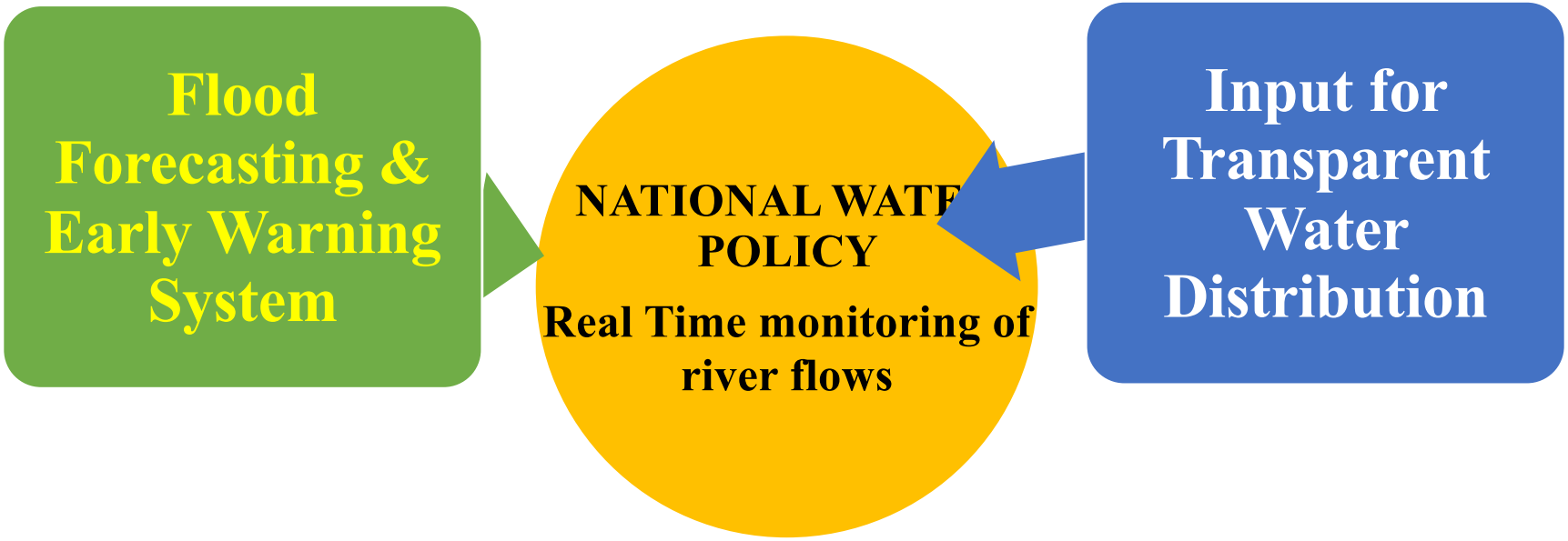
Structural Interventions:

- Small/Medium Dams;
- Hill Torrents Flood Diversion/Dispersal Structures;
  Construction/Strengthening/Remodeling of Flood Embankments/Dikes;
- Spurs/Series of Spurs;
- Improvement of Drainage Network etc.
- Urban Flood Management

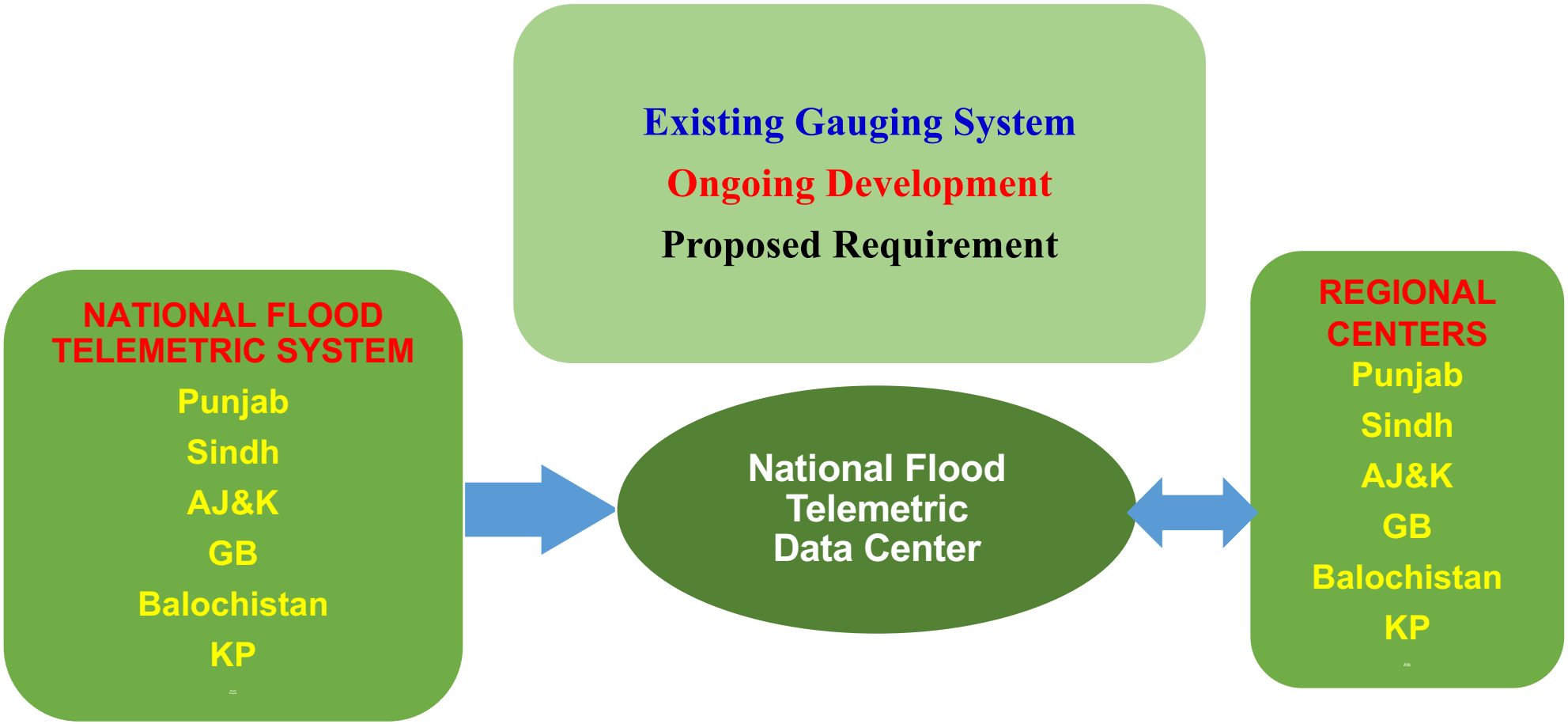
Non-Structural Interventions:

- Improvement of EWS by installation of AWS;
- Establishment of Regional FF&W Centres;
- Installation of Flood Telemetry Network on main, secondary and tertiary rivers;
- Urban Strom Management Information System;
- Implementation of Nature-based/ Green Interventions etc.;
- Awareness raising, Knowledge Management;
- Institutional Strengthening & Capacity Building

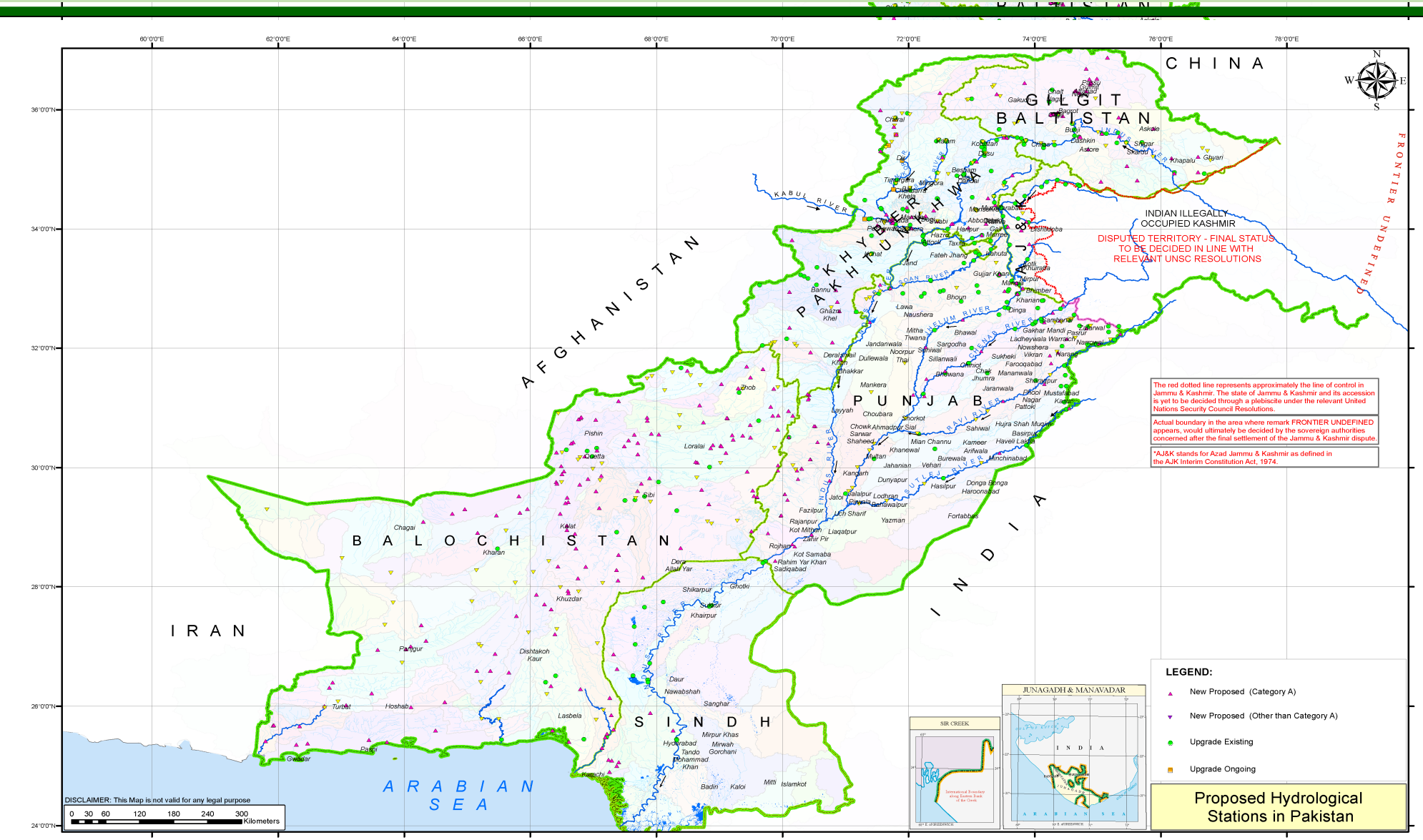
Objectives


Flood Forecasting & Early Warning System
NATIONAL WATE
POLICY
Real Time monitoring of river flows
Input for Transparent Water Distribution

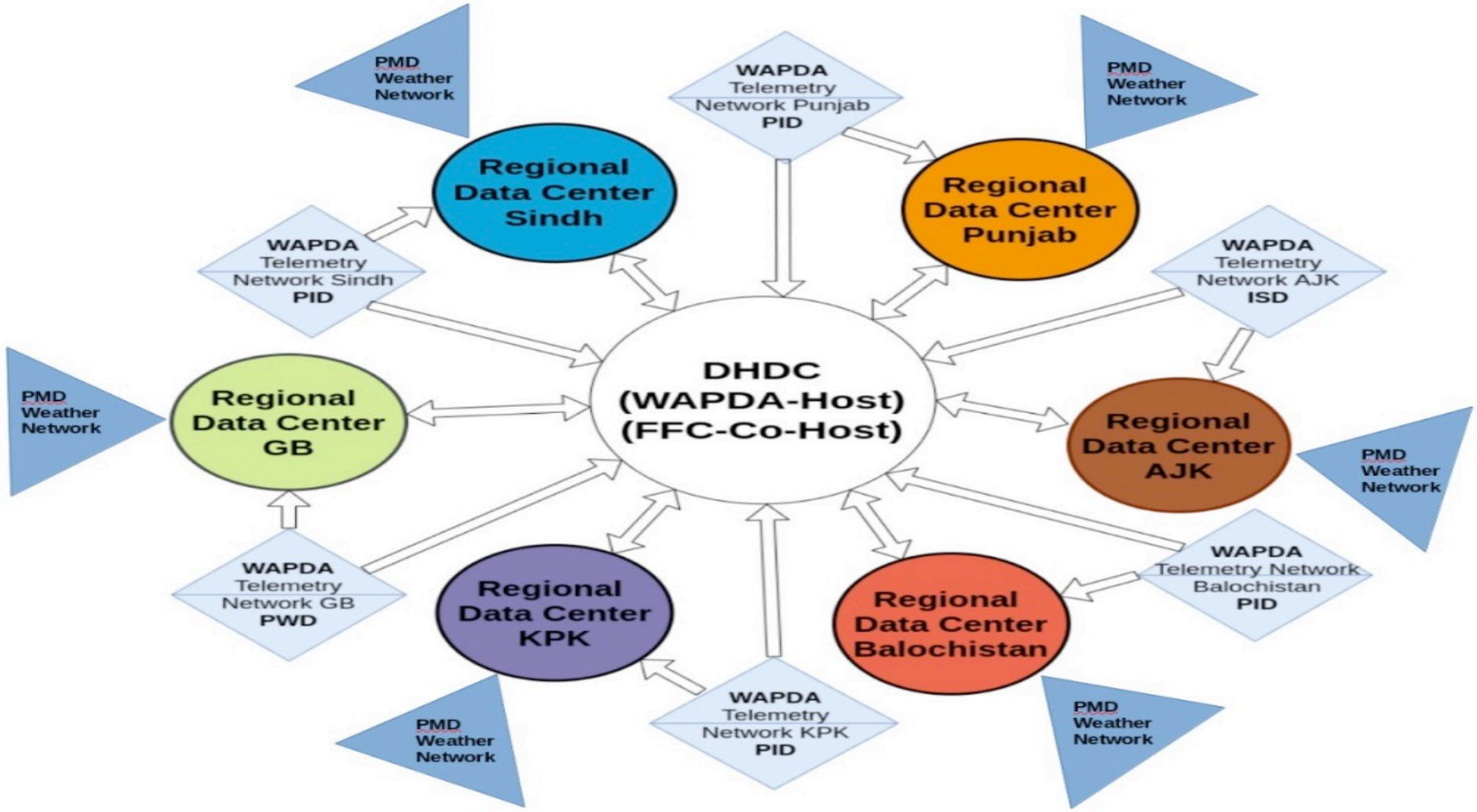
Master Plan Concept



Flood Telemetry Sites - Location



Data Receipt & Sharing Mechanisum



Issues and Challenges

- **Scale and intensity** of natural disasters faced by the country is **too large** to cause huge damages
- **Investment** in flood protection is **limited** compared with **loss and damage** caused by th floods (Floods-**2022** alone caused loss and damages of **USD 30 billion**)
- To address **climate threats**, role of multiple departments, International development partners, NGOs/INGOs **needs enhancement**
- **Practical deficiencies** - Local needs not **fully addressed** yet particular with regard to improvement of drainage system
- **Departments - less equipped** to handle **emerging challenges** associated with **torrential flash** flooding and rainstorm/ **pluvial** flooding
- **Need of SOPs** to effectively manage rain-caused **pluvial** flooding

Opportunities

- **NFPP-IV** is a **Pivotal Document** to **unlock** the **pledges** made to Pakistan at the **launch of 4RF** document in **Geneva** earlier in January 2023.
- Plan **considers** many aspects to ensure interest from various **development partners**
- To adapt to **NbS/ Green interventions** strongly suggested by the international consultants (M/s Deltares) under Asian Development Bank
- To **link IFRM** with other related **ongoing initiatives** (Recharge Pakistan, Living Indus Initiatives, others)
- The **Plan** and its Phase-I document **(FPSP-III)** besides the National Master Plan on **Flood Telemetry Network** is an excellent manifestation of **ADB, FFC, MoWR, GOP partnership**

Opportunities

- **Remodeling of constructed drains** (RBOD-I, RBOD-II and RBOD-III etc.)
- **Tapping** storage potential of **Hill Torrents** and installation of **Flood Telemetry**
- **Expansion** of Gauging system, especially for **Drains** in Sindh province.
- **Floodplains Development** to enhance their Productivity **(Installation of Solar Tubewells for enhanced agricultural activity/ forestation etc.)**; &
- Institutional **Capacity** Building & **Strengthening**

THANK YOU

Structural Interventions Proposed NFPP-IV
(Phase-I : First Five Years, Rs in Million)

Sr. No.	Description	Estimated Cost
1.	Construction of proposed flood protection works (577 flood protection Works)	91,743
2.	Flood Management Structures Hill Torrents Flood Generating Nullahs (433 Projects)	26,371
3.	Feasibility & Detailed Design Studies of Barrages and Hydraulic Structures (20 sites)	1,500
4.	Master Planning, Feasibility Studies, and Detailed Designing Studies (41 study projects)	3,000
5.	Physical hydraulic Model Study for Major Railway Bridges and Improvement of Flood Protection Facilities of Pakistan Railway (9 Railway Bridges)	450
6.	Physical Hydraulic Model Study for Selected Reaches of Major Rivers	200
7.	Measures for GLOFs & Land sliding in Hilly areas (Province/Agency-wise detail)	1,000
8.	Remodeling & Proper Maintenance of Drainage System in Lower Indus	9,763
9.	Coastal Flood Protection Works in Sindh & Balochistan	1,622
10.	Flood Mitigation, channelization and Execution of Lai Nullah Project (Flood component)	16,000
11.	Studies for proper town planning and improving storm drainage system in Urban Areas	1,000
12.	Flood fighting activities during flood season and procurement & Repair of flood fighting equipment & machinery under PIDs	5,000
Total A (Structural Measures)		**157,649**

Non-Structural Measures Proposed NFPP-IV
(Phase-I : First Five Years)

Sr. No.	Description	Estimated Cost (Rs Million)
1.	Up-gradation & expansion in the existing Radar Network of PMD	4,205
2.	Up-gradation & expansion in the existing flood forecasting and warning system	300
3.	Up-gradation, installation and expansion in the existing gauging system of WAPDA	2,297
4.	Study to be conducted for removal of encroachments in major rivers & hill torrents and procurement of LIDAR's (Detail)	750
5.	Study and implementation cost for development of watershed management in upper catchment areas of rivers & hill torrents.	4,500
6.	Disaster Management Activities by NDMA, rescue and relief.	6,500
7.	Study for Drought Management	50
8.	Feasibility/ Technical studies for Ramsar sites.	30
9.	Capacity building for all institutions dealing with flood management	1,380
Sub-Total-B (Non-Structural Measures):		**20,012**
Grand Total A+B (Structural & Non-structural Measures)		**177,661**