

# Impressions Gathered at the 5<sup>th</sup> World Water Forum and Key Messages Communicated by ICIMOD

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International Centre for Integrated Mountain Development

Kathmandu, Nepal

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# Key Issues of interest to ICIMOD

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- Problem of water storage with all its features, which could become a strategic theme for ICIMOD
- Hydroclimatic data as public goods to be shared at all levels (local, national, regional)
- Early warnings must reach people

# Rationale for ICIMOD's intervention in policy-related panels

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- Efforts to bring mountain systems into the category of hotspots

# ICIMOD Activities at 5WWF

	17	18	19	20	21
DG	Towers Pres; Snowpack Roundtable Chair		Adaptation Panel	Ministerial Panel; Mountain Side-event Chair	
ME	Hot Spots Pres			Disasters Pres	
BS	Disasters Panel			Data Panel	
RV	Snowpack Rapport	GLOF Pres			IWRM Pres

# Message from the UN Secretary General (16 March 2009)

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(UNSGAB is headed by HRH The Prince of Orange)

- Water and ***climate change*** (water stress and water related hazards)
- ***Adaptation*** to climate change (IWRM)
- ***Transboundary*** waters (shared waters, shared opportunities; strong institutions)
- Human and institutional ***capability improvement***; adequate financial resources; equitability (cutting budget for water amid the financial crisis will be a mistake)

## WWDR Perspective on Water, Adaptation and Climate by William Cosgrove (March 19, 2009)

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- Transboundary waters: national strategies should take this into account; need regional action
- Groundwater as storage: we have to manage it properly
- Surface water: do not pollute it, think of downstream users
- Energy for water (20% electricity for irrigation in India; same as electricity from water)
- Virtual water: we have to think about other people who have to depend on our products

# WWDR Perspective from William Cosgrove (Contd.)

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- Action is needed today, now.
- Permanent forum for parliamentarians at regional level
- Investment: essential that govts start to invest money for data gathering
- Research: need to get to the local scale; big challenge in downscaling information to local level
- Regional focus on the next WWDR

# Keynote Lecture by HH The Crown Prince of Japan (17 March 2009)

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- Need a combined focus on preventing loss of life and floods during floods and providing drinking water and sanitation facilities after floods (many lives may be lost after the floods).
- Opportunities to learn from history about participatory approach to flood risk management: the example of the Tone River basin regarding the national project in the 17<sup>th</sup> century (c 1600). Solutions like building houses on the top of Mizuka mounds and planting trees near the house: examples of finding local solutions to local problems by putting creative minds together.
- The example of Sekiyado Castle museum: an example of providing broad based education and capacity building, that could help people to find innovative solutions.
- The holistic approach to managing river basin to encourage cooperation and resolve conflicts between upper and lower riparian communities or nations. Also, useful for thinking about ways of adapting to climate change impacts.



## Panel Discussion at AP Ministers Regional Session (March 20, 2009)

- India: recharging groundwater; rainwater harvesting; 5000 water conservation centers; drip irrigation
- FAO: food security-water security linkage; water productivity; storage systems
- ICHARM: data sharing; budget allocation for water security
- ICIMOD: regional database, making accessible the data that is available; community based adaptation activities; river basin approach; PES

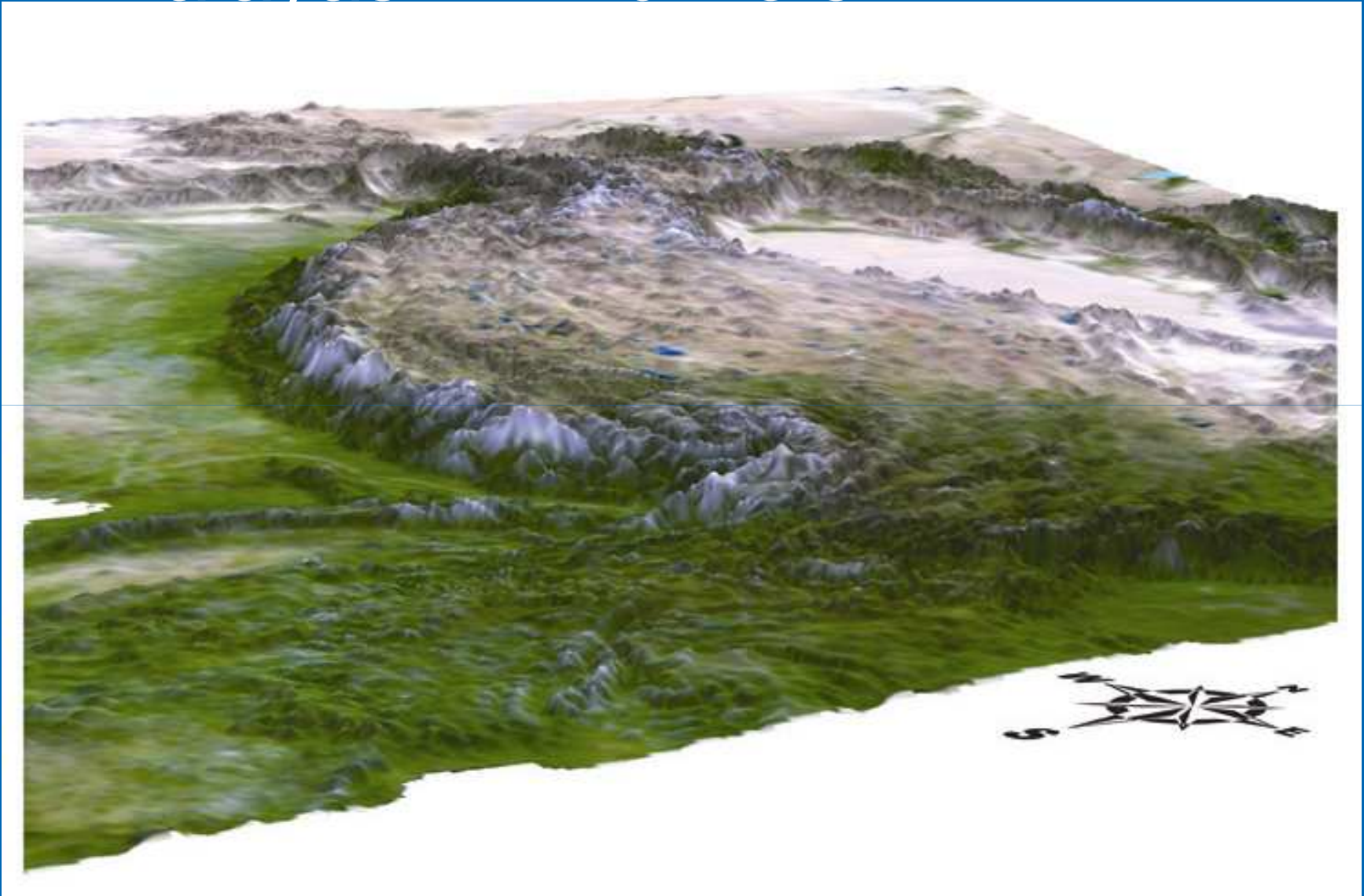
## Adaptation Roundtable on Snowpack Dependent Water Services (March 17, 2009)



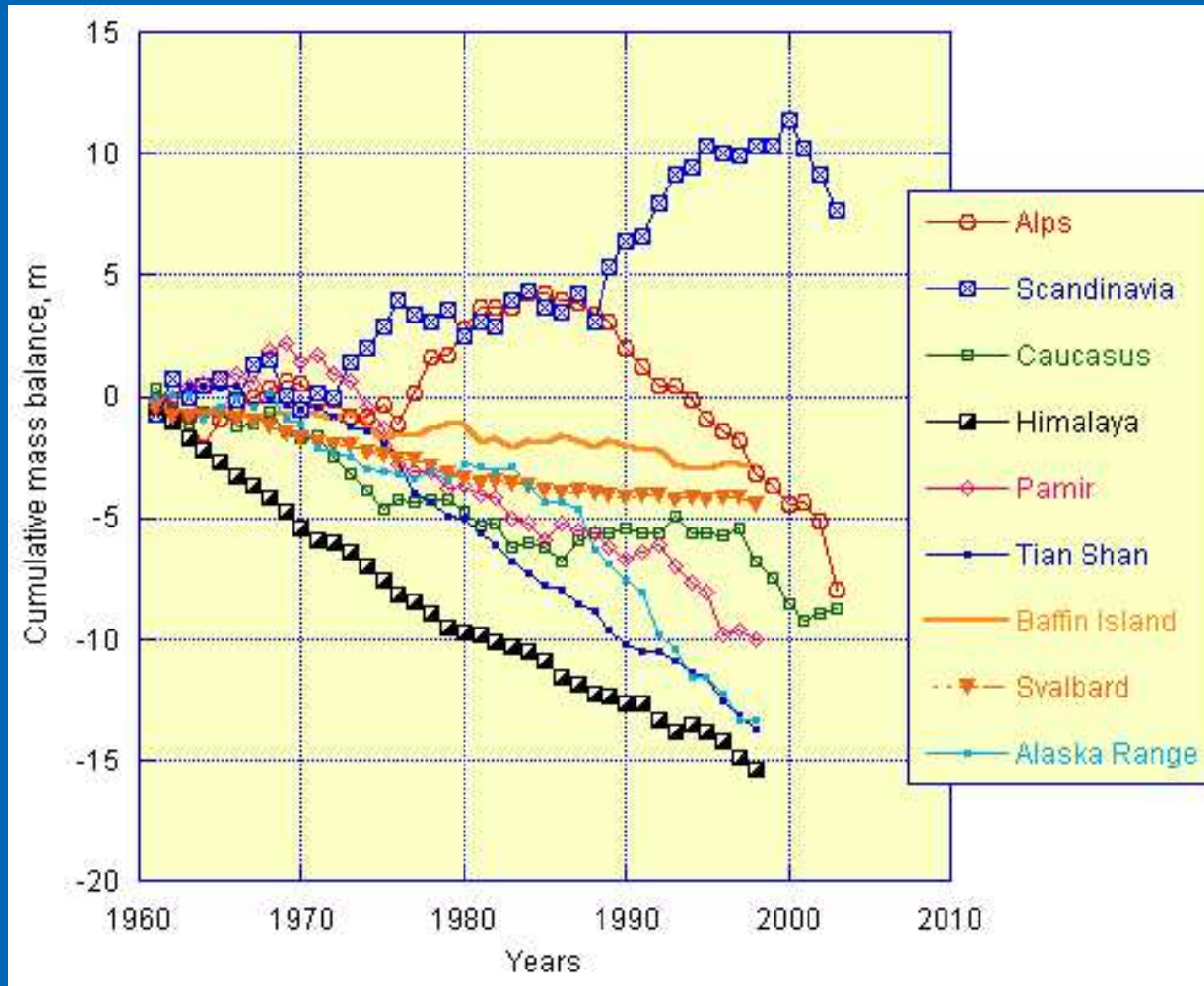
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- Scientific information and Knowledge: hydrological consequences are uncertain, regional experiences are different, other global changes (e.g., population growth), climate variability or climate change
- Natural and manmade hard/soft, structural/nonstructural infrastructure solutions: **storage facilities** (incl high altitude wetlands, ground water aquifers)
- Institutional strengthening for improving governance and for demand management: holistic approach, participatory process

# Himalayas - Third Pole



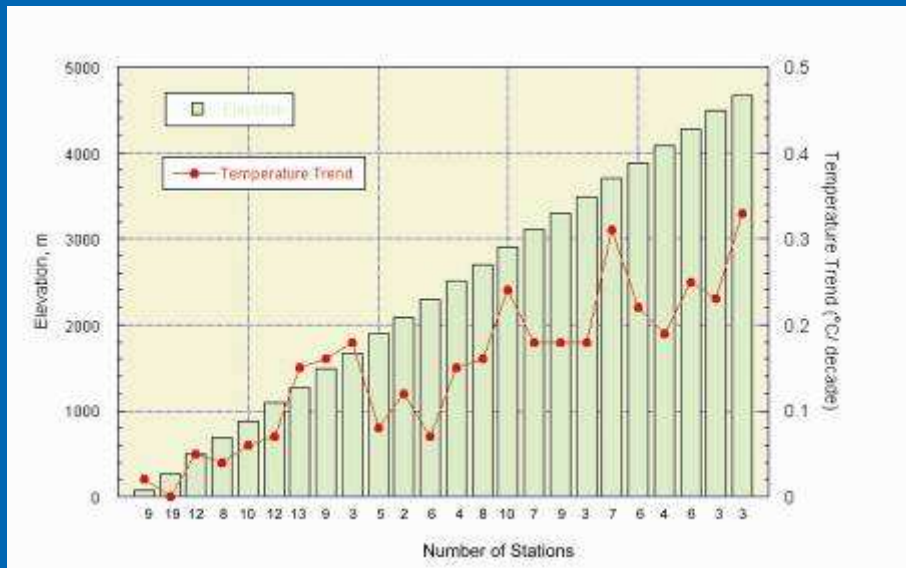
# Glacier Mass Balance



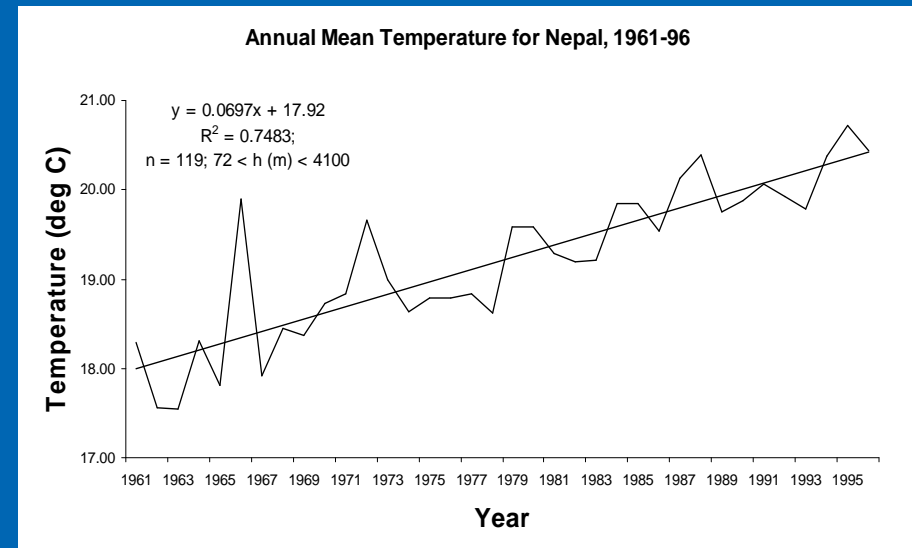
- **Himalayan glaciers are shrinking more rapidly than elsewhere**

Dyurgerov and Meier, 2005

# Temperature increases more on high altitude



(Liu and Chen 2000)

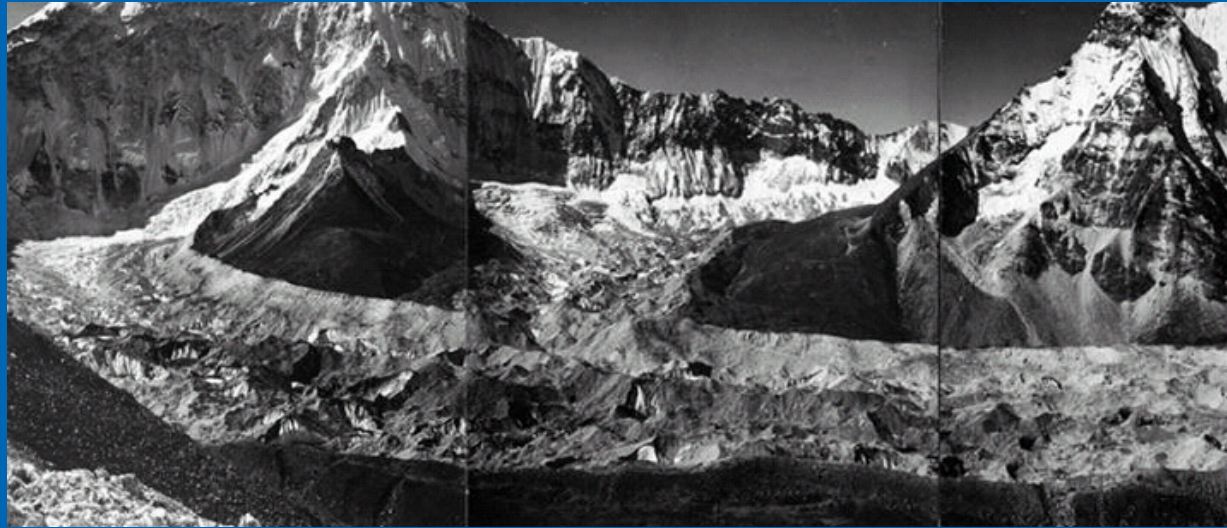


(Shrestha et al, 1999)

The temperature increase in Nepal and Tibetan Plateau is greater than global average



**Most of glacial lakes in the region are formed/developing since last half century**



**1956**

**photograph of Imja glacier  
(Photo: Fritz Muller;  
courtesy of Jack Ives)**



**2006**

**photograph of Imja glacier  
(Photo: Giovanni Kappenberger  
courtesy of Alton C Byers)**

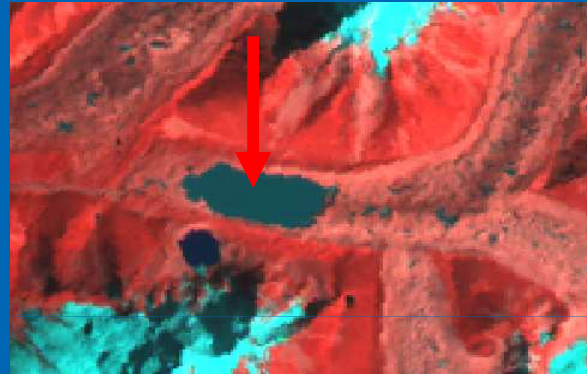
**Imja Glacier and formation of Imja glacial lake, Nepal – Repeat Photography**



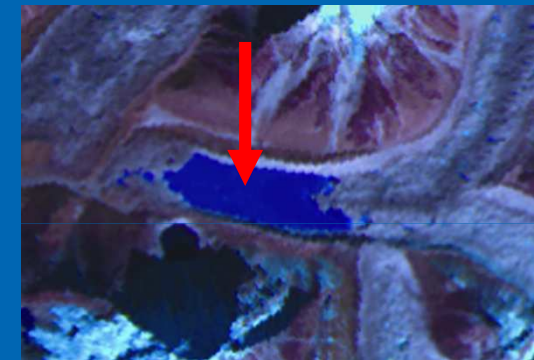
# Imja glacier of Everest region is retreating at a rate of 74m/yr



CORONA 15 DEC 1962



LANDSAT TM 1992

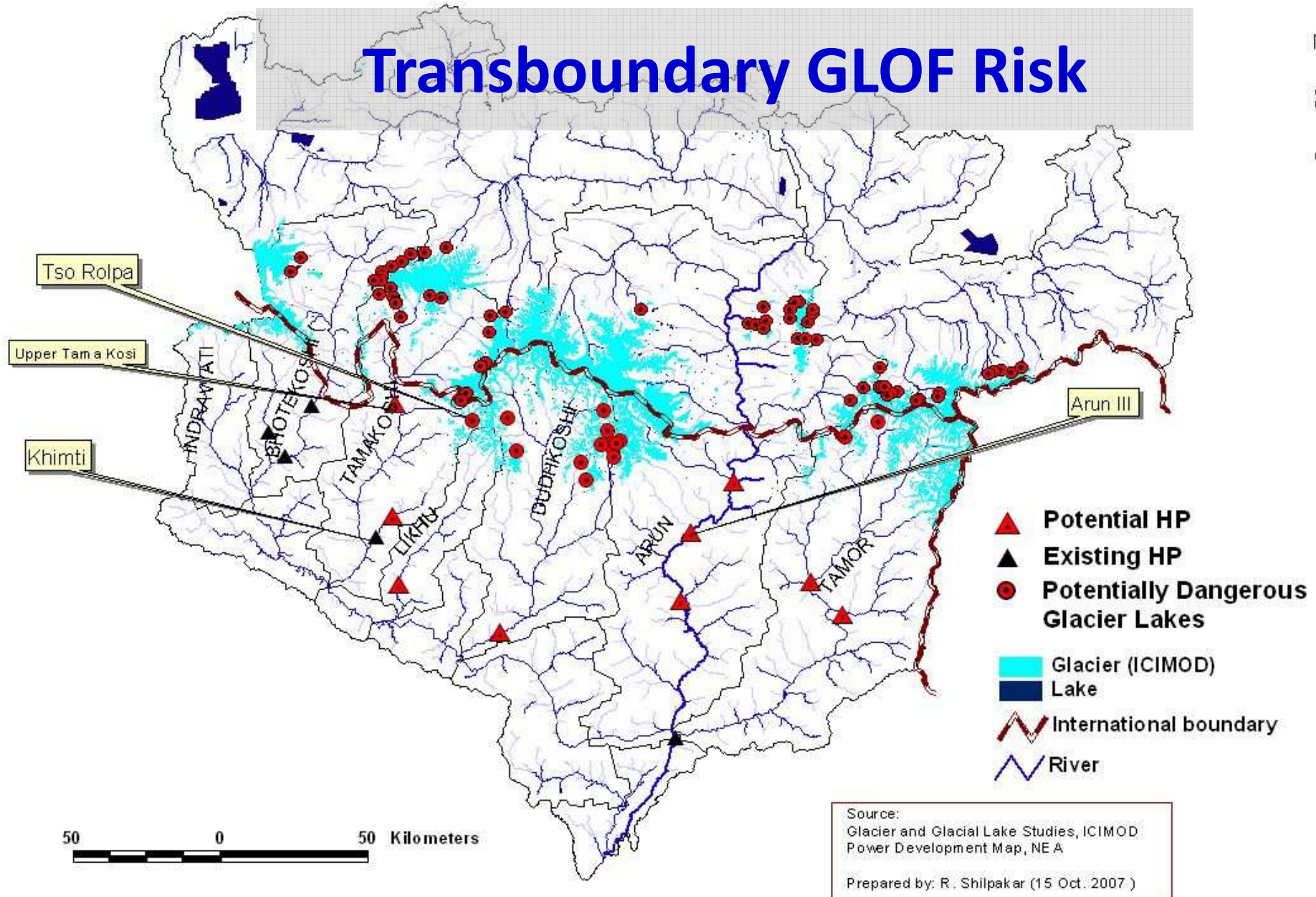


IRS LISS3 2005





# Transboundary GLOF Risk





# Scientific Uncertainty

## Under-representation of Meteorological Stations in high Himalaya



Elevation (m)	Area ( 10000 Km <sup>2</sup> )	No. Met Stati on	Density (No./10000 km <sup>2</sup> )
<b>Below 300</b>	<b>17.36</b>	<b>419</b>	<b>24.13</b>
300-1000	175.49	146	0.83
<b>1000-2000</b>	<b>175.12</b>	<b>266</b>	<b>1.52</b>
2000-3000	84.95	53	0.62
3000-4000	72.17	74	1.03
4000-5000	141.73	58	0.41
>5000	72.00	16	0.22

WMO Recommendation for  
minimum network area for 1  
station (km<sup>2</sup>) in mountain  
region:

Normal: 100-250

Difficult condition: 250-1000  
(very difficult condition: 2000)

Figure 1: Dams in 1965

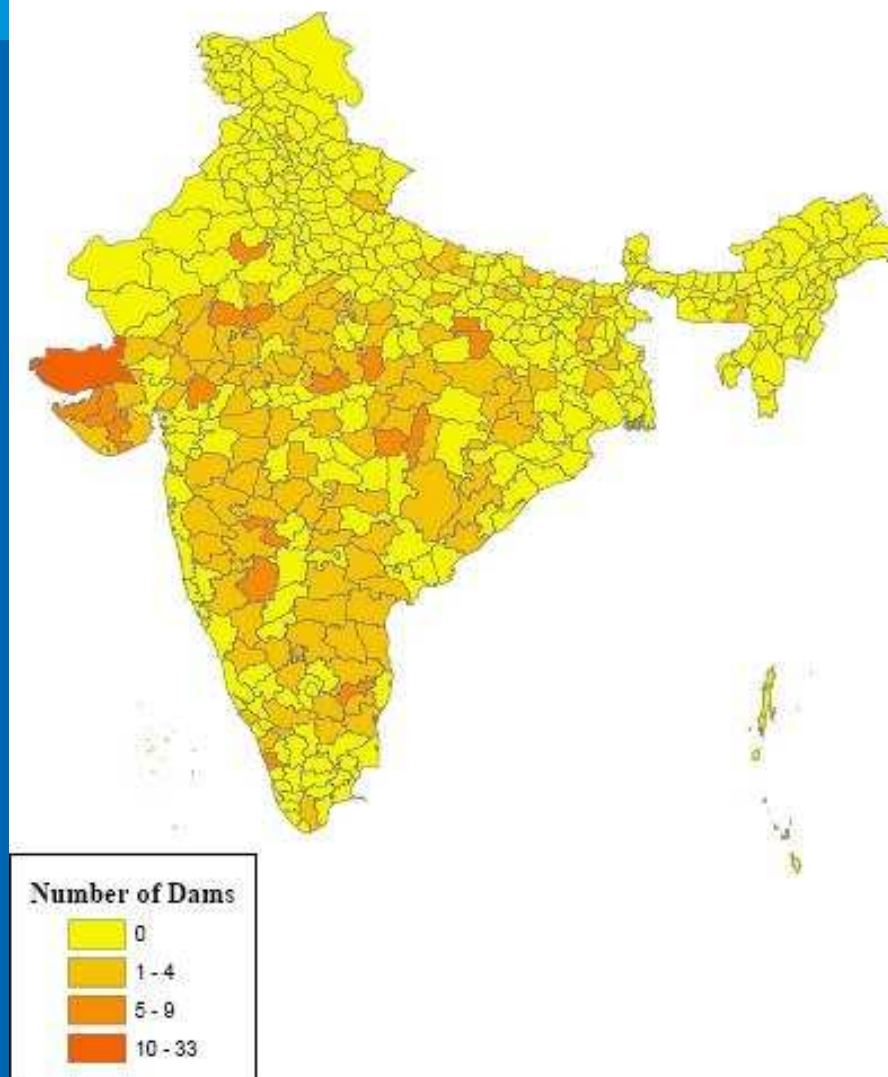


Figure 2: Dams in 1995

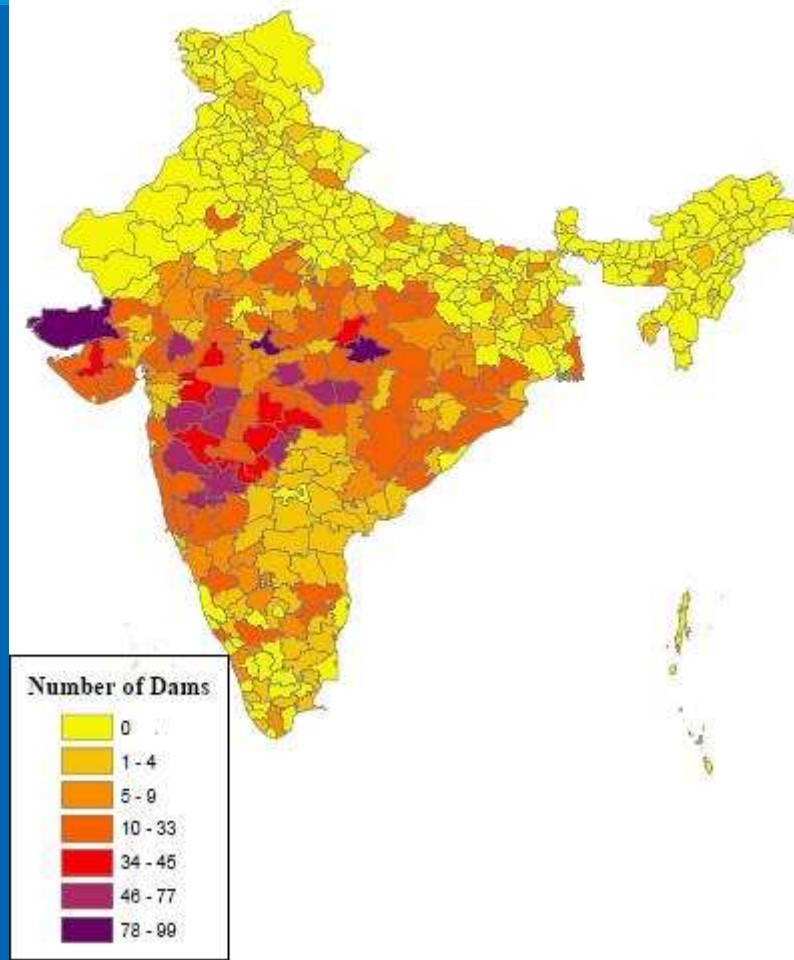


Figure 3: Average District Gradient

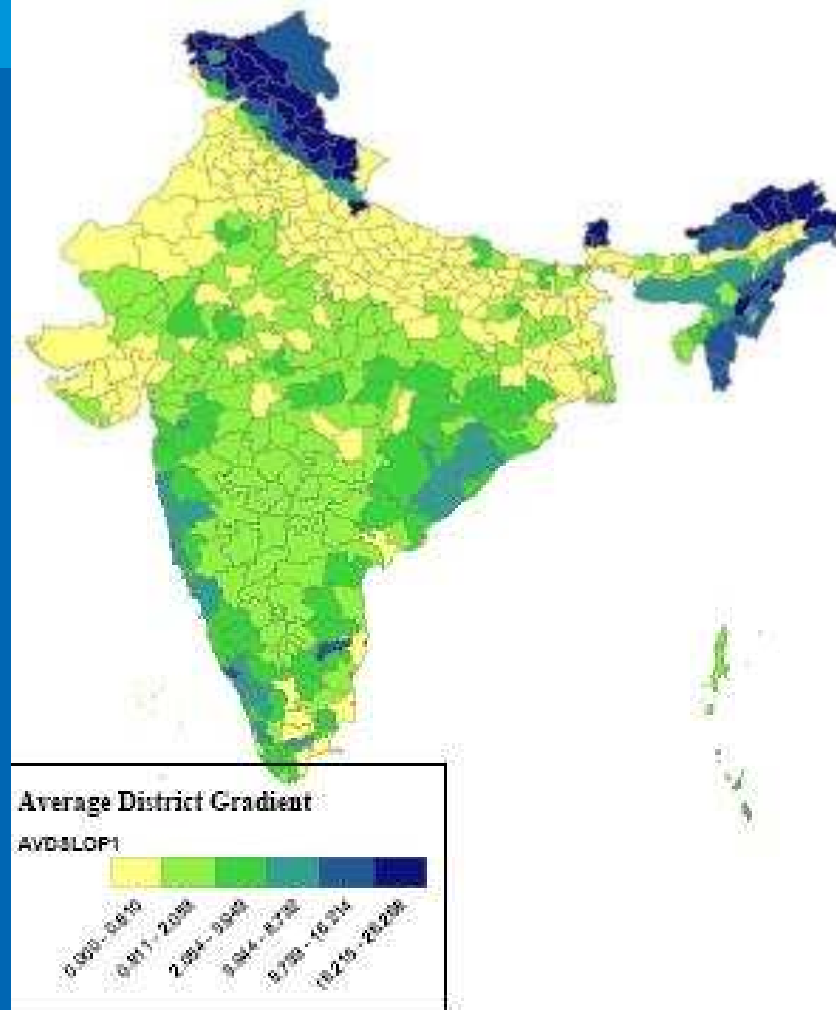
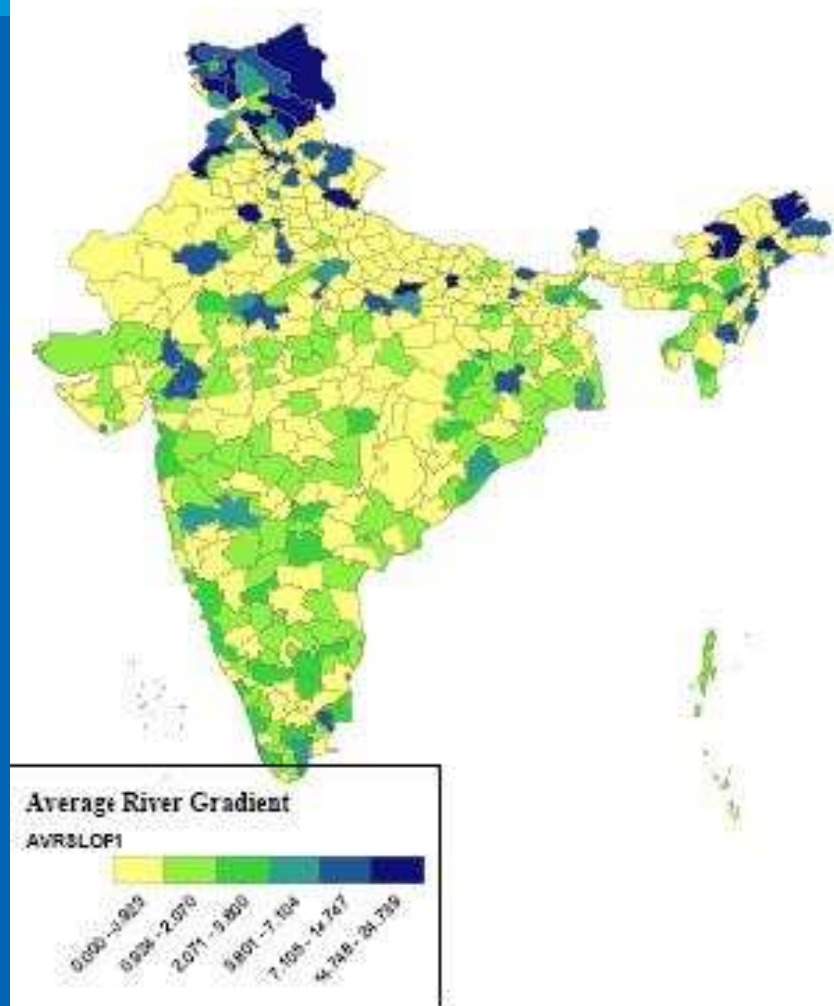


Figure 4: Average River Gradient



# Key Messages of ICIMOD Perspective Document

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- Reduce scientific uncertainty
- Reduce risk from floods and flash floods
- Support community led adaptation
- Regional cooperation for sustainable and prosperous water management
- Payment for Ecosystem Services (PES)

## UNSGAB/High-Level Expert Panel on Water and Disaster: Six Urgent Imperatives to Implement HFA

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- 1. Galvanize and mobilize before disaster strikes
- 2. Prioritize systems to forecast, inform, alert and evacuate
- 3. Incorporate DRR and climate change adaptation as integral to development planning
- 4. Improve disaster response
- 5. Provide safe water and toilets quickly when disaster strikes
- 6. Special cross-cutting initiatives



# Outline of the GLOF Presentation

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Climate change, melting glaciers, and glacial lake outburst floods (GLOFs) in the Himalayan Region

WMO/GWP Integrated Flood Management Approach

Integrated approach to GLOF risk management:

Structural measures:

An example of the Tsho Rolpa lake

Non-structural measures:

- Risk assessment exercises (hydrodynamic modeling and inundation mapping) to develop a disaster management plan
- Early Warning Systems

Participatory process involving local communities

The Way Forward



# Conclusions of GLOF Presentation

- ❑ An integrated approach could help GLOF risk management :
  - It is necessary to supplement satellite-based investigations with field-based investigations for assessing GLOF event risks and monitoring the status of glacier lakes.
  - Structural DRR measures, such as an outlet channel with regulating gate structure may help to prevent GLOF events.
  - It is necessary to reduce the vulnerability of areas downstream by implementing a disaster management plan incorporating early warning systems (EWS). Hydrodynamic models would help to estimate the travel times of peak flood. Inundation maps would help to provide information necessary for planning locations of various installations related to EWS.
  - Local communities should be involved in the risk management process.

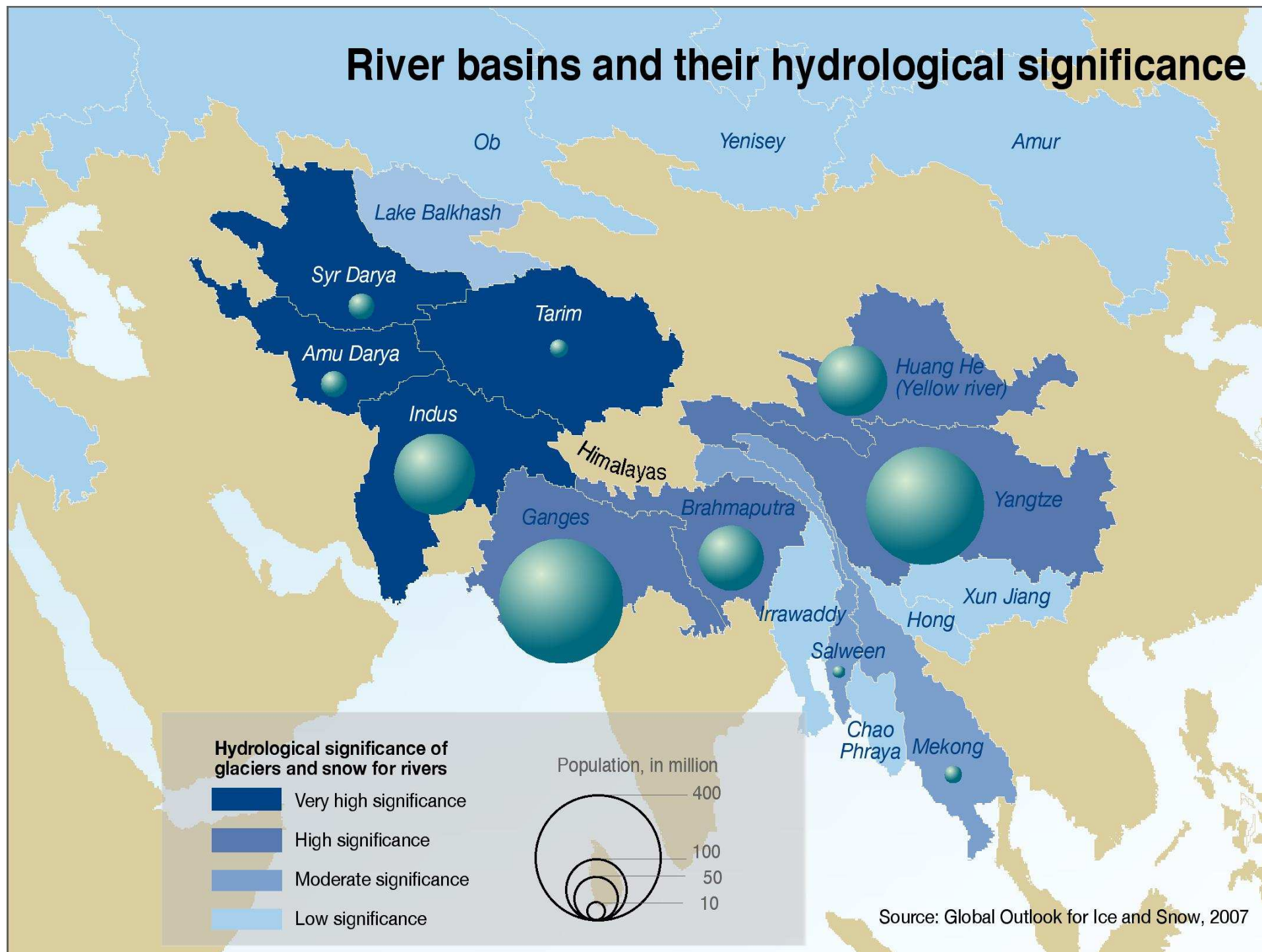
# Joint side event with FAO: Mountains as Water Towers

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- A series of presentations highlighted:
  - The importance of mountain areas for water supply
  - How climate change is likely to enhance water hazards in mountain regions and that mountain people are the first to pay the price (with their lives and lost livelihoods)
  - How reduced ice storage in the Andes impact on mountain farming
  - The importance of mountain watershed management for securing downstream water services
- The event contributed to awareness of mountains as vulnerable hotspots to climate change

# River basins and their hydrological significance





# ***WHAT DOES IT MEAN FOR FUTURE FOOD SECURITY?***



# Managing Disasters

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- Managing Water Related Risks in Changing Climate
- WMO and Korea Water Forum
- Panel discussion - six key organizations along with ICIMOD
- HKH region as a key hotspot – disaster point of view
- Water related extremes are increasing due to climate change

# Data for All – Panel discussion

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- IAHS; WMO; UNSD
- Data needs and data acquisition
- Data integration and dissemination
- Barriers to Data availability
- Blank-spot in terms of data in global climatic assessment
- Need to bridge data gap in priority basis such as the HKH region



An aerial photograph of a vast, rugged mountain range. The peaks are covered in snow and partially shrouded in low-hanging clouds. A winding road or path is visible on the left side of the image, leading through the mountainous terrain. The foreground shows a steep, snow-covered slope with some rocky outcrops. The sky is a deep blue with scattered white clouds.

**Thank You!**