

# Disaster Risk Reduction in the Hindu Kush-Himalayan Region

ICIMOD

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Basanta Shrestha  
Division Head, MENRIS

International Centre for Integrated Mountain Development

Kathmandu, Nepal

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**A regional mountain knowledge and learning centre devoted to sustainable mountain development in the greater Himalayan region.**

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[www.icimod.org](http://www.icimod.org)

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Regional Member Countries: Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan

# Climate Change in the Himalaya - an overarching issue in the region

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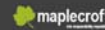


## Most Vulnerable

- Bangladesh (1)
- India (2)
- Nepal (4)
- Afghanistan (8)
- Myanmar (10)
- Pakistan (16)

## Climate Change Vulnerability Map 2011

Maplecroft assesses sub-national climate change vulnerability "hotspots" down to 20km for 172 countries by using a Geographical Information System (GIS) model. The sub-national map is based on Maplecroft's Climate Change Vulnerability Index (CCVI) 2011, which evaluates the vulnerability of human populations to adverse climate-related events and changes in major climate parameters over the next 30 years. The CCVI considers the risk of exposure to climate change and related extreme events (drought, cyclones, landslides, flooding and sea-level rise), with the degree of current sensitivity to that exposure and the ability of the country to adjust to, or take advantage of existing or anticipated stresses resulting from climate change.



## Mountains: Prone to Natural Disaster

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Floods



Flash Floods

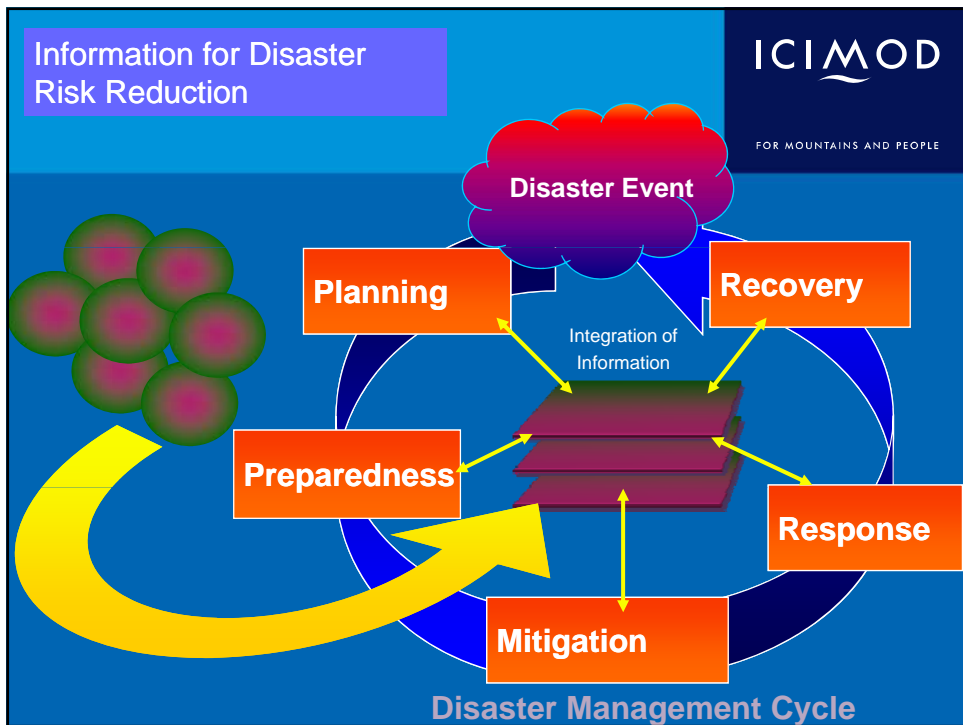
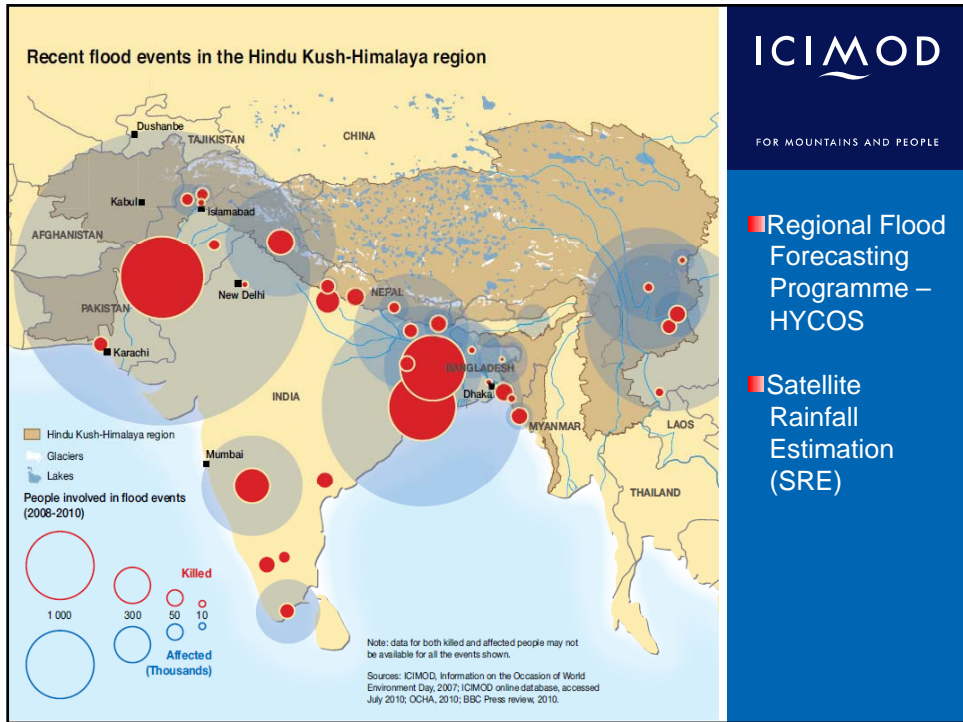


Landslides



Earthquake





# From Observation to societal benefits

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Near real time

Satellite



Tracking

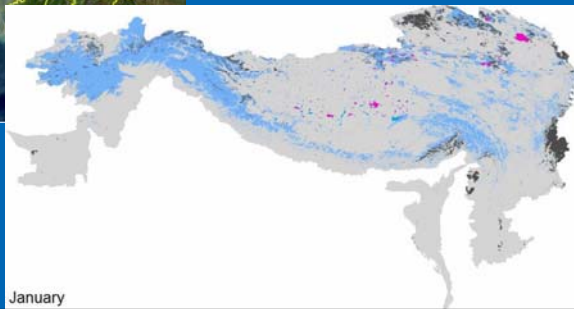
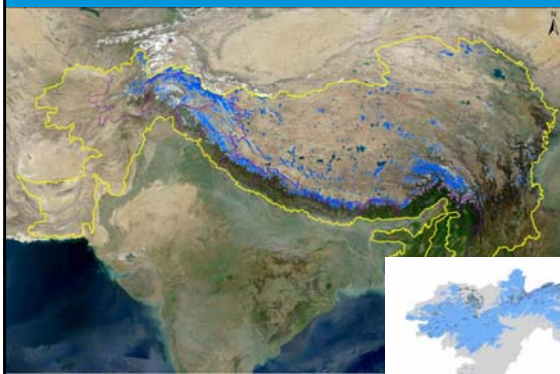
## THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



# Regional monitoring of snow and glaciers

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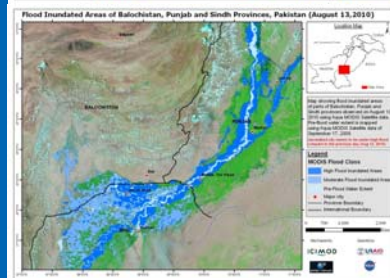
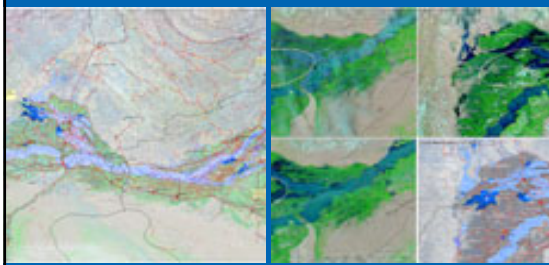
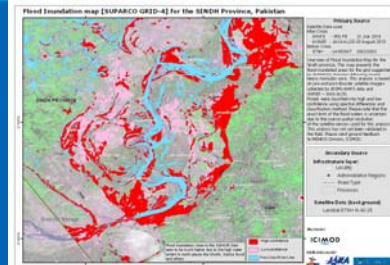


## Pakistan Floods August 2008

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- Rapid response Mapping efforts
- 39 flood maps and geodatabases were generated and supported to disaster networks in Pakistan and International organizations



## Glacial Lake Outburst Floods (GLOFs)

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### Impact of 1994 GLOF event from Luggye Tsho in Bhutan



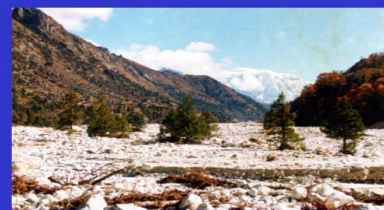
Punakha Dzong was not built on island



This sacred temple was not built on island



People do not transport logs this way in Pho Chu



Forest does not grow well in such river bed

Locations often have trans-boundary implications

## Simulation of Imja GLOF

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## Monitoring of Imja Glacial lake

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- Wi-Fi Mesh-network
- Web Server
  - ✓ Measurement
  - ✓ Device Control
- Sensors (up to 24ch)
  - ✓ Air temp.
  - ✓ Humidity
  - ✓ Solar Radiation, UV
  - ✓ CO<sub>2</sub> concentration
  - ✓ .....tolerate the cold weather
- Camera (0.3-8M Pixels)
- Solar-cell
- LED Lighting





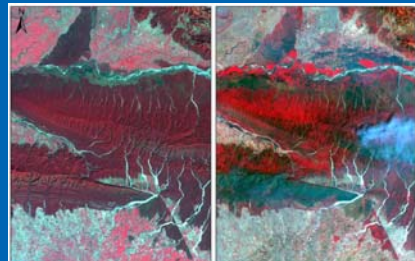
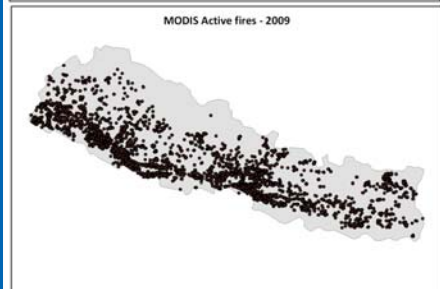
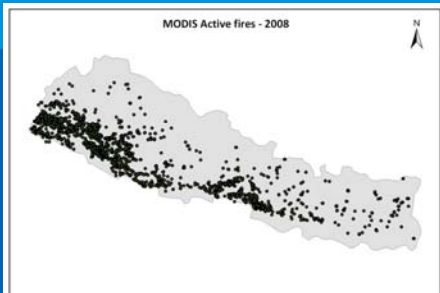
## Landslides and Debris Flow



## Forest Fires Detection and Monitoring

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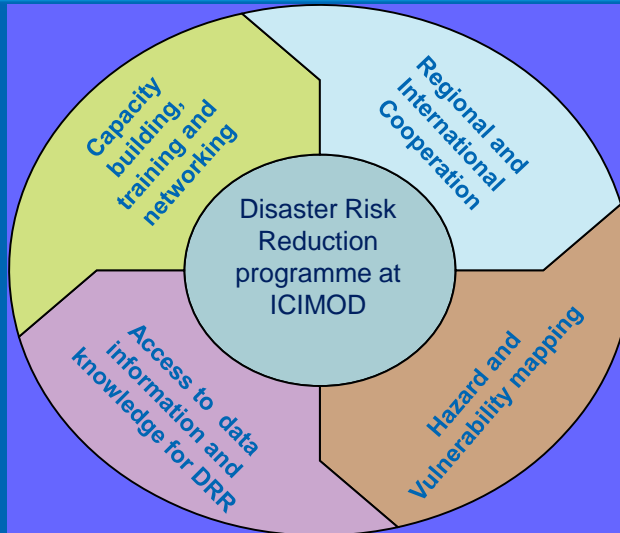
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## Regional cooperation for disaster risk reduction in the HKH region

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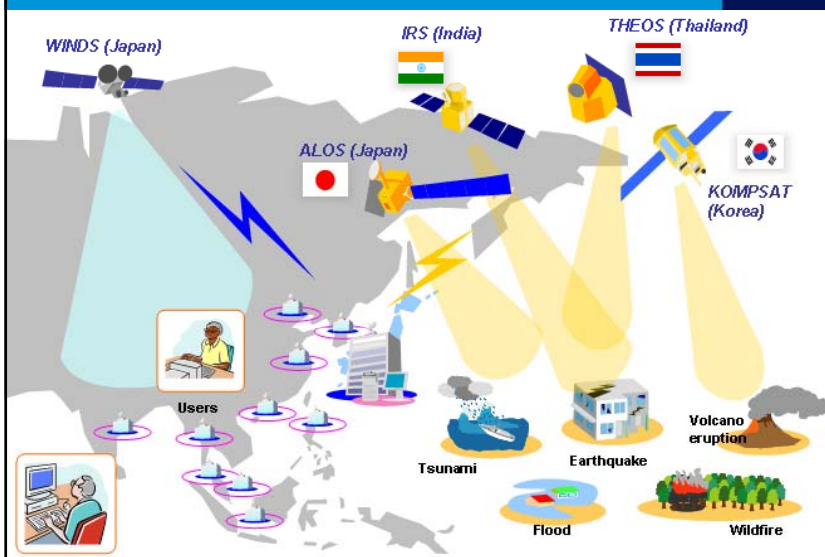


- Bridge the gap between technology and disaster management communities
- Improve coordination and communication with regional and international stakeholders
- Identify gaps and strengthen national institutions on DRR
- Regional Gateway / Platform for DRR

## JAXA's WINDS Station

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# SERVIR-HIMALAYA

Regional Visualization and Monitoring System

SERVIR is an earth observation, monitoring, and visualization system that integrates satellite and other geospatial data for improved scientific knowledge and decision-making by managers, researchers, students, and the general public.

Thank You for Your Attention !

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Enhancing resilience  
of Mountain  
Communities

