



The 5th GEOSS Asia - Pacific Symposium
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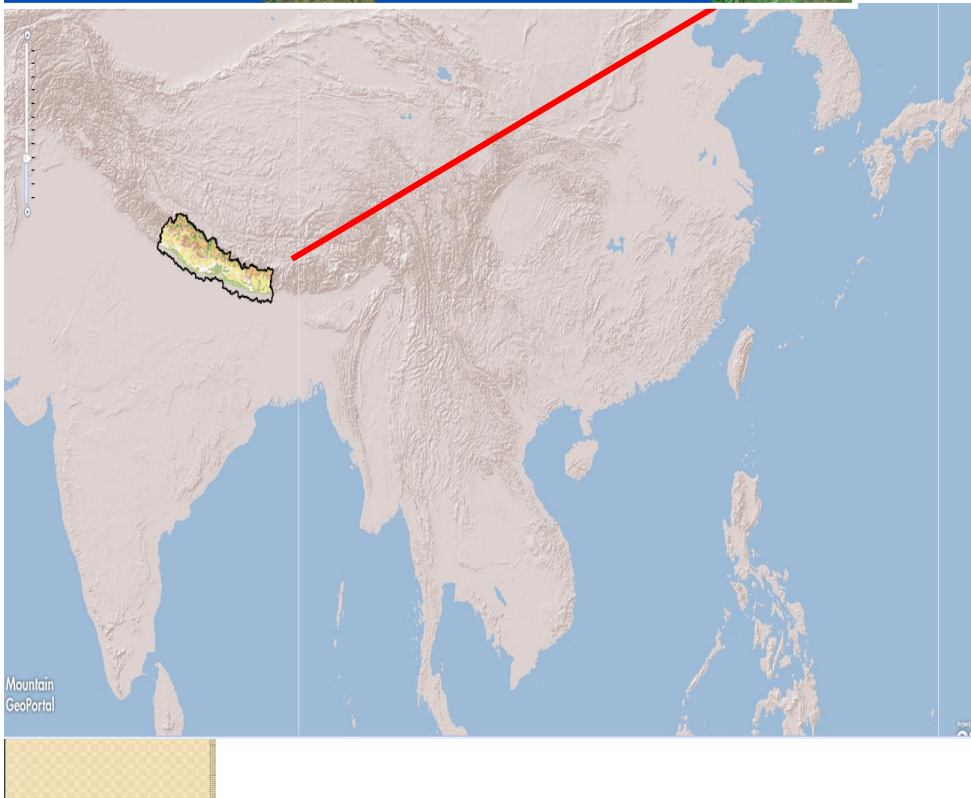
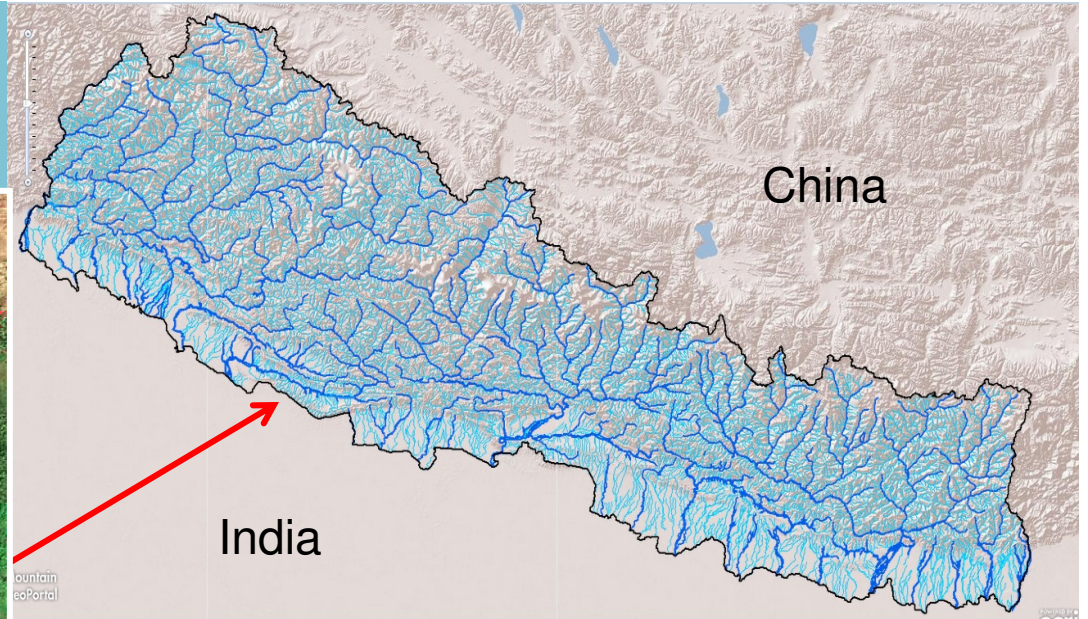
AWCI Implementation Plan 2 - Country
Input: Nepal

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Nepal: At Glance



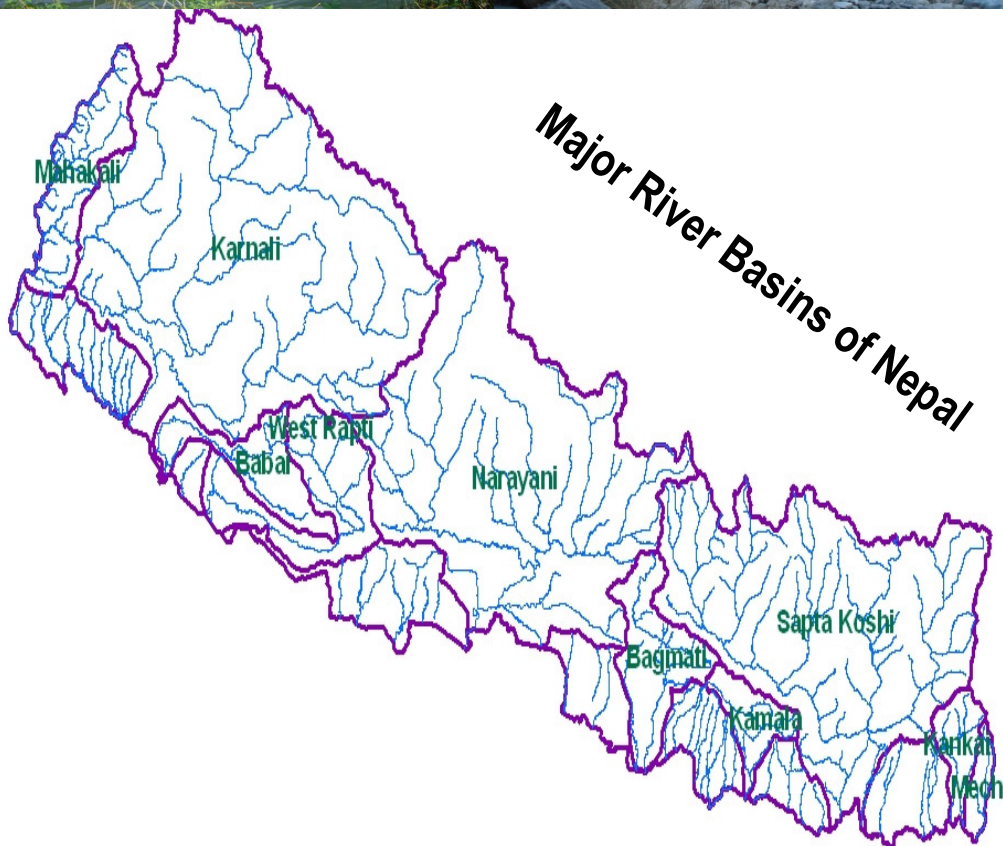
- Area – 147181 Km²
- 3 Ecological zones : Himalaya, Mountain & Terai
- Approx. 6000 Rivers and rivulets with drainage area 194471 Km² (76% in Nepal)
- 33 Rivers with CA > 1000 Km²
- Elevation – 8848 m to 64 m from AMSL

Nepal: Unique Country

- Inaccessibility
 - World's highest peak & deepest gorge with very high degree of inaccessibility
- Verticality
 - Extremely rugged terrain with high topographic variations within short distance
- Fragility
 - Youngest geological formation & fragile mountain ecosystem
- Diversity
 - Diverse physical climatic & social Conditions



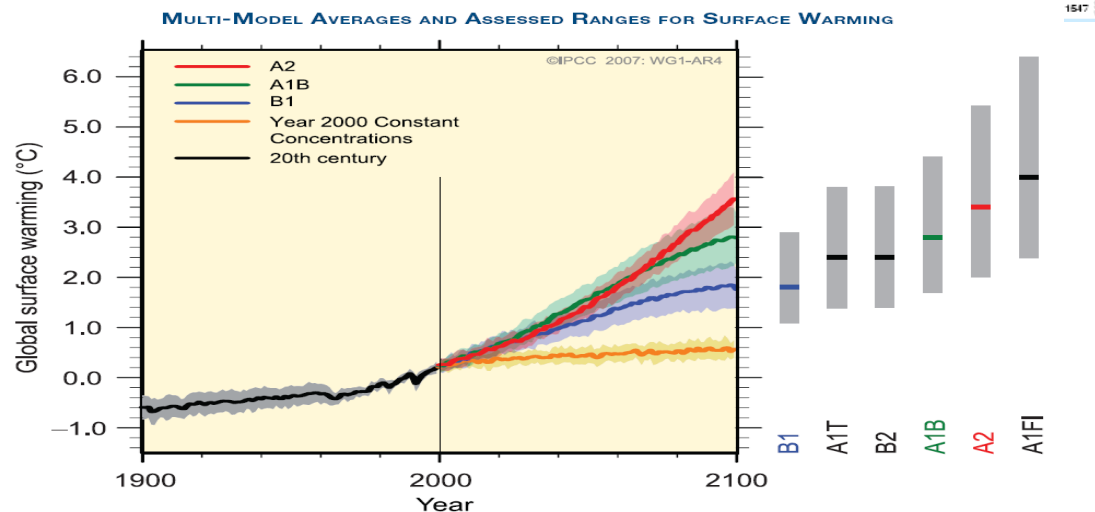
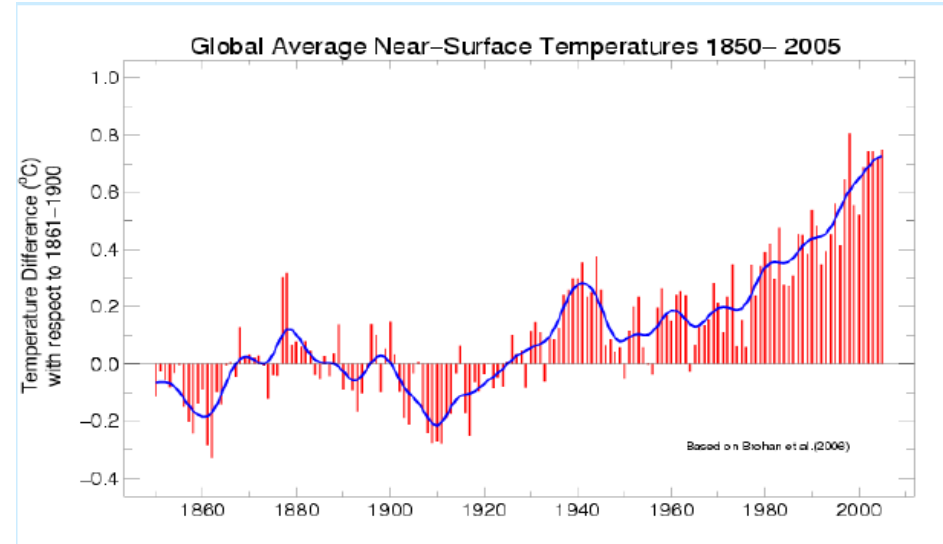
Nepal : Water Resources



- Three types of Rivers
 - Perennial with snow fed: Koshi (60400 Km²); Narayani (34960 Km²) ; Karnali (43679 Km²) & Mahakali (15260 km²)
 - Rivers Originated in mid hills, fed by precipitation & GW
 - Small rivers originated in southern siwalik range, flow during monsoon
- Annual surface Water availability : 225 BMC
- Annual rechargeable GW: 11.5 BMC
- Annual Avg. Precipitation: 1857 mm
- Avg. drainage density: 0.31/km² and total length of streams: 45000 Km

Climate Change: Nepal

- Earth – warmed by 0.7°C since 1900
- Nepal : Temp increase
 - 0.09°C in Hill
 - 0.04°C in Terai
 - Increase air surface temp during winter than in summer
- No distinct long term trend in precipitation



Climate Change : Nepal

- **Nepal :- 4th the most climate vulnerable country due to**
 - fragile and young geology
 - its extraordinary geography
 - largely poor and resource dependent population
 - weak institutional capability to manage the range of climate challenges
- **Climate Change risks:**
 - **Water: Extreme floods; landslides; GLOF; and droughts**
 - **Agriculture and Food Security**
 - **Eco – System Health**

AWCI Phase 2 Implementation Plan: Nepal

- **Issues and Needs**
 - Temperature – in rising trend
 - intensification of variability (intense rainfall)
 - high frequency of extreme events e.g. floods, dry spell
 - seasonal climate pattern – wet and dry season period shifting
- **Available capability/Resources:**
 - 282 No Meteorological stations, 51 No. Hydrological stations over country, 9 no of real time data stations
 - Appreciable no of Trained manpower

AWCI Phase 2 Implementation Plan: Nepal

- **Lack of capability**
 - less intensive monitoring network in alpine areas
 - Lack of understanding of modeling techniques
 - In-house capacity building
 - Lack of accurate and long period length data
- **Critical and specific Issues**
 - Landslide and river bank erosion
 - Debris Flood, Flash flood
 - Retreat of glaciers and glacier lake – GLOF
 - Depletion of ground water
 - Trans boundary and international coordination – Narayani and Koshi; Karnali trans boundary rivers

AWCI Phase 2 Implementation Plan: Nepal

- Non availability of water for hydropower and irrigation
- Shifting snow residency, melting period and snow line
- **Issues related to Water Nexus**
 - Agriculture – water scarcity, crop failure
 - Energy – reduce hydropower production
 - Urban – inundation, water supply & quality, ground water depletion,
 - Health – water borne diseases
 - Infrastructure – design and management

AWCI Phase 2 Implementation Plan: Nepal

- **Needs for functions/tools of WCI**
 - **In-situ telemetric network (mountain)**
 - **Access to remote sensing data**
 - **Understanding of physical based modeling technique**
 - **Common platform for sharing data and knowledge and exchanging ideas and experiences**

Implementation Modality

- **Framework development approach – Introducing legislation-high level coordination- research promotion- improvement awareness- private sector involvement**

AWCI Phase 2 Implementation Plan: Nepal

- **Strategic Approach**

- **Showcase: Background, objectives, achievements**
- **Demonstration: regional and general commonality**
- **Expansion of AWCI demonstration studies- sharing experiences**

Technical Approach

- **Understanding climate change assessment – detail assessment – model – demonstration – mainstreaming – creation of regional knowledge**

AWCI Phase 2 Implementation Plan: Nepal

- **Additional Resources/Collaborators**
 - **Collaborators:**
 - **Local and National level of Government offices
NGO/INGO, Consultants;**
 - **Universities and Research Institutes,**
 - **Regional Universities; Institutions**
 - **Financial**
 - **Government, Donor Agencies; Private Sectors**
 - **Human Resources**
 - **Government officials, Researchers, Consultants,
Private Sectors**

Collaborators

Collaborators Field	Local	National	Regional	Worldwide
Research	Local level Offices of GoN (line agencies), NGOs/INGOs, Universities Students	Universities, Engineering Institutes, Research Institutions, National level GoN Offices (DoI, DHM etc)	AWCI, Regional Universities, SARC, ICIMOD, IWMI	UNU, UT, JAXA, NASA
Operation	District / Regional level Offices of GoN, NGOs/INGOs	Related Ministries of GoN	AWCI, SARC, Regional Universities, ICIMOD, IWMI	UN, UT
Administration	District / Regional level Offices of GoN, NGOs/INGOs	Related Ministries of GoN	AWCI, SARC, Regional Universities, ICIMOD, IWMI	UN
Financial Resources	Private Sectors, Government	Government, Donor Agencies,	UNDP, DFID JICA, ADB	WB, IMF, IFC
Human Resources	Government Officers, Consultants, NGO/INGOs, Universities Students	Government Officers, Consultants, Researchers	Human resources from collaborating countries	Human resources from collaborating countries

AWCI Phase 2 Implementation Plan: Nepal

- **Specific request to GEOSS/AWCI**
 - **Inventory: Water Resources Inventory and glaciers inventory**
 - **Future scenarios of GCM/RCM output for Nepal river basin**
 - **Distributed Hydrological Modeling techniques**
 - **Access to Satellite and radar data**
 - **Establishment of Regional data centre**

Thank you

