Nepal

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Country Report: Nepal

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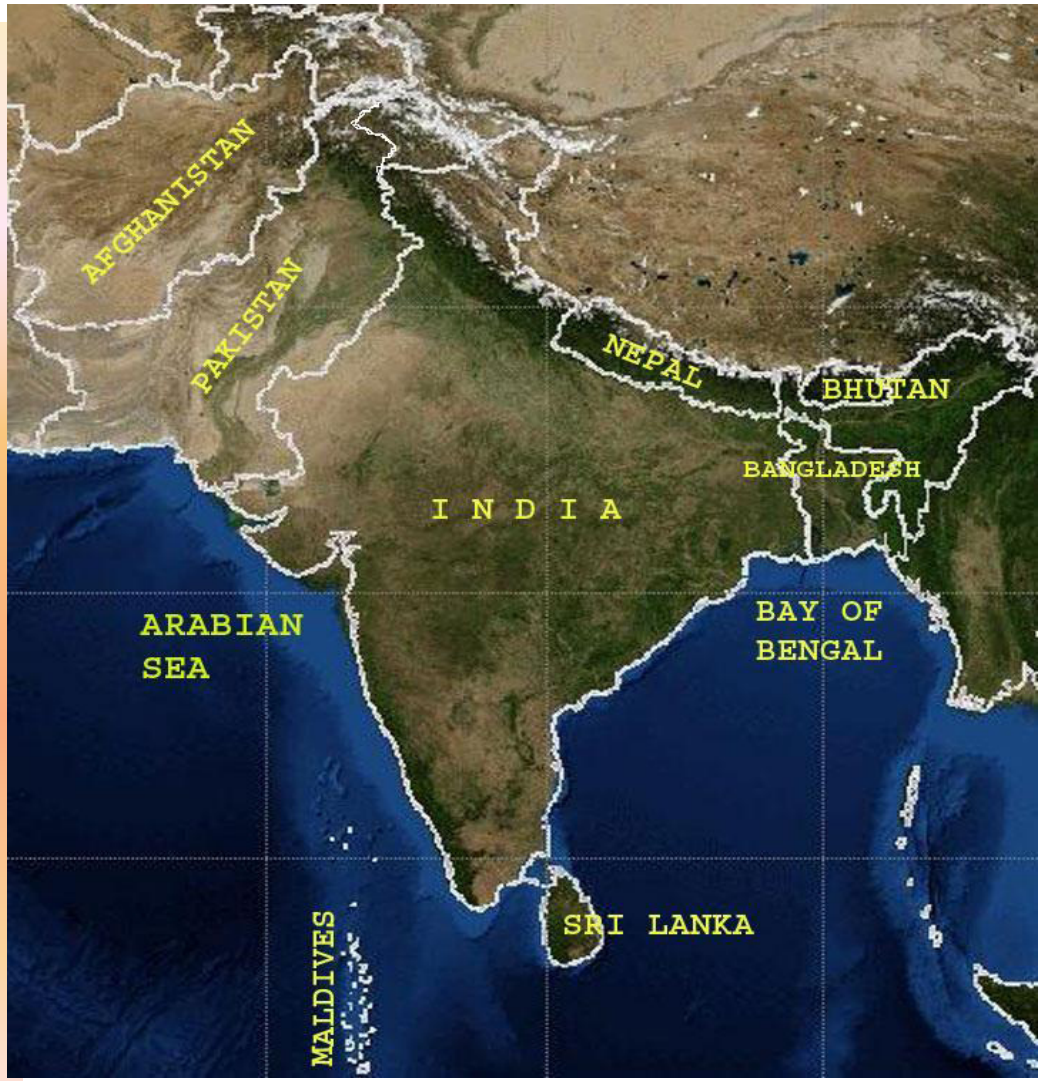
NEPAL : COUNTRY PROFILE

- Total Area – 147,181 Sq. Km
- Located between – Latitudes 26^0 22’ and 30^0 27’; Longitudes- 80^0 40’ and 88^0 12’
- Rectangle in Shape – average length in east west direction 885 km and average width – 193 km
- Mountains cover 44 %; Hills – 30% and Terai – 26%
- Population – 23.15 million with growth rate 2.25
- Average per capita GDP $470
- Agriculture – 40% on national GDP



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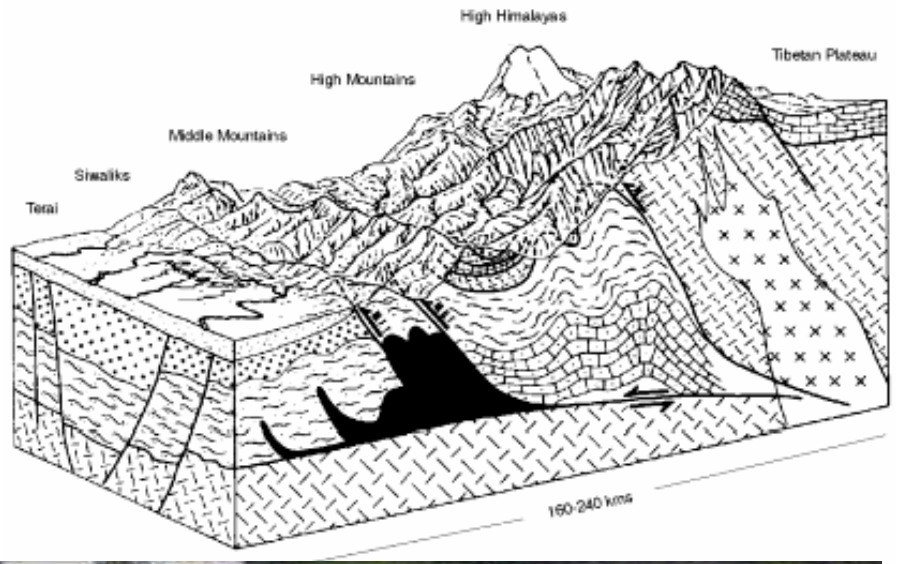
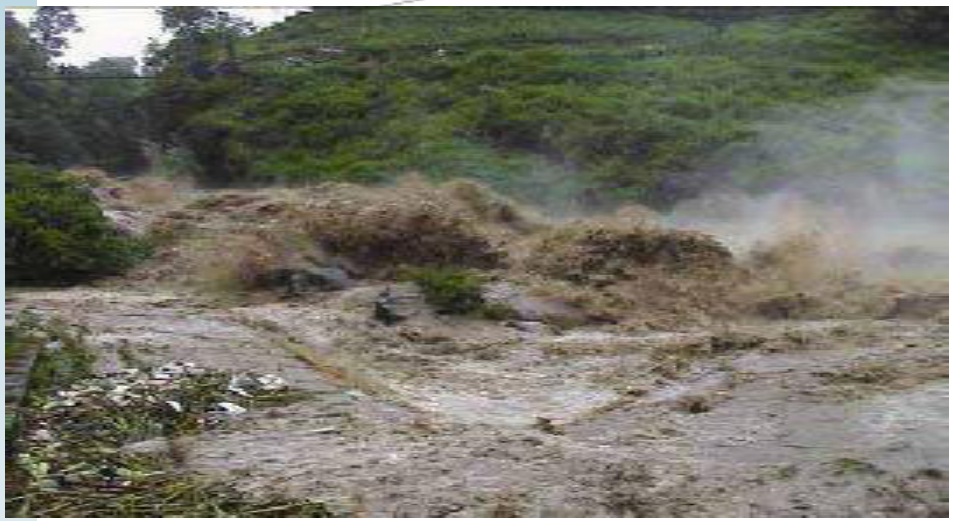
Nepal: Climate

- Four seasons (spring, summer monsoon, autumn, winter)
- Temperature: 15°C mean – Varies by altitude
- Rainfall: 1875.60mm
- – Uneven distribution
- Most floods in the monsoon season





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Nepal: Climate

- Rainfall – dominated by south easterly monsoon

Items	Monsoon	Post Mon	Winter	Pre Mon	Annual
Rainfall (mm)	1478.2	79.0	64.9	235.4	1857.6
% Rainfall	79.58	4.25	3.49	12.68	100

- Rainfall contributes 267 MCM of water annually (26.7 MCM – Snow; 240.3 MCM – Rain)

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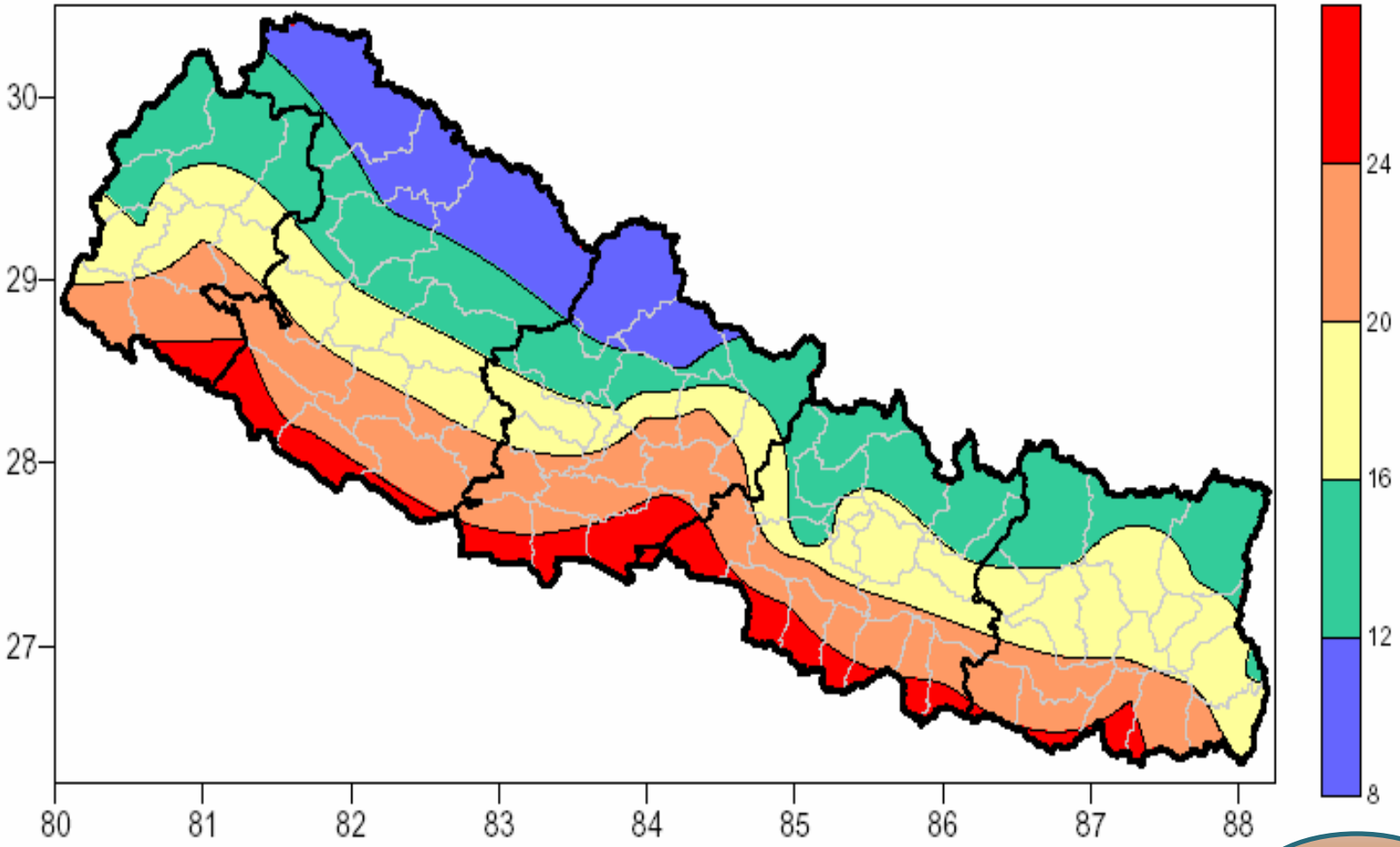
Spatial Variation of mean Annual Temperature



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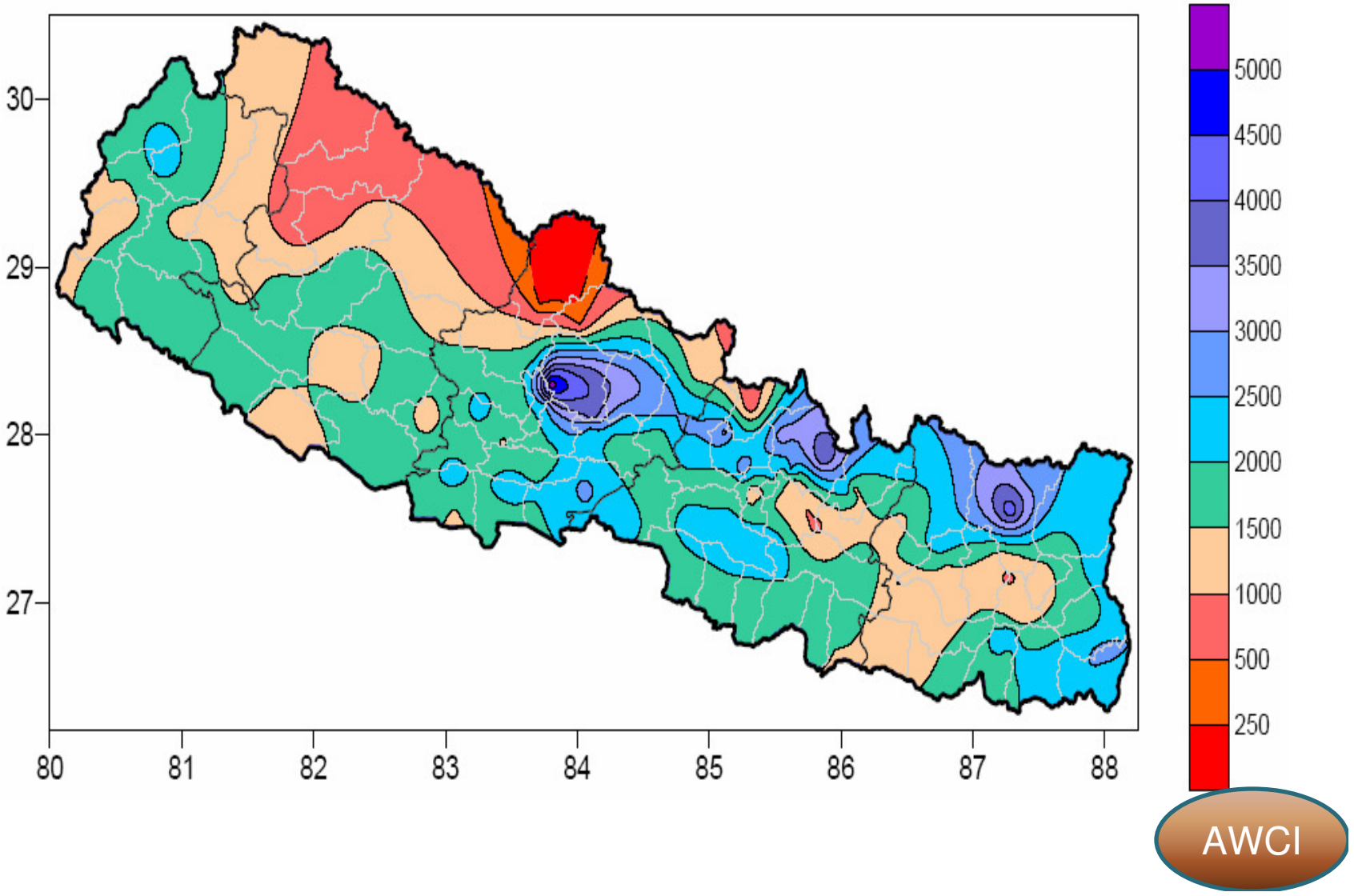
Annual mean Rainfall distribution



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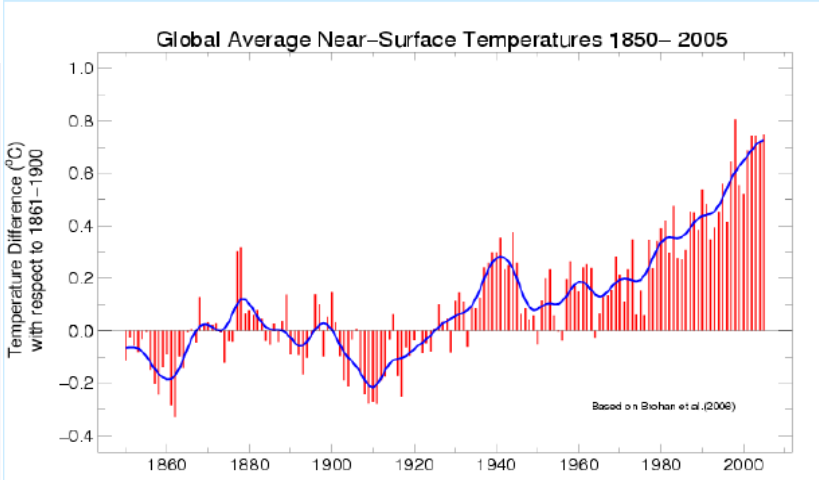
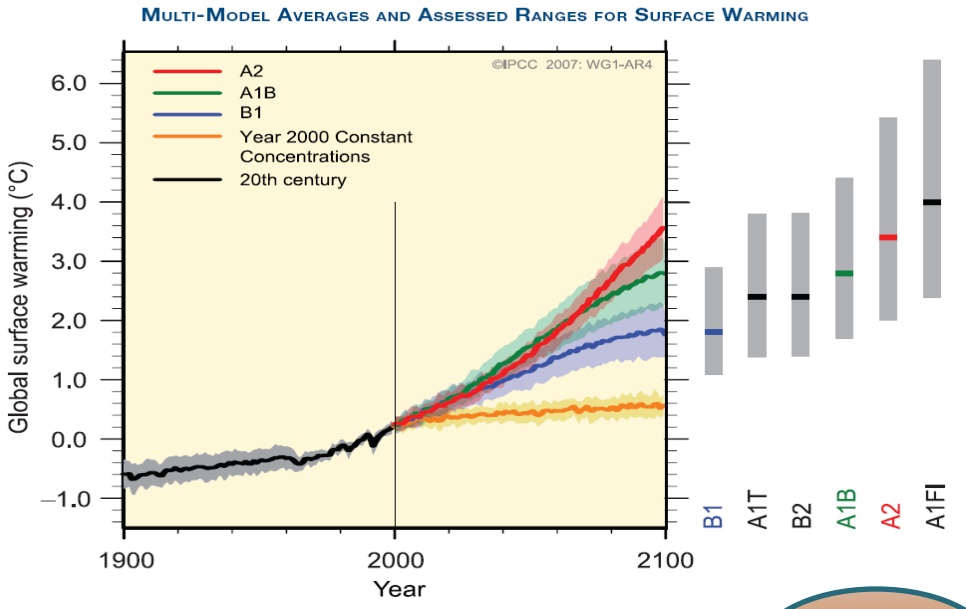
Nepal: Climate Change

- Earth – warmed by 0.7^0c since 1900
- Nepal : Temp increase
  - 0.09^0c in Hill
  - 0.04^0 C in Terai
  - Increase air surface temp during winter than in summer
    - No distinct long term trend in precipitation





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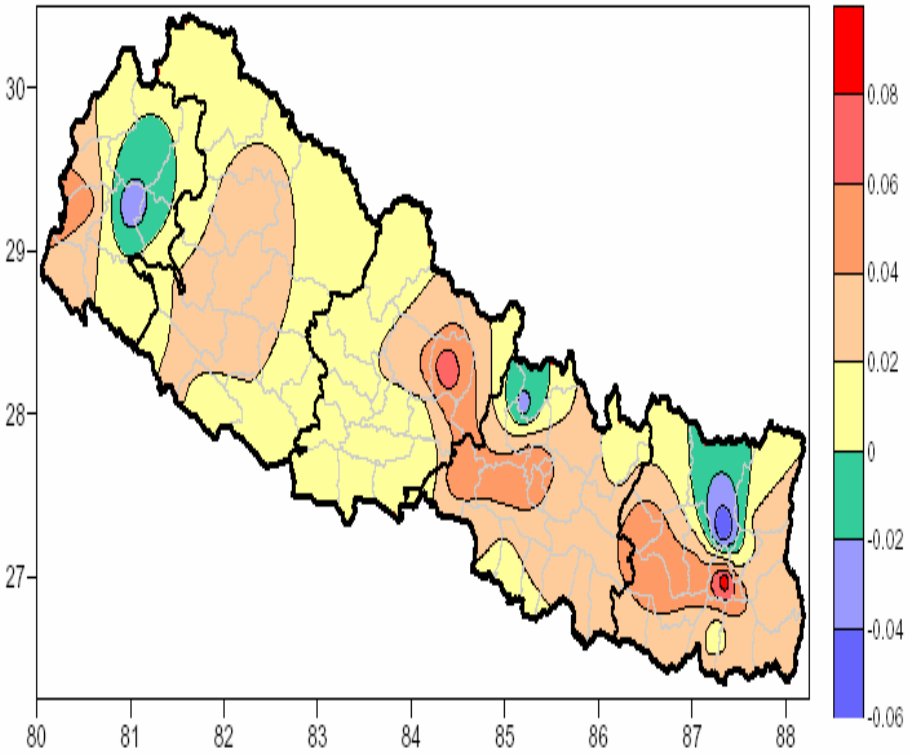
Spatial variation of annual mean temperature trends ^{0}C

(45 stations 1976 -2005)

- Consistent and continuous warming at annual rate of 0.04^0 c/yr
- Warming trend all over country but not uniform spatially
- Some part has decreasing trend with -0.06^0c/yr



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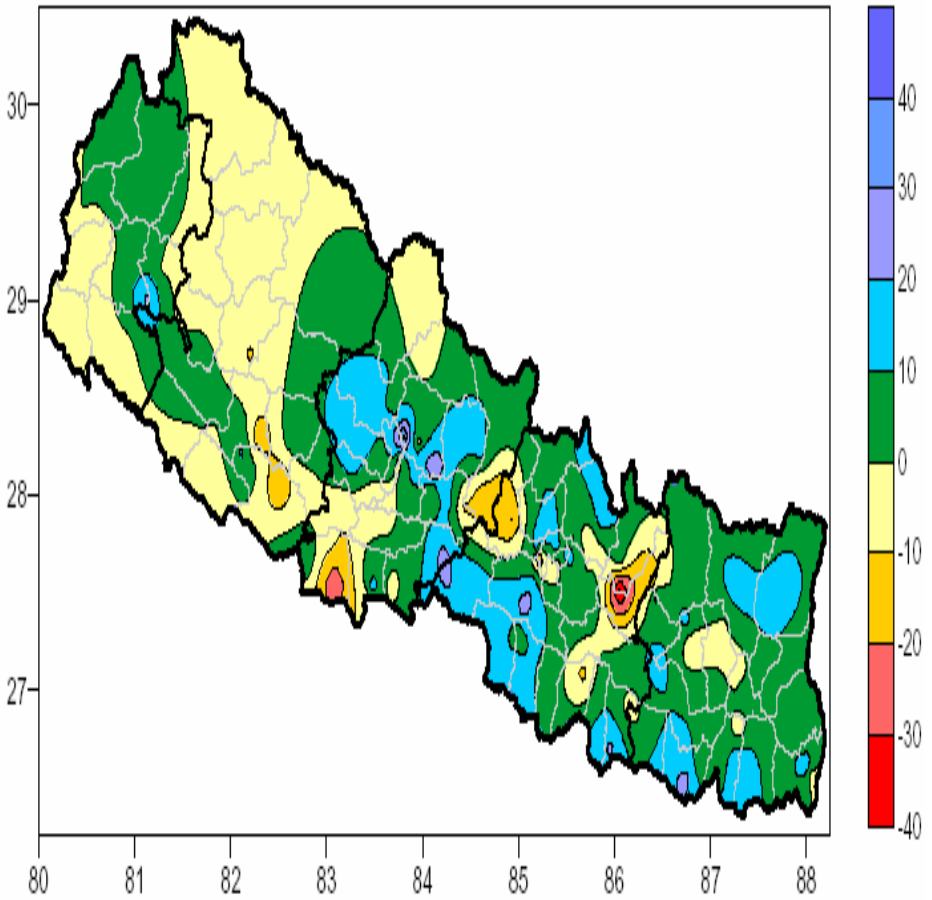
Annual Precipitation Trend (mm/yr)

- No any significant trend
- Overall Increase by 3.6 mm/yr
- Observed even 40 mm/yr increase in Kaski
- Observed even -40 mm/yr decrease in Dolakha



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Nepal is Vulnerable to Climate Change

- Fragile mountain ecosystem
- Lack of appropriate mechanisms to response its implications
- Nepal's Mountain highly sensitive to climate change
- Country is the under developed and its economy is entirely based on agriculture

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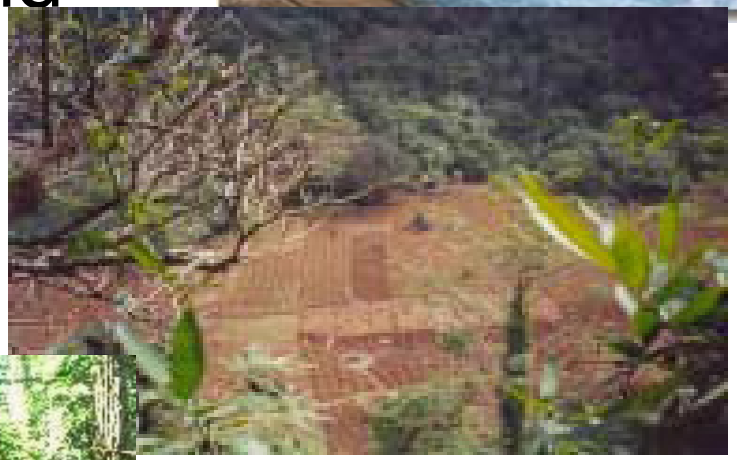
Sectors Vulnerable to Climate Change

- Water resources
- Agriculture and food security
- Natural ecosystem and Biodiversity
- Health
- Energy



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Water induced Disasters in Nepal

- Glacial Lake Outburst Floods
- Floods and Landslides
- Landslide Dam Burst
- Avalanches
- Flashfloods
- Bank Erosio

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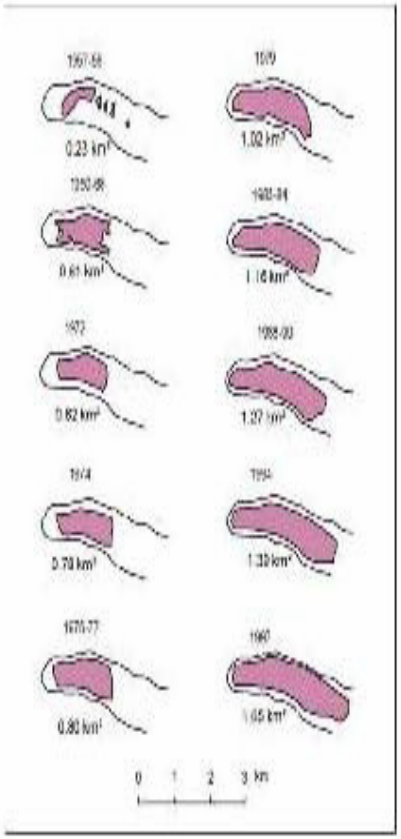
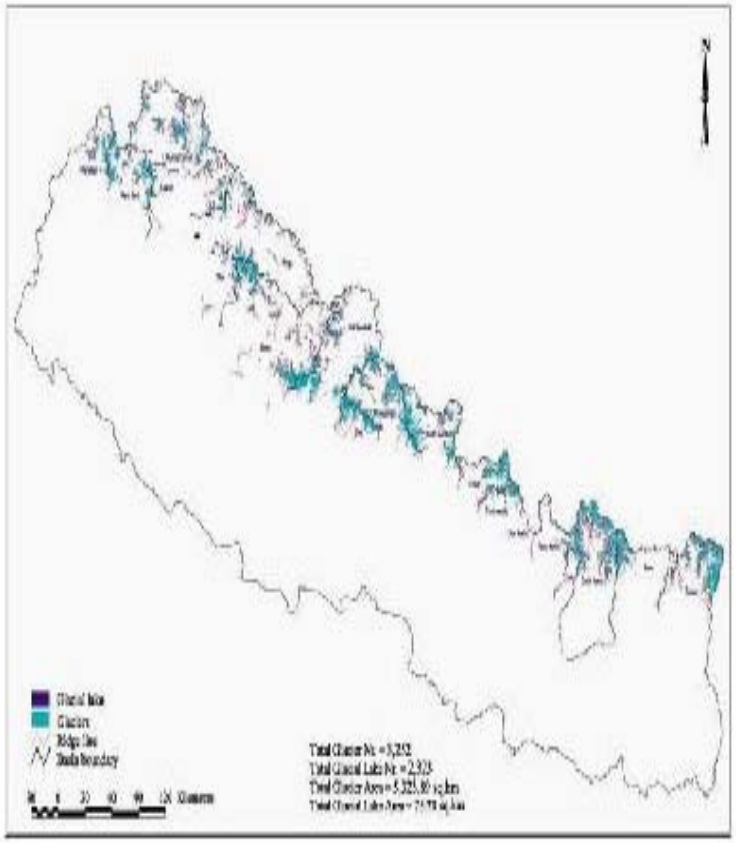
Glacial Lake Outburst Floods





- 3,252 glaciers and 2,323 glacial lakes
- 20 Potential GLOF sites

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Landslide Dam Burst Flood in CCAA Basin (5th May 2012)

-Death Toll : 31 Nos
- Missing : 40 Nos

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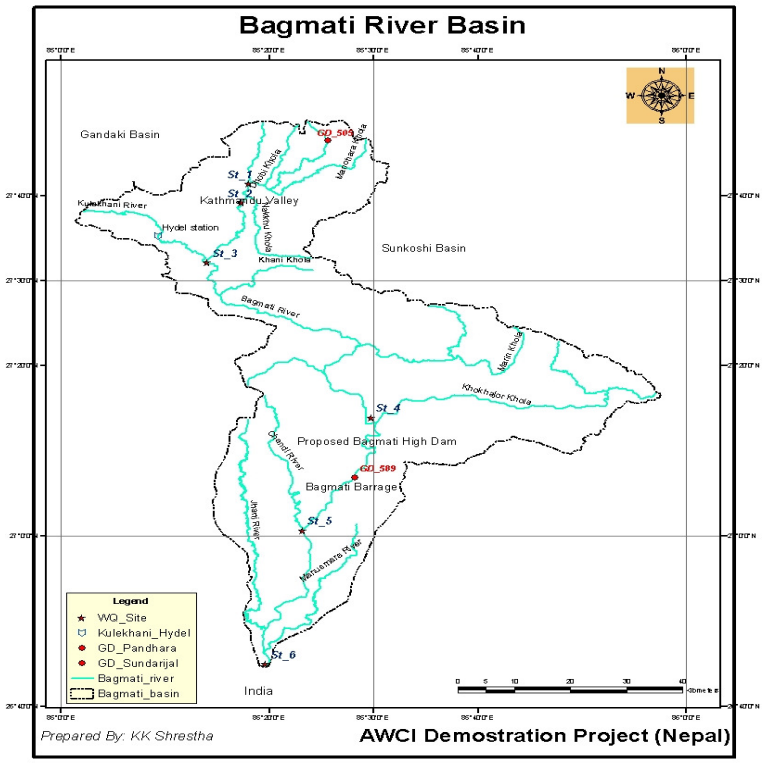
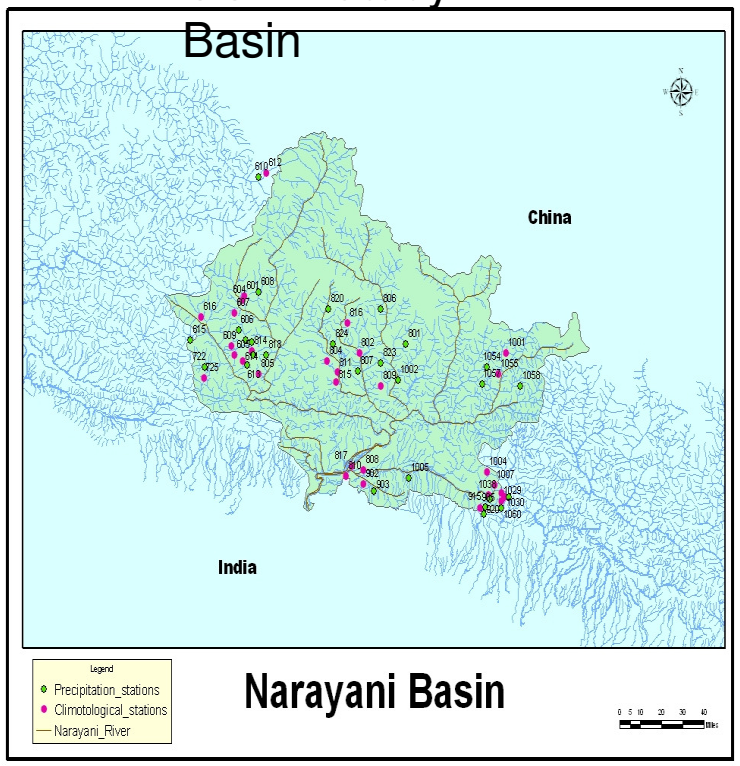
Nepal activities in AWCI

Demonstration Basin



CCAA Study Basin



Proposed PDM is prepared for Bagmati River Basin

Overall goal: Reduction of hydrological and meteorological disasters
and effective uses of water resources

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Bagmati River Basin

Problem to be addressed:

- Upper Reach of the Basin
  - Flood Damage, Landslides, Bank Erosion
  - Water pollution
  - Maintaining minimum regular flow in dry period
- Lower reach of the Basin
  - Flooding, Inundation, Bank Erosion
  - River Bed Rising
  - Drought damage on food security

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Bagmati River Basin

Measures to be taken:

- Enhance quantitative and qualitative water cycle observation in the basin
- Demonstrate flood and drought early warning system
- Assess climate change impacts
- Prototype data and information integration and sharing system
- Enhance observational, modeling and application capability
- Contribute to National climate change policy

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Bagmati River Basin

Outputs:

- Enhance qualitative and qualitative water cycle observation
  - Prototype near-real time rainfall observation and data dissemination systems by coupling satellite and in-situ measurements which is used as inputs into flood prediction.
  - Develop comprehensive in-situ and satellite observation data archive for improving monitoring capability of water cycle and developing hydrological models to be used for early warning.
  - Develop long-term and comprehensive climate observation data archive which is used for climate change analysis climate projection model bias correction.

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Outputs:

- Demonstrate flood and drought early warning system
  - Develop hydrological models for converting meteorological data to hydrological information.
  - Prototype real-time data management, modeling and information dissemination systems.
- Assess climate change impacts
  - Select GCMs which can express the regional climate properly.
  - Implement bias correction and downscaling (statistical- and dynamic-) of the selected GCMs.
  - Develop socio-economic data archive
  - Compare changes of frequency and intensity of flood, drought and water-nexus.

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Bagmati River Basin

Outputs:

- Prototype data and information integration and sharing system
  - Develop an integrated water portal for improving data accessibility and data sharing.
  - Prototype a data integration and analysis and information dissemination system
- Enhance observational, modeling and application capability
  - Develop training modules of satellite remote sensing, modeling, bias correction and downscaling, make design of training courses on integrated observations, early warning and climate change assessment, and offer the courses.
  - Promote secondary educational programs in collaboration with universities.

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Bagmati River Basin

Outputs:

- Contribute to National climate change policy
  - Enhancement of crop water requirement estimation, evapo-transpiration, design discharge estimation, estimation of dependable discharge for hydro power generation
  - Application of models to estimate design flood discharge for hydraulic structures and flood water management

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Bagmati River Basin

Key Leaders and Contributors (National):

- Ministry of Irrigation (MoI)
  - Department of Irrigation (DoI)
  - Department of Water Induced Dissater Prevention (DWIDP)
- Ministry of Urban Development
  - Bagmati River Basin Improvement Project
- Ministry of science and Technology
  - Department of Hydrology and Meteorology
- Universities
  - Tribhuwan University
  - Kathmandu University

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Contributors (International):

JAXA, DIAS, WMO/HyCOS, CEOS Water Portal, UNESCO, ITC, Utokyo, UNU

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Thank You

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