

# Land Cover Land Use studies in the Hindu Kush Himalaya

Land Cover/Land Use Change SARI International Regional  
Science Meeting in South/Southeast Asia  
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FOR MOUNTAINS AND PEOPLE

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Kathmandu, Nepal



# Hindu Kush-Himalaya Region





# HINDU KUSH HIMALAYAS

A Global Asset



ICIMOD

FOR MOUNTAINS AND PEOPLE



CORE  
COMPETENCIES



Livelihoods



Ecosystem Services



Water and Air



Geospatial Solutions



# Land cover change in HKH

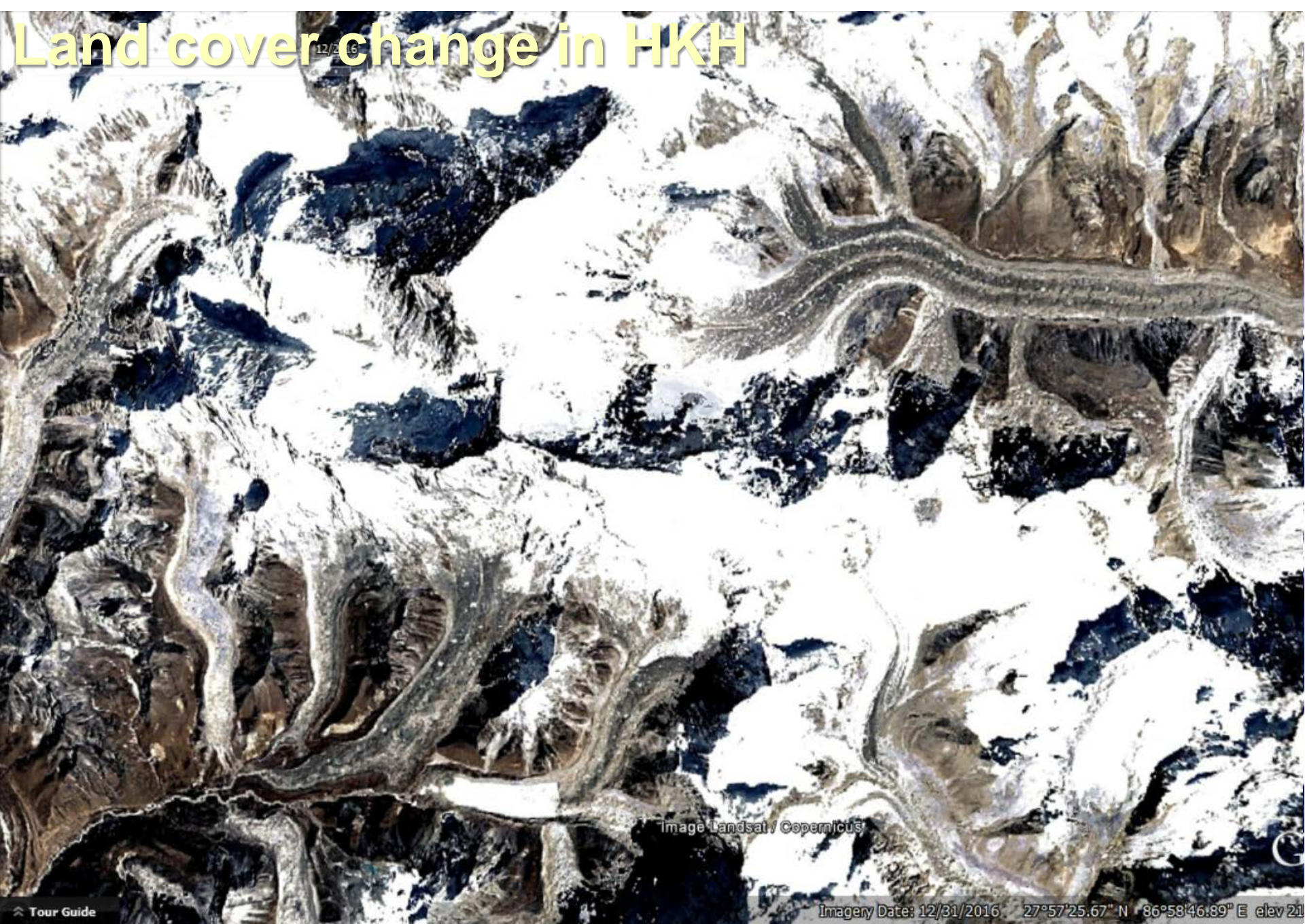


Image Landsat / Copernicus

Imagery Date: 12/31/2016 27°57'25.67" N 86°58'46.89" E elev 21



# Land cover change in HKH



Image © 2017 CNES / Airbus



# Land cover change in HKH





# Land cover change in HKH



Image © 2017 DigitalGlobe

Google earth

Imagery Date: 11/22/2016 27°43'30.16" N 85°22'39.87" E [New notifications](#) [e alt: 10219 ft](#)



# Land cover change in HKH



Image © 2017 DigitalGlobe  
Image © 2017 CNES / Airbus



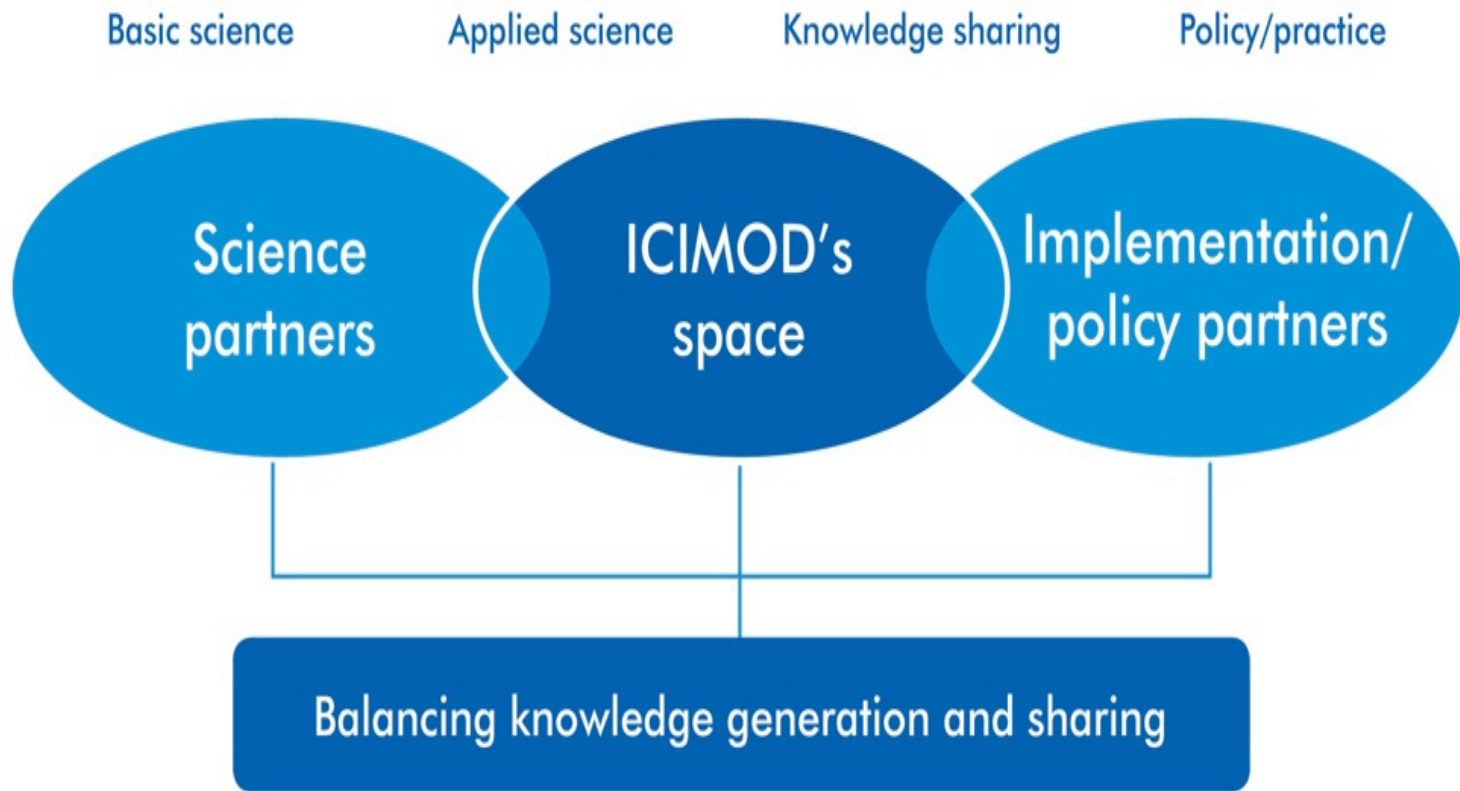


12/16/2010



Pragati, Janapragati and Nibuwater Community Forest





## Regional Programmes

- Adaptation to Change
- Transboundary Landscape Management
- River Basin Management
- Cryosphere and Atmosphere
- **Mountain Environment Regional Information System**
- Himalayan University Consortium



# Land cover activities in ICIMOD - driven by application needs

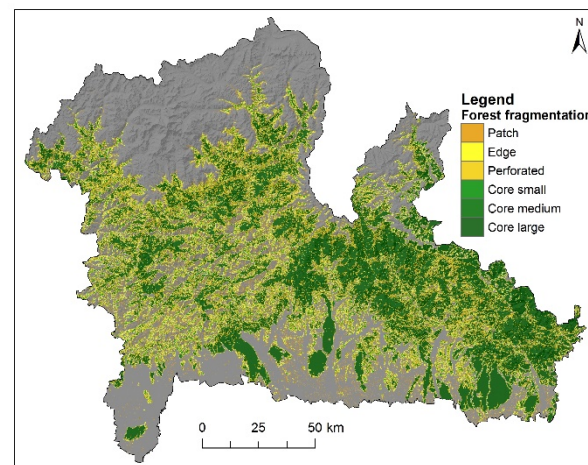
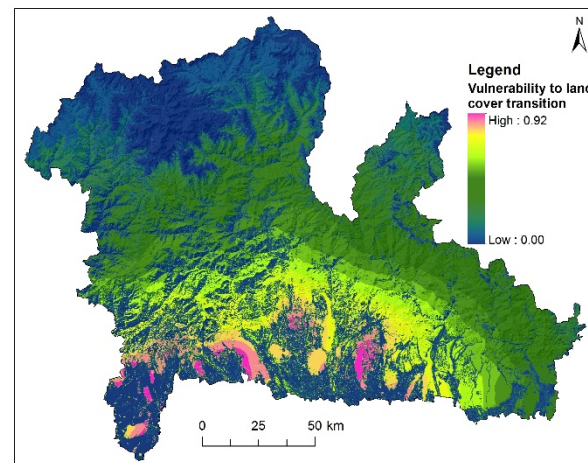
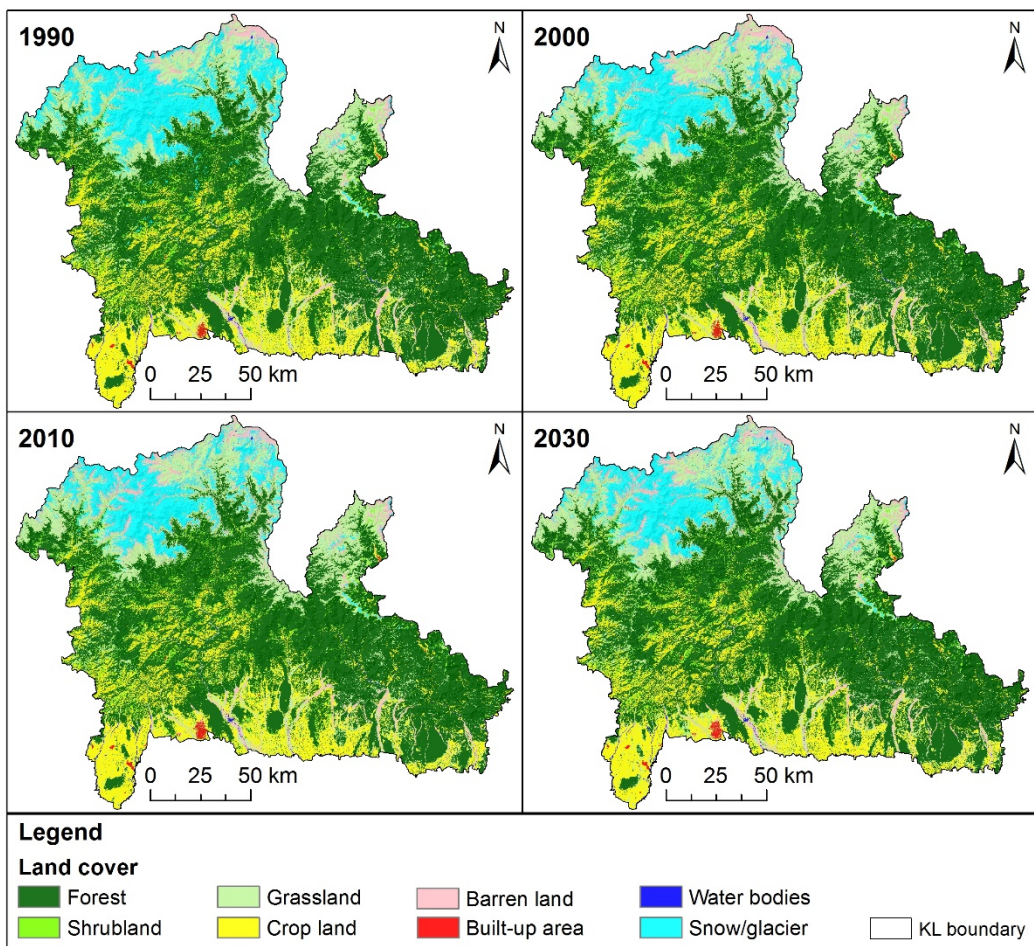


**Workshops on  
harmonization of  
classification**



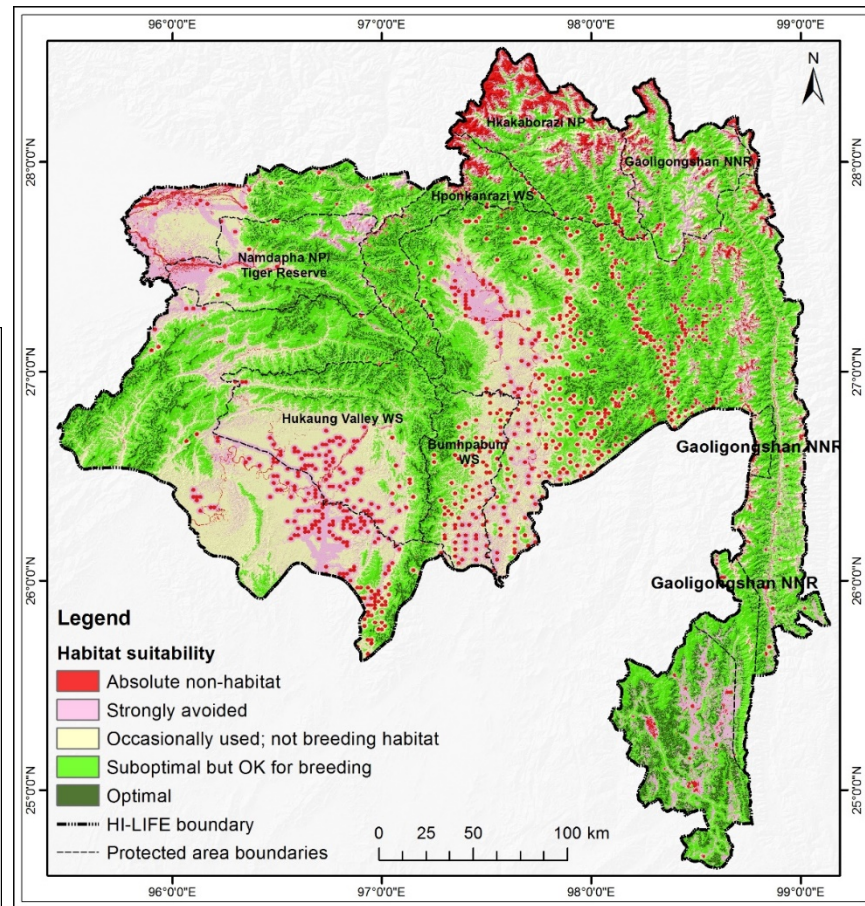
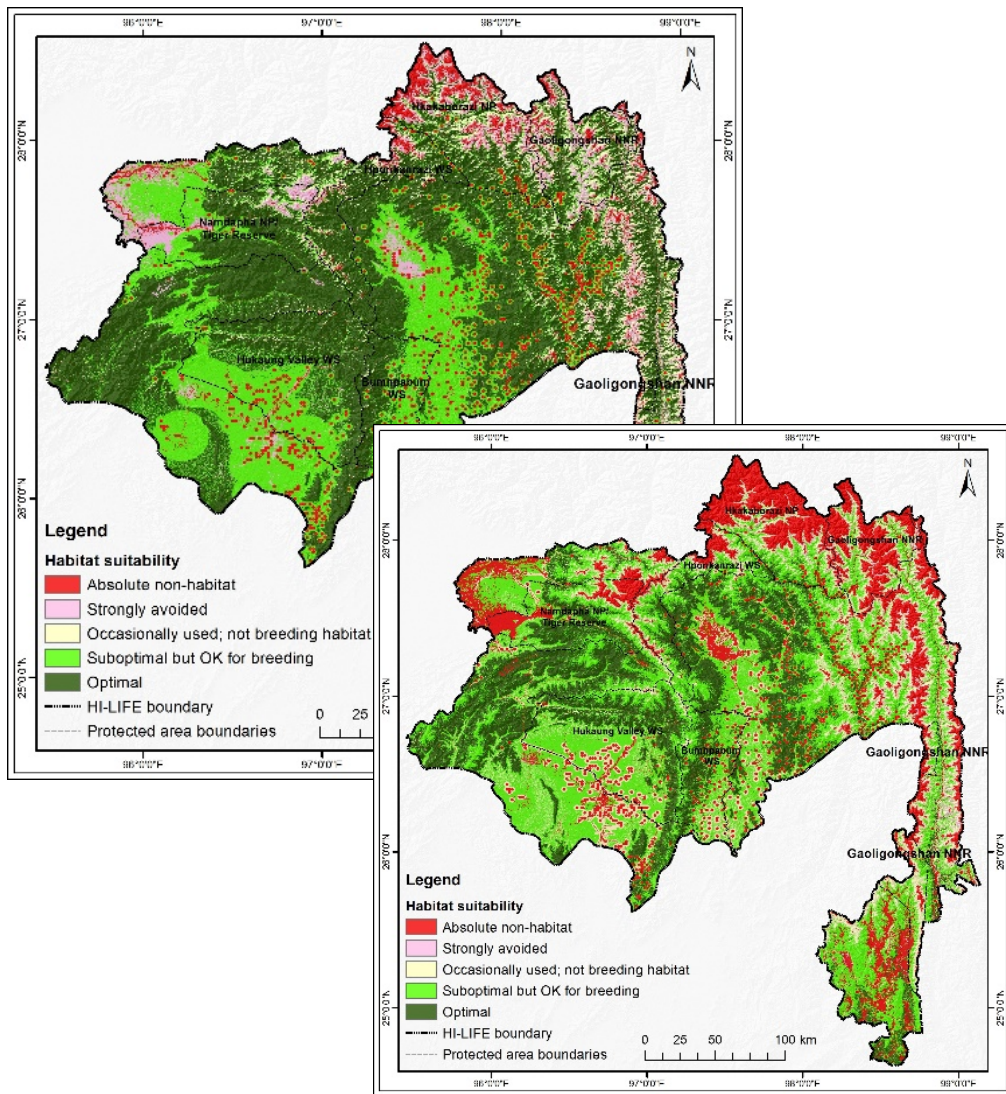


# Application example: Land use and cover change and forest fragmentation in Kangchenjunga Landscape



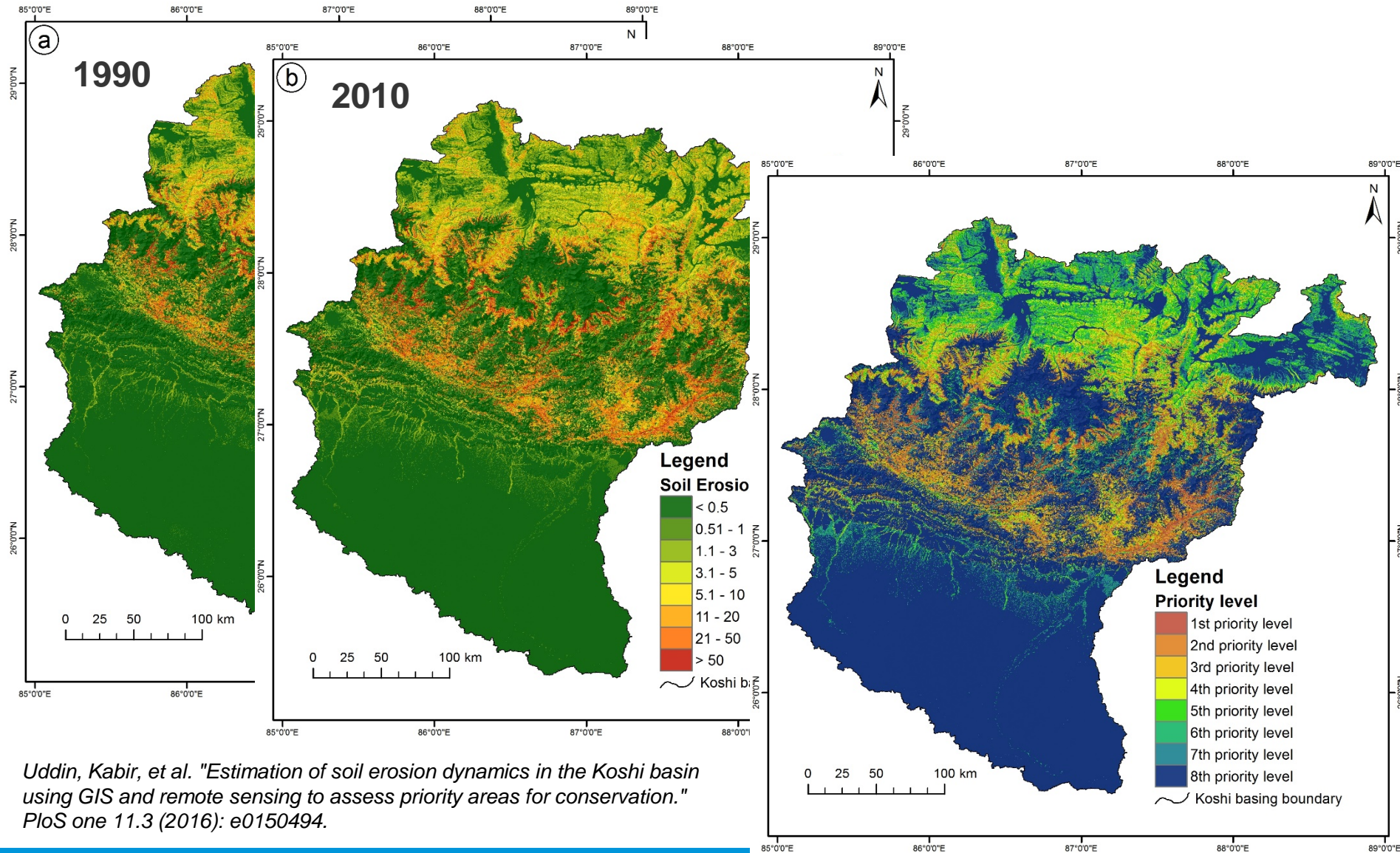


# Application example: Habitat suitability modelling for conservation planning





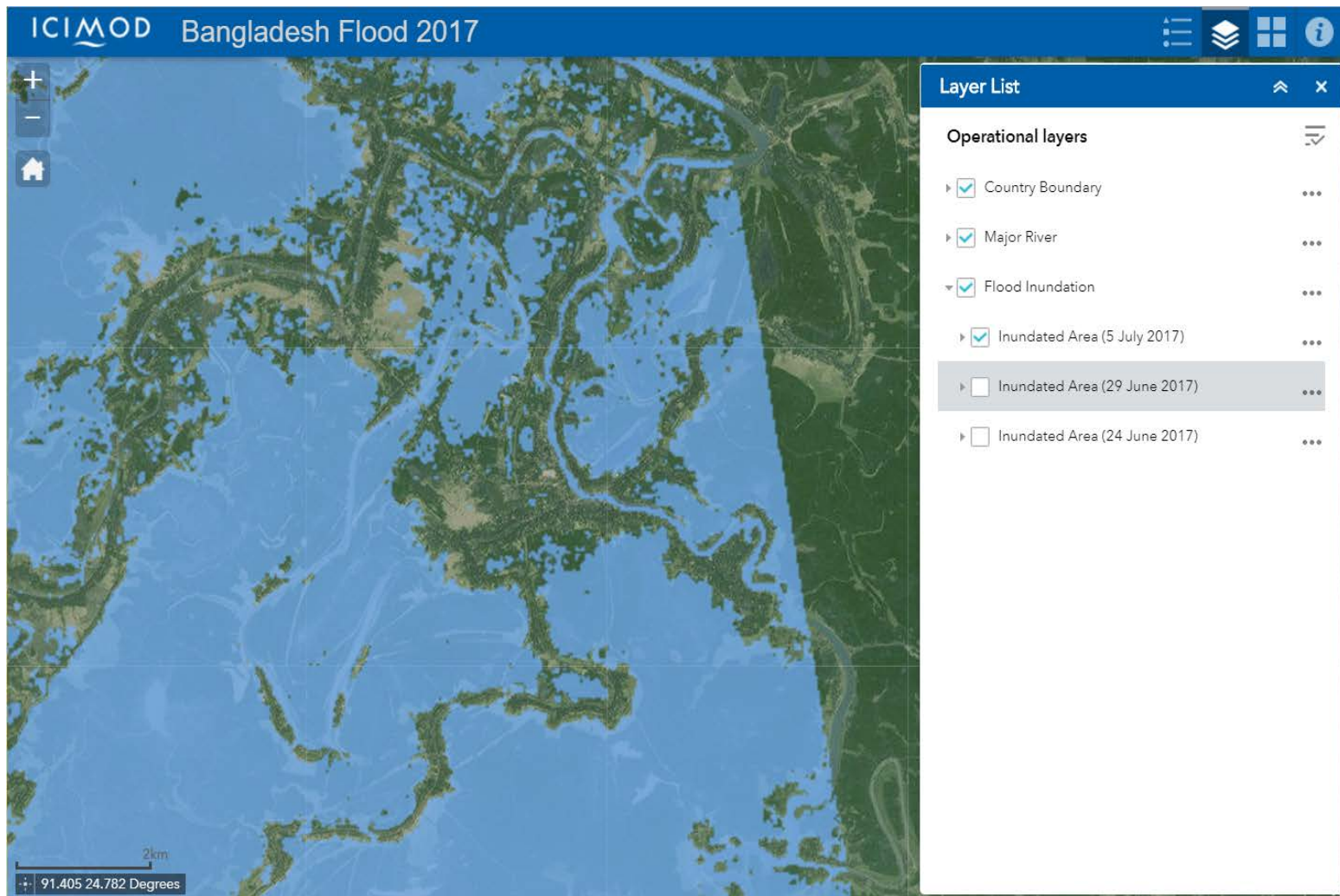
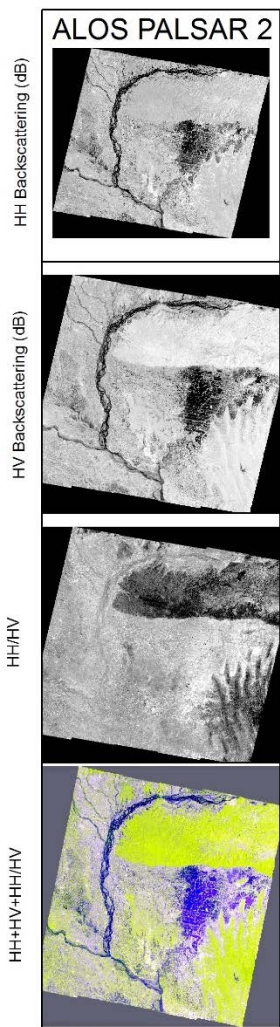
# Application example: Estimation of Soil Erosion Dynamics in the Koshi Basin



Uddin, Kabir, et al. "Estimation of soil erosion dynamics in the Koshi basin using GIS and remote sensing to assess priority areas for conservation." *PloS one* 11.3 (2016): e0150494.



# Application example: Flood damage assessment





**SCO NASA**



**West Africa**



**East Africa**



**HKH**



**Lower Mekong**



A flagship NASA-USAID partnership to improve environmental management and resilience to climate change by strengthening the capacity of governments and other key stakeholders to integrate Earth observation information and geospatial technologies into development decision-making



# Decadal land cover change analysis

## Land Cover Dynamics in the Hindu Kush Himalaya

Nepal Bhutan Pakistan Myanmar Bangladesh

### Summary Statistics

Nepal

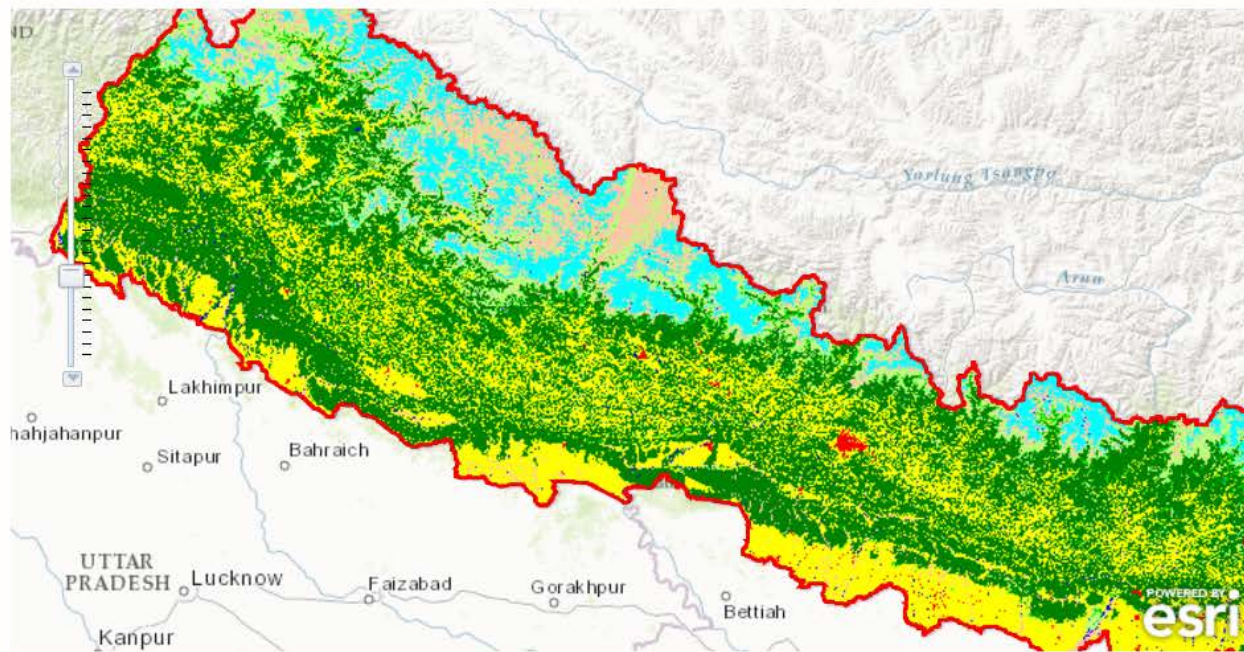
Select District

Achham

View Statistics

Change Statistics

Swipe Tool



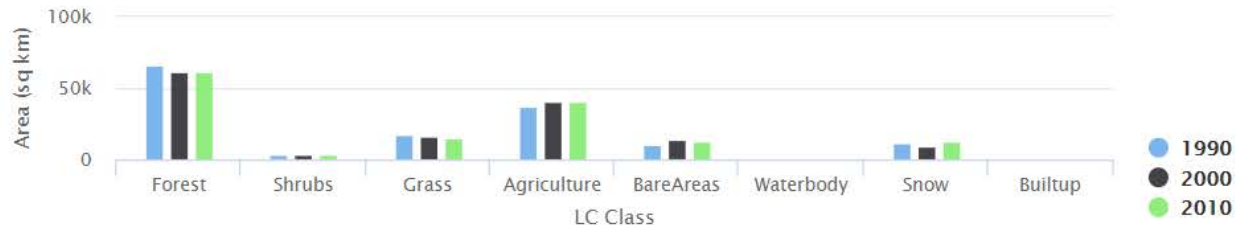
### Land Cover Dynamics in Nepal

Assessment and monitoring of land cover dynamics are essential for the sustainable management of natural resources, environmental protection, biodiversity conservation, and developing sustainable livelihoods, particularly for the

Layer Legend

- HKH Outline
- Outline
- District
- Land Cover 2010
- Land Cover 2000
- Land Cover 1990

### Land Cover Distribution for Nepal



### Related Dataset

- Landcover Data of Nepal 1990
- Landcover Data of Nepal 2000
- Landcover Data of Nepal 2010



## Agriculture Atlas of Nepal



Digital agriculture atlas of Nepal provides free access to vital information for agriculture planning, research and overall economic development of the country. It covers vast issues including statistics on cereal crops, cash crops, legume, vegetables, fruits and livestock.

[READ MORE](#)

## Forest Fire Detection and Monitoring in Nepal

ICIMOD, in close collaboration with the Department of Forests of Nepal, has developed a forest fire detection and monitoring system for Nepal based on Moderate Resolution Imaging Spectroradiometer (MODIS) data. The work was supported by the United States Agency for International Development (USAID) and the National Aeronautics and Space Administration (NASA) under the SERVIR-Himalaya initiative.

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## Historic Changes in Snow Cover in the HKH Region



The snow cover data is presented for 92 sub-basins from the 10 major river basins of the HKH. Users can view basin/sub-basin wise statistics of the snow cover for different elevation zones, slopes and aspects. The snow cover maps can be displayed for a particular date or a specified time period using a time-slider tool.

[READ MORE](#)

## Glacial Lake Inventory of the HKH Region



Glaciers and glacial lakes in the Hindu Kush-Himalayas have been essential natural resources providing fresh water to about one third of the world population. In the HKH also, as in many other parts of the world, glaciers are shrinking and glacial lakes are being formed due to the current climate warming.

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## REDD information system



The application allows users to view and monitor of Kayar Khola watershed covers an area of 8,002 ha at an elevation of 245 to 1944 m in Chitwan district in the central development region of Nepal. Mainly swiping tools allow visitors to see the changes spatially and social profile of each community forest level.

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## Rangelands decision support system in Pakistan



This application has been developed to help decision makers in rangeland management in Pakistan. The application allows visualization of various layers such as bio-climate, phenology, grazing pattern, and biomass & productivity. In addition, the application allows viewing of suitability ranking map for rangeland based on productivity, area, greening/browning or overall.

[READ MORE](#)

## Climate change vulnerability and adaption strategies of forest ecosystem



The web app on climate change vulnerability of forest ecosystems provides information about the current relationships between climate variables and biophysical variables depicting functioning of forests. The application also provides VDC level information on the projected relationships between climate and forest functioning that gives us a better idea about impacts of future climate change, along with this the

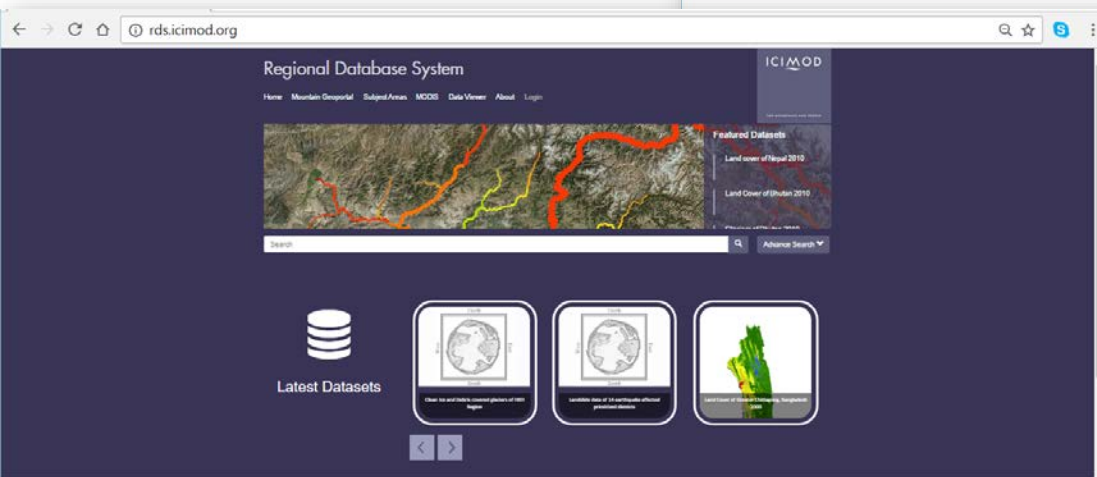
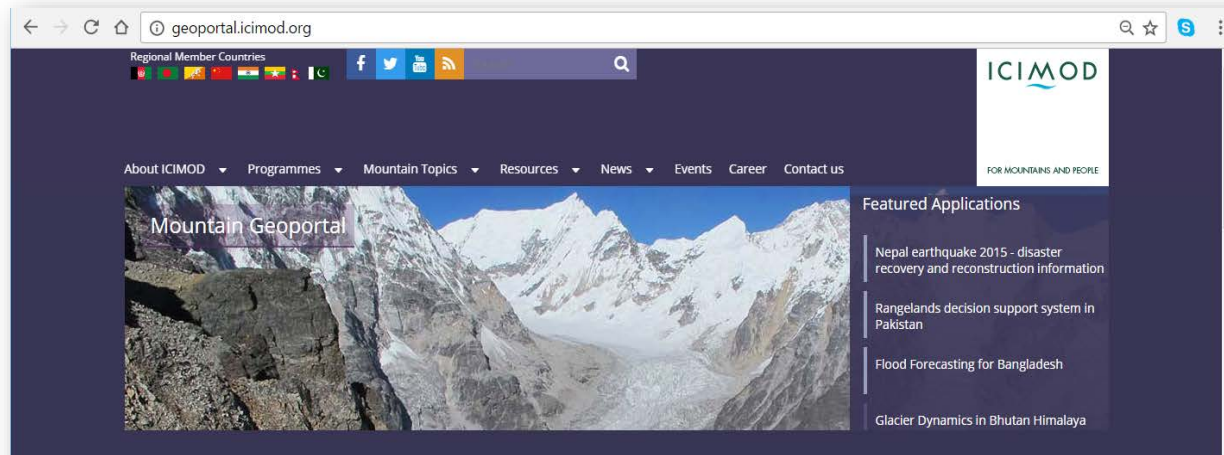
app also provides forest areas falling under different degrees of human dependence.

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# Dissemination of data and applications

- Mountain Geoportal
- Regional Database system





# Current approach and strategy

- MoU with Global Forest Watch
- Collaboration with SilvaCarbon and UMD
- Land cover information as a “service”

## Team up with SERVIR Mekong on RLCMS

SERVIR  MEKONG Land Cover Portal

Home

Map

Reference Data

Methods

Trainings

**REGIONAL LAND COVER MONITORING SYSTEM**

Powered by  Earth Engine 



# Thank You....

SANTOSH RAJ PATHAK

