Kailash CAFE: Sharing knowledge of a sacred landscape

Forest cover change in north-western border districts of far-west, Nepal

Presented By:

Sushila Rijal
Department of Environmental Management
Prince of Songkla University, Hat Yai, Thailand
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Authors:
Sushila Rijal
Bhagawat Rimal
Pramod Pandey
Amar S Dhami
Ripu M Kunwar

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Organization of the Work

- Introduction
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- Results
- Conclusions

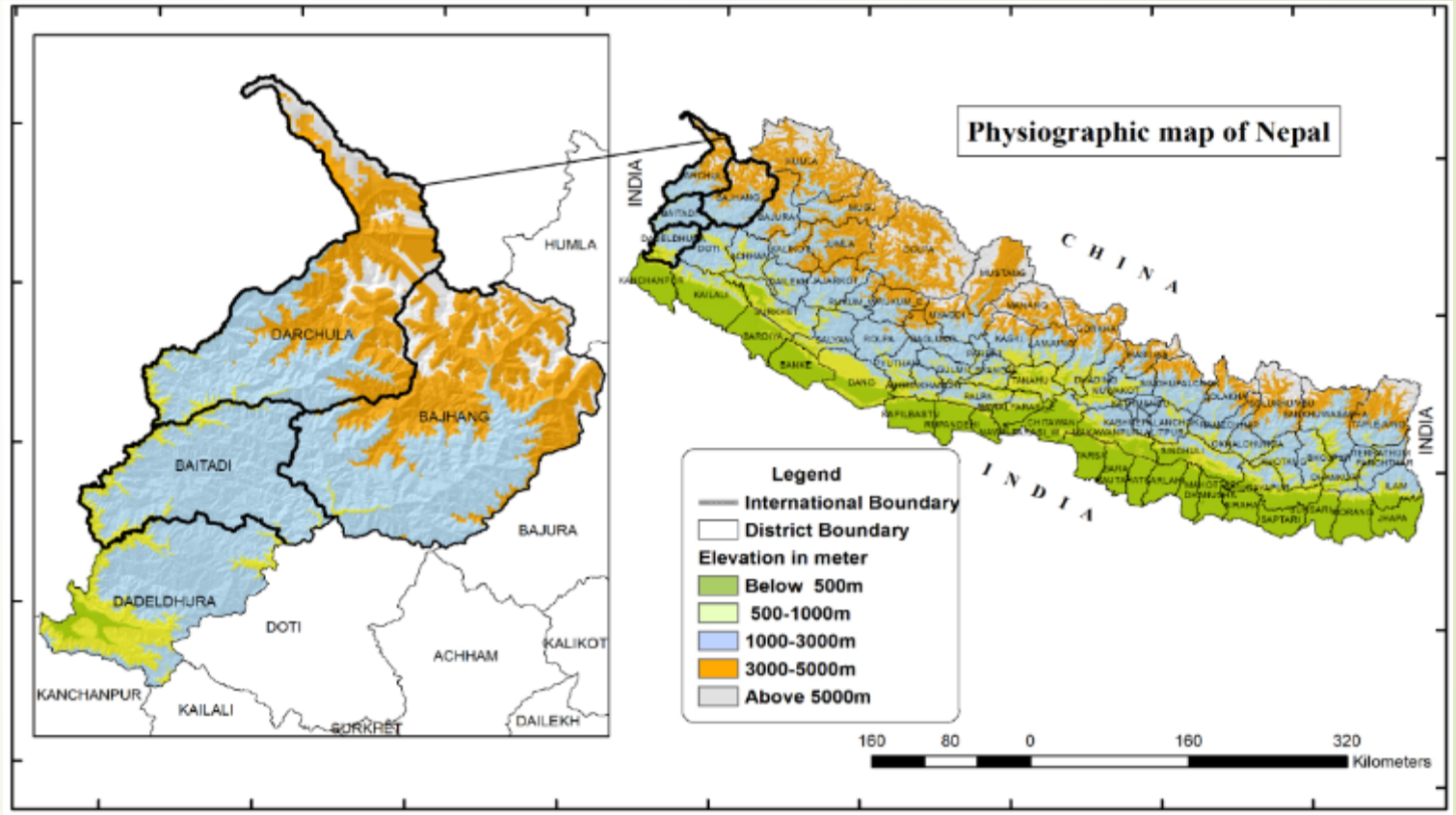
Introduction

- Land use/land cover (LULC) change is an integral part of changing environment globally (Cai et al, 2016). It has the capacity to influence biodiversity, modifying ecosystem and converting the climatic condition in the local and global scale (Aguilar and Ward, 2003).
- Environmental sustainability, biodiversity and ecosystem services supply depends upon the changing forest cover particularly in the area where the livelihood largely relies upon the forest resource.
- In several part of Nepal and elsewhere, forest resources have been confronting various pressurizing factors such as urbanization, forest fire hazards, smuggling and encroachment, over exploitation and degeneration hence, regular monitoring of the valuable forests of is remarkably essential.

Study Area

- **north-western border districts of far-west, Nepal**
- **Area:** 8786 sq.km
- **Elevation:** 257 to 7132 masl
- **Districts:** Darchula, Baitadi, Dadheldhura and Bhajhang

  Country: Nepal
- **Boundary:** North: Humla district and China; South: Kailali and Kanchanpur, East: Doti, Achham, Bajura, West: India



Research Gap, Objectives and Significance

Research Gap:

- Rapid change in land use land cover
- Forest-based livelihood but limited studies have explored forest cover change
- Forest based ecosystem services and biodiversity
- Freely available updated forest cover data of high resolution is lacking
- Drivers of forest cover change has not been explored

Objectives:

- To explore the LULC change of four districts of north-western Nepal within Kailash Sacerd landscape with particular focus to forest cover during 1989 to 2019
- To investigate the factors influencing the change in forest cover in the study area

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Significance of study:

- Updated LULC **database** are fundamental part of global environmental studies
- Monitoring the forest cover is imperative to sustainably utilize the resource, **update the existing plans** and management activities
- Obtained outputs will remain as the basic **foundation** for the planners and policy makers to formulate effective forest management plans

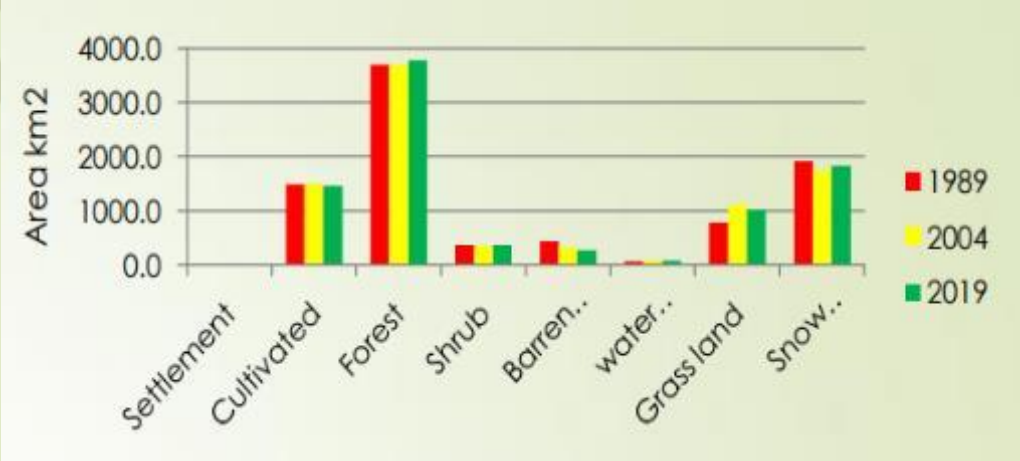
Methods and Materials

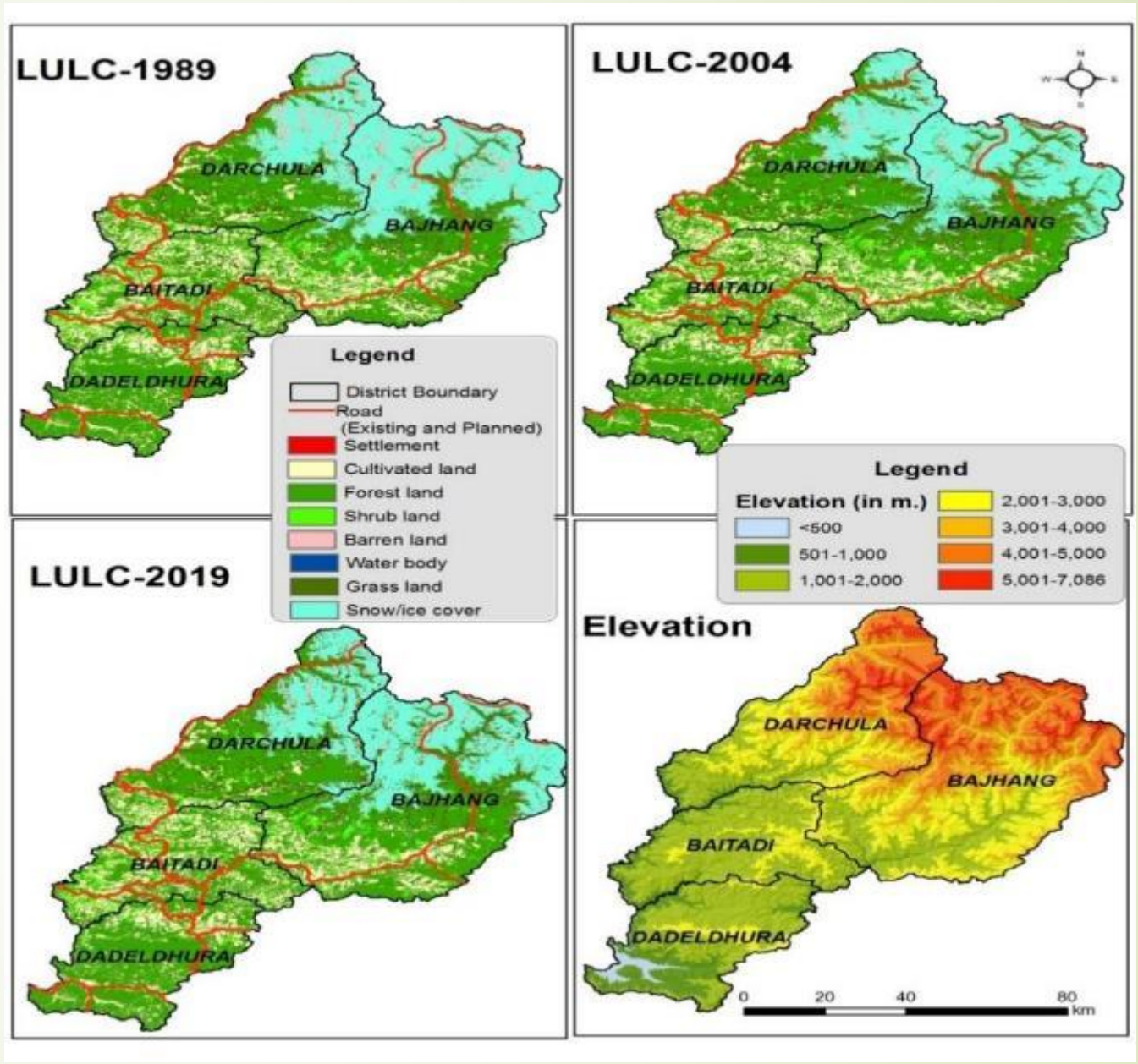
- Ongoing Research Project
- **LULC Data:** Landsat satellite images (Landsat 5 and OLI) 1989, 2004 and 2019
- Land cover classification into 8 classes: (Forest, shrub, grass, settlement, cultivated land, barren land, waterbody and snow/ice cover)
- **Accuracy assessment**: Topographical data of Survey Department of Nepal 2001 field visit: ground control points (GPS) of 2016 and 2018.
- **Driving factors:** FGD with local including indigenous people, forest experts, technical persons and personnel from DFO, and secondary sources for forest regimes will be reviewed

Results: Objective 1

Increase: settlement area, forest cover, grass land

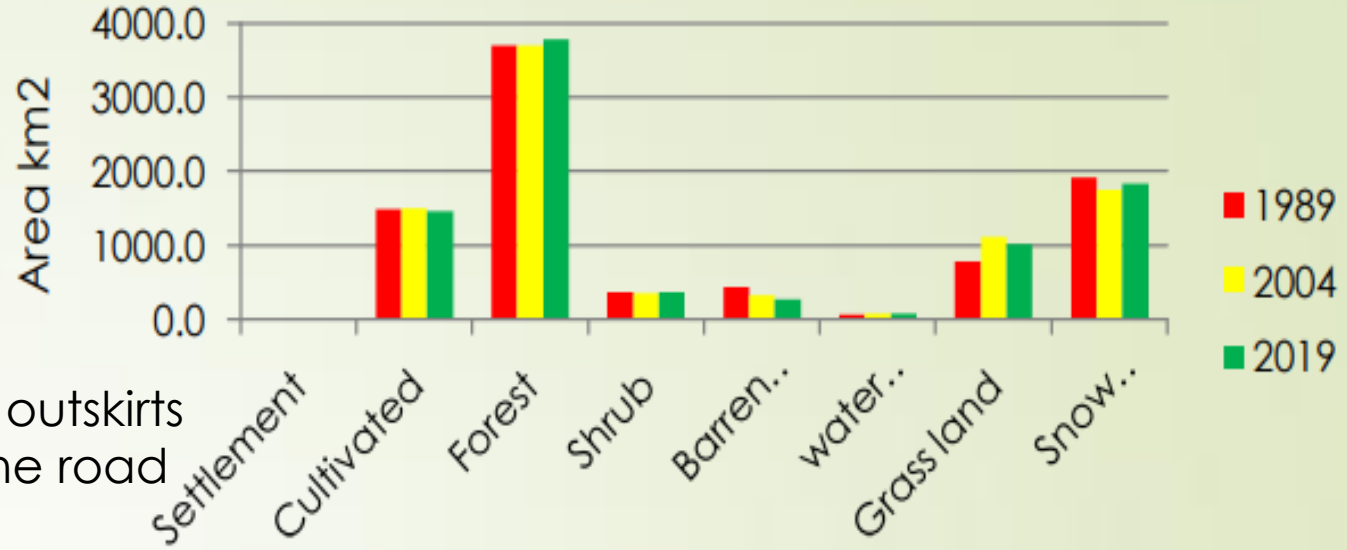
Decrease: cultivated land area, shrub land, barren land, water body, snow and ice cover





Rimal et al 2019

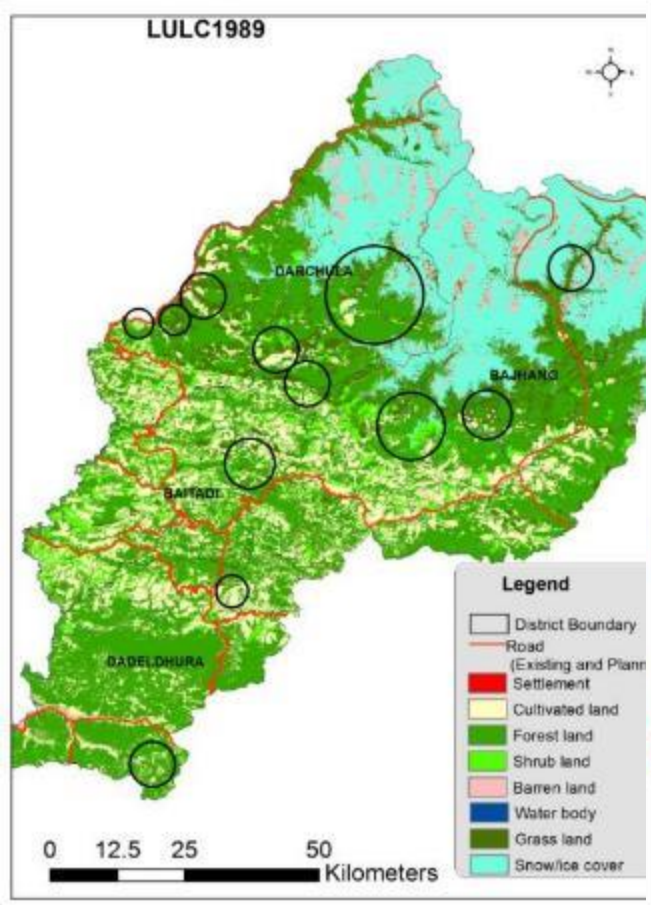
Results-Contd…

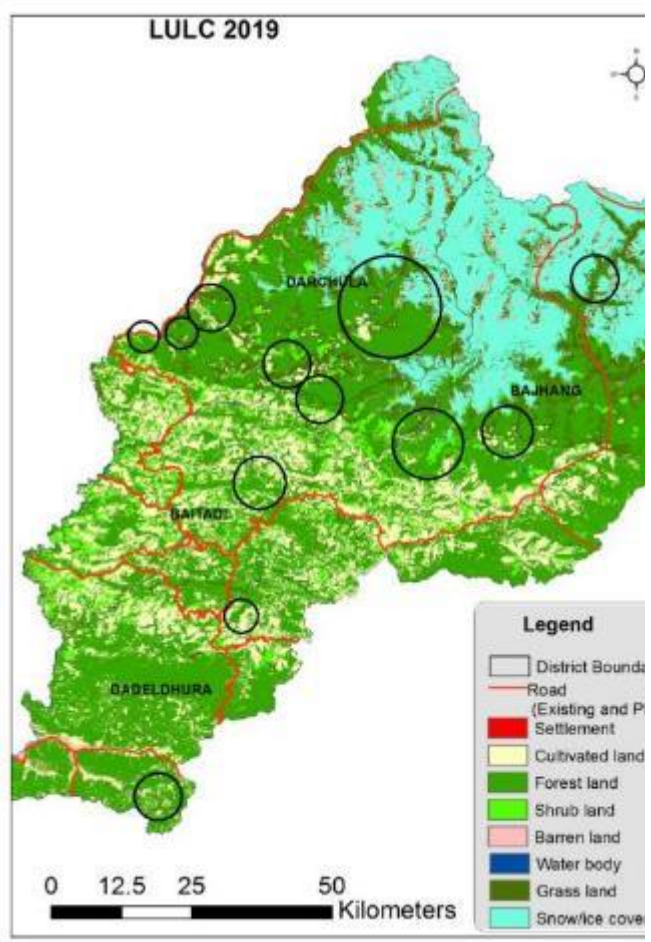


- Newer settlement areas expanded at the outskirts of district headquarters and proximity to the road networks.
- Cultivated land had increased during 1989-2004 however it declined during 2004-2019.
- Forest cover increased 1989 to 2019
- Shrub land area slightly declined throughout the period and this is one of the important factors of forest cover increase
- Barren land remarkably declined whereas grass land increased significantly over the period
- Snow and ice cover has declined in the 30 years' period

LULC	Area in Percentage		
	1989	2004	2019
Settlement	0.01	0.03	0.09
Cultivated	16.94	17.02	16.57
Forest	42.03	42.02	42.97
Shrub	4.22	3.99	4.15
Barren land	5.04	3.61	3.02
water body	0.84	0.83	0.82
Grass land	9.00	12.64	11.55
Snow /ice cover	21.88	19.83	20.78
Total	100	100	100

Results- Contd… (1989-2019)





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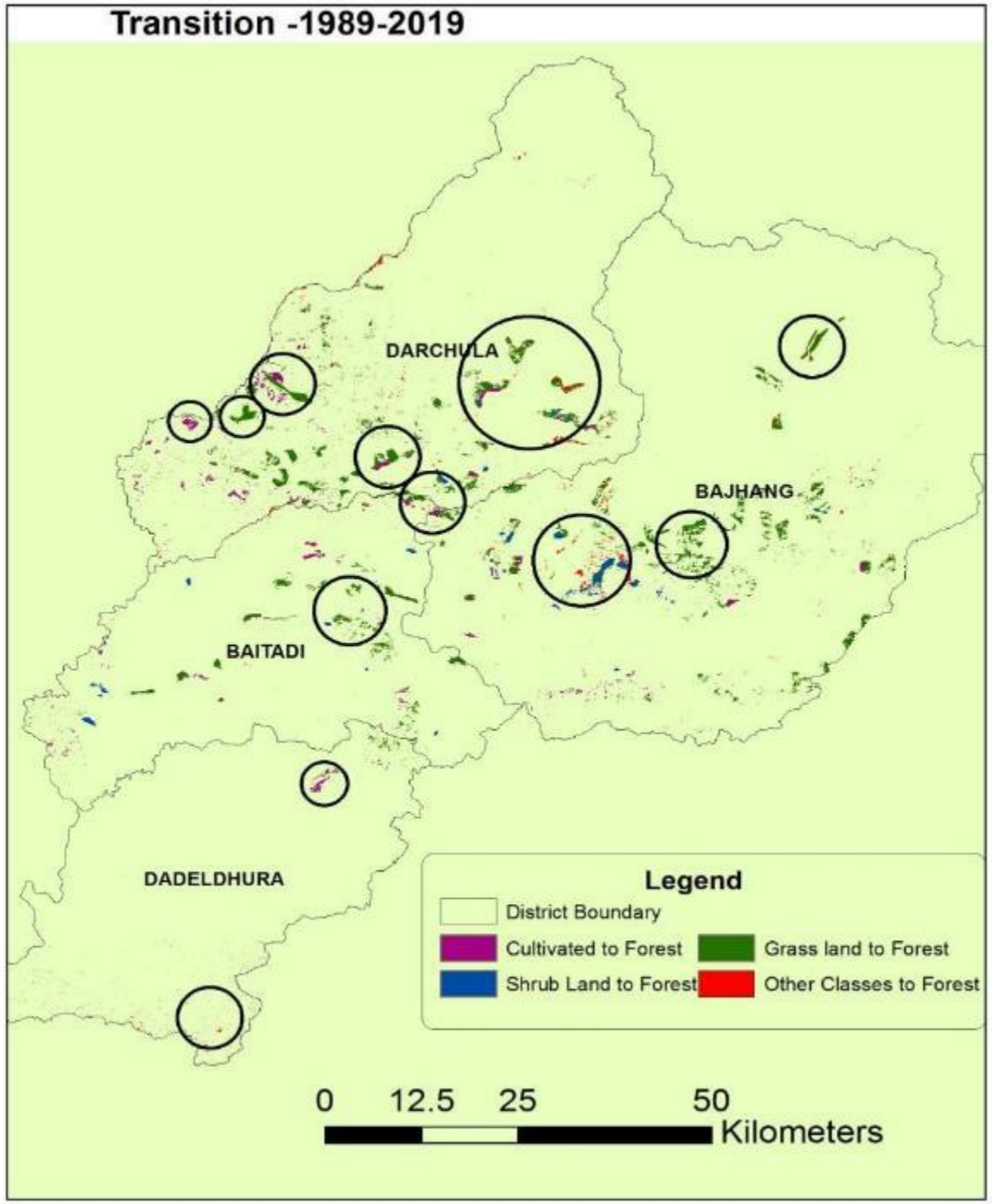

Results- Objective 2: Drivers of Forest cover change

A. Forest management Regimes

- **Community forest management**: started from 1979, so far 1056 CFUGs.
- **Leasehold forest management**: started from 1993, 1000 ha area handed over to poor communities for their livelihood.
- **Religious forest management**: have long been conserving, Sacred groves (mandus, devi thans),
- **Private forest management**: have long been conserved, threatened once the private forests were nationalized in 1957.
- **Protected forest management**: Since 1973, Chitwan National park (1973) is the first one (Chitwan district), Api- Nampa Conservation Area (Darchula district) (Latest, 2010).
- **The Kailash Sacred landscape Conservation and Development Initiative (KSLCDI)** across the boarder area Nepal, India and China aims to gain the long term conservation of ecosystem s and safeguarding the cultural linkages.
- **Collaborative forest management**: Started from ~2000, only applied in low land Tarai.

Results: Objective 2, Contd…

B. Agroforestry

C. Conservation of the resource by the local indigenous people

local indigenous communities and the women have possessed a sound knowledge about preserving, processing and commercializing the local and indigenous plants and their culinary uses (Joshi et al , 2007).

- **Pasture management** systems have been based on the indigenous local knowledge and experiences. The local people have set certain rules and schedules in terms of the utilization of the natural resources such as the specific time for collecting fodders/grass/fire woods and grazing the livestock.
  - Agro-pasture system
  - Major indg communities: Semi-nomadic, transhumans - Byanshi, Raute
  - Medicinal plant collection, barter, trade in lowlands
- **Migration:** migration from mountain to Hill and Tarai has resulted in land abandonment, fallow lands or increased private forest in the former cultivated lands

Conclusions

We identified several challenges

1. Migration
2. Over exploitation of resources
3. Lack of scientific knowledge
4. Urbanization
5. Forest fire
6. Lack of sustainable land-use and resource management
7. Less emphasis on the documentation and institutionalization of traditional and indigenous knowledge and practices
8. Cultivated land loss and sustainable food security

- Need to incorporate the indigenous local knowledge based conservation practice

Promote and exchange the knowledge and focus capacity building in terms of livestock farming management practice

- Need to promote the local species and varieties through awareness and dissemination
- Combating several challenges and sustainable utilization of forest resource is highly essential
- Our study has provided the major changing locations and areas under pressure which require special attention.

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Thank You !!