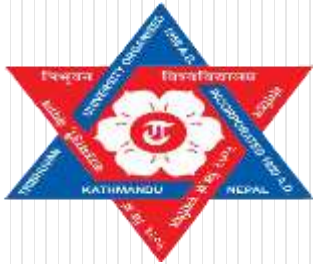
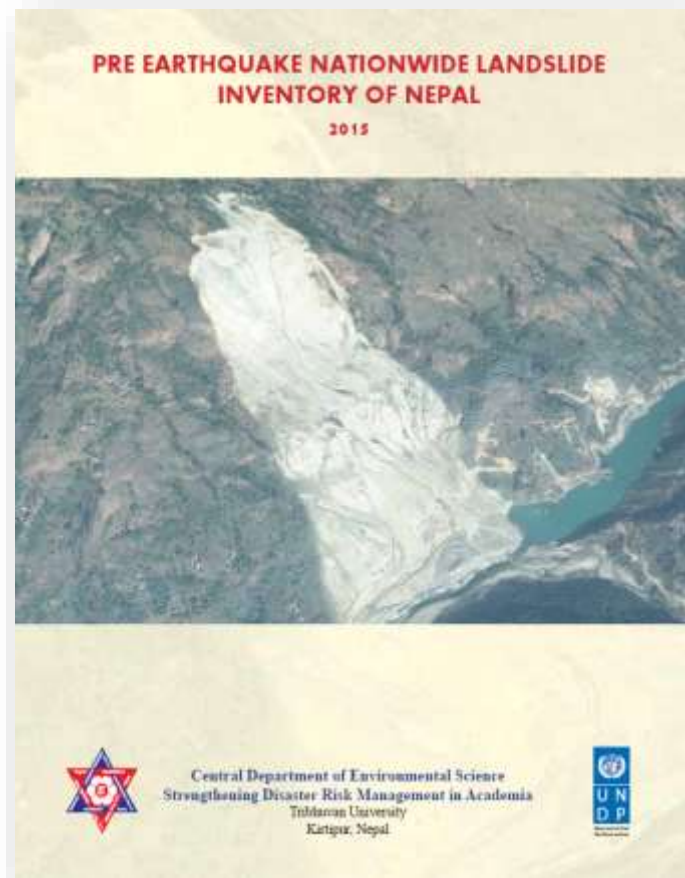


Pre Earthquake Nationwide Landslide Inventory of Nepal 2015: An Academic Exercise



DR Bhaju and P Pokharel
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Amrit Sharma
Binod Pyakurel



Tribhuban University
**CENTRAL DEPARTMENT OF
ENVIRONMENTAL SCIENCE**
Kirtipur, Kathmandu, Nepal

Establishment: 2001; Self-sustained

Course & Programme:

- MSc and PhD in Environmental Science
- Oversee BSc Environmental Science

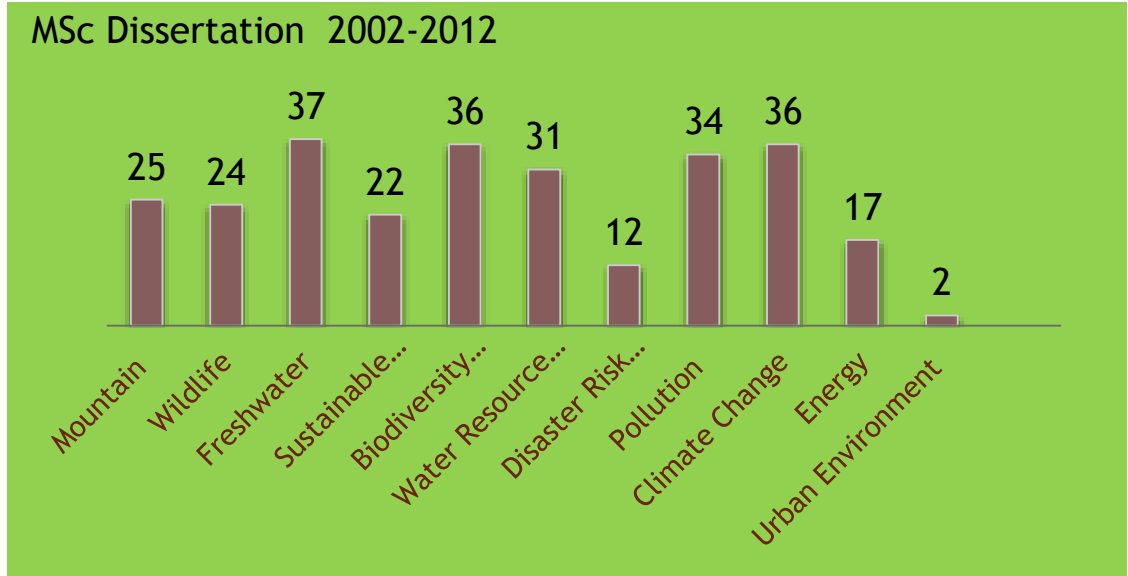
Objective:

- To produce capable manpower in the field of environmental science who can make meaningful contribution in education, research and development.
- To undertake research in environmental problems in support of science based good decisions



Special Courses Offered

- Fresh water Environment
- Mountain Environment
- Wild life Management
- Sustainable Development
- Pollution Control
- Climate Change
- Disaster Risk Management
- Sustainable Urbanization



2001-2014
Case Studies: > 1200
MSc Dissertation: 300



INTRODUCTION

- Himalaya: Hazardous landscape prone to landslide because of high relief, steep gradient, active geology, intense monsoon
- A UN Report (2008) shows that of the 75 districts in the country, 49 are prone to landslides
- Landslide is second most hazard in Nepal after epidemics (Nepal Disaster Report, 2011)



A landslide spreads a cloud of dust in to the air in one of the many deep valleys of the region on May 17, 2015 in Nepal. Jonas - Gratzter/Getty Images

OBJECTIVES

- To document the extent of landslides phenomena in Nepal by involving university graduates
- To investigate the distribution, type and pattern of landslides in relation to morphological and geological attributes by districts
- To enhance research capability of the academia, the university in particular to contribute to the nation's dire needs

MATERIALS AND METHODS

- Training workshops to the graduate students by experts
- Determination of scale and identification of image
- Digitization of landslides from Google image 2014
- GIS tool *Arc GIS 9.3 and 10.1*

Basis of Landslide Classification

- Mass wasting type
- Pre existing land use and land cover
- Aspect
- Topographic Position
- Human disturbance
- Risk

District Ranking

- Very High: First 14
- High: Second 14
- Moderate: Third 14
- Low: Fourth 14
- Very low: Remaining

FINDINGS

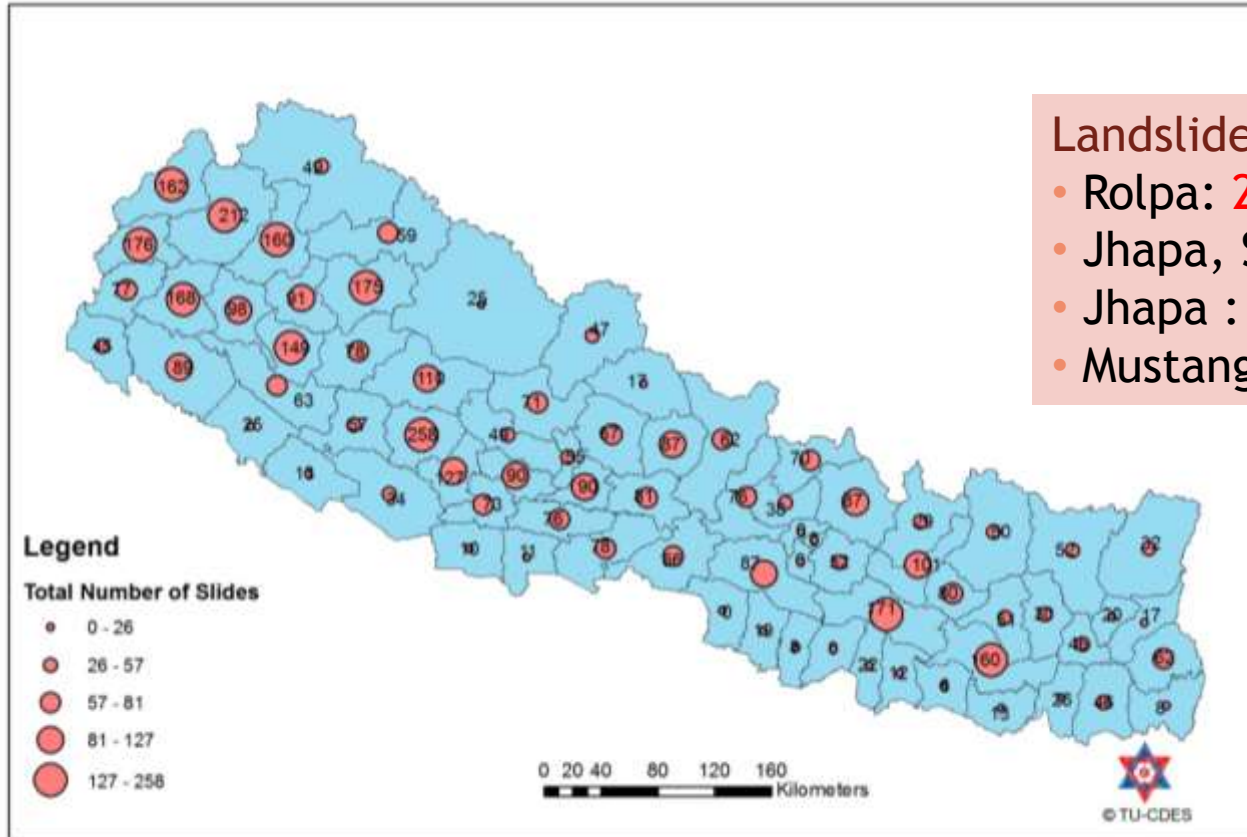
Landslides Documentation

- 72 out of 75 districts
- Total landslides: 5003
- Total area : 126.34 km²
- Parsa and Sarlahi : 0

Landslide Classification

- Slide (2328) followed by flow(899) & complex (844) landslide in Nepal
- South aspect contains highest number/area (43%) of total landslide
- Highest shrubland (782) and Dense forest (779)
- Highest number landslides is in mid-slope (1923), but by area it is in up-slope (36.72%)
- Human disturbance (road construction) have contributed 603 patches of landslides, about 5.5% of total landslide area
- Forest and shrubland has highest risk due to 1844 no. of landslides followed by 1125 landslides in agriculture

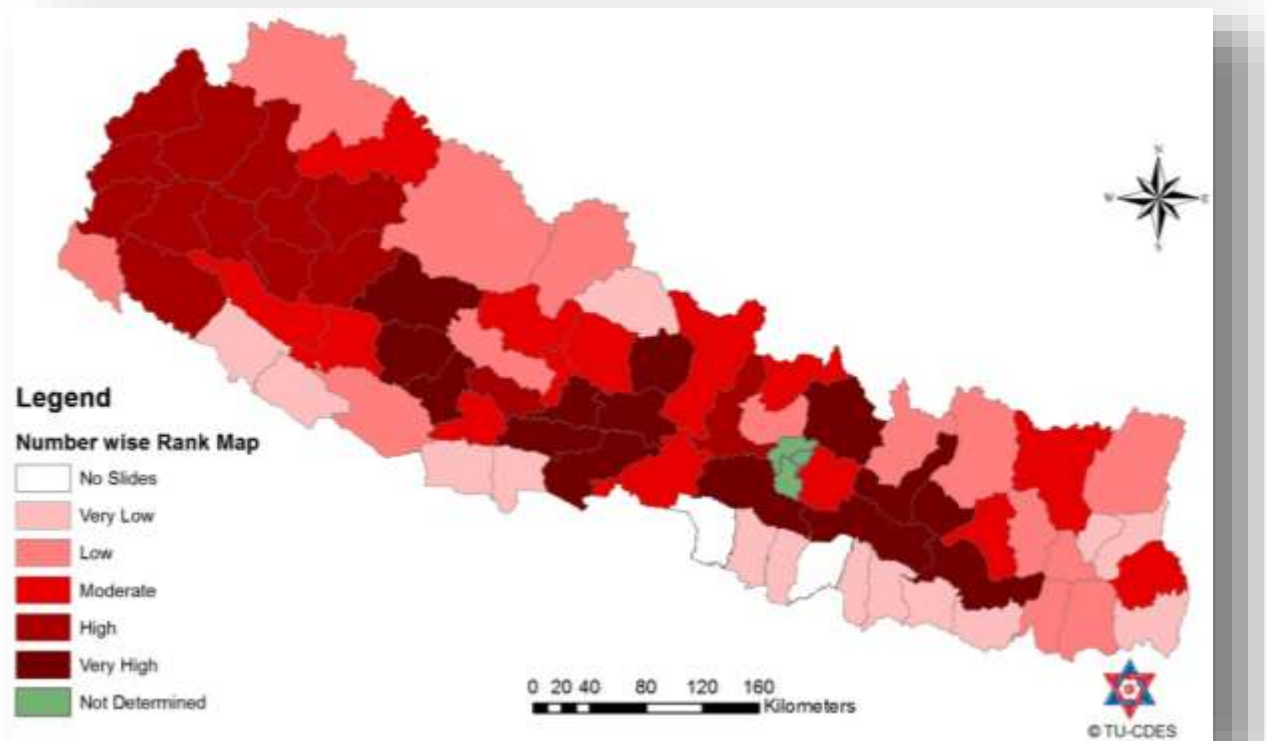
LANDSLIDES NUMBERS IN DISTRICTS



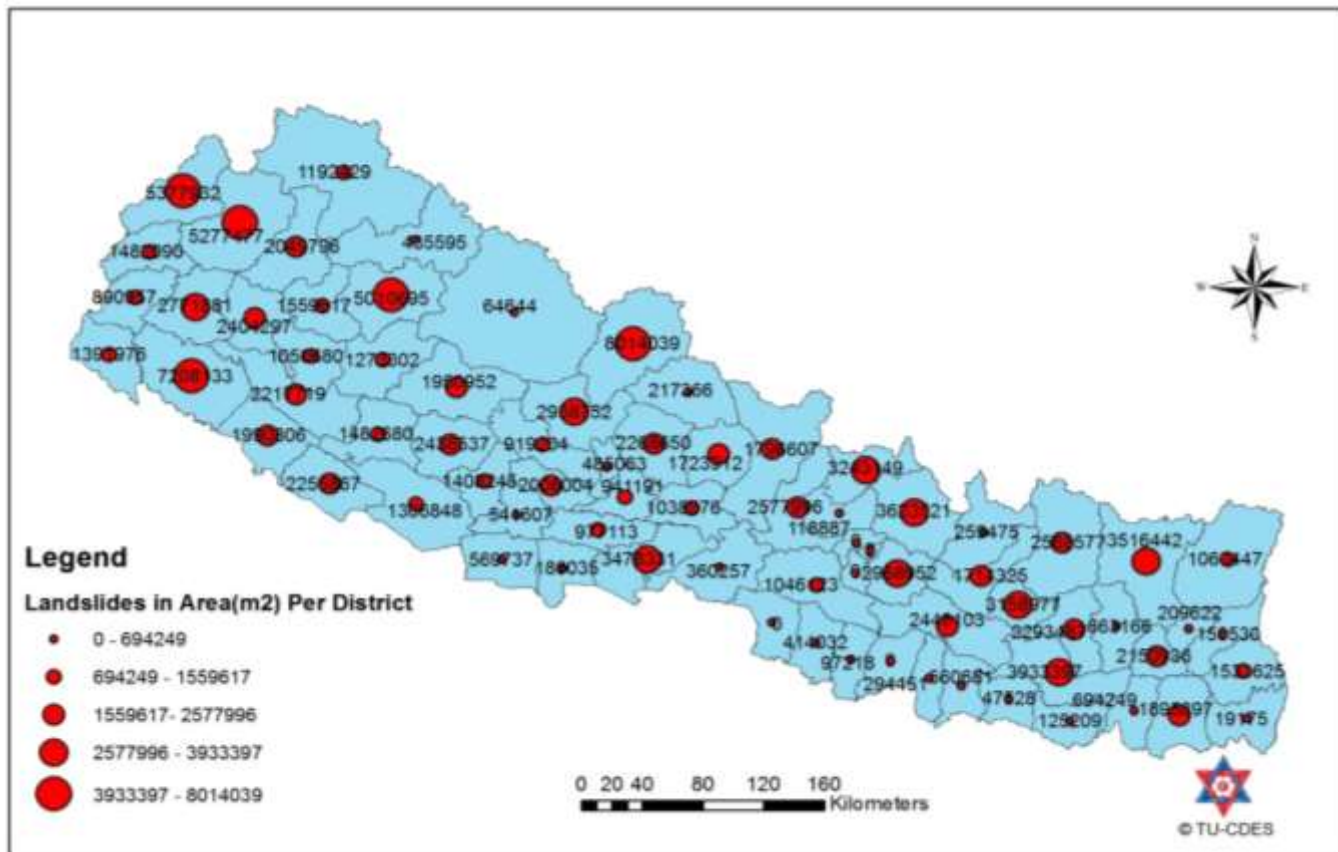
Landslides total: 5003

- Rolpa: **258**
- Jhapa, Siraha, Rautahat : **8**
- Jhapa : **19175 (0.015%)**
- Mustang: **8014039(6.34%)**

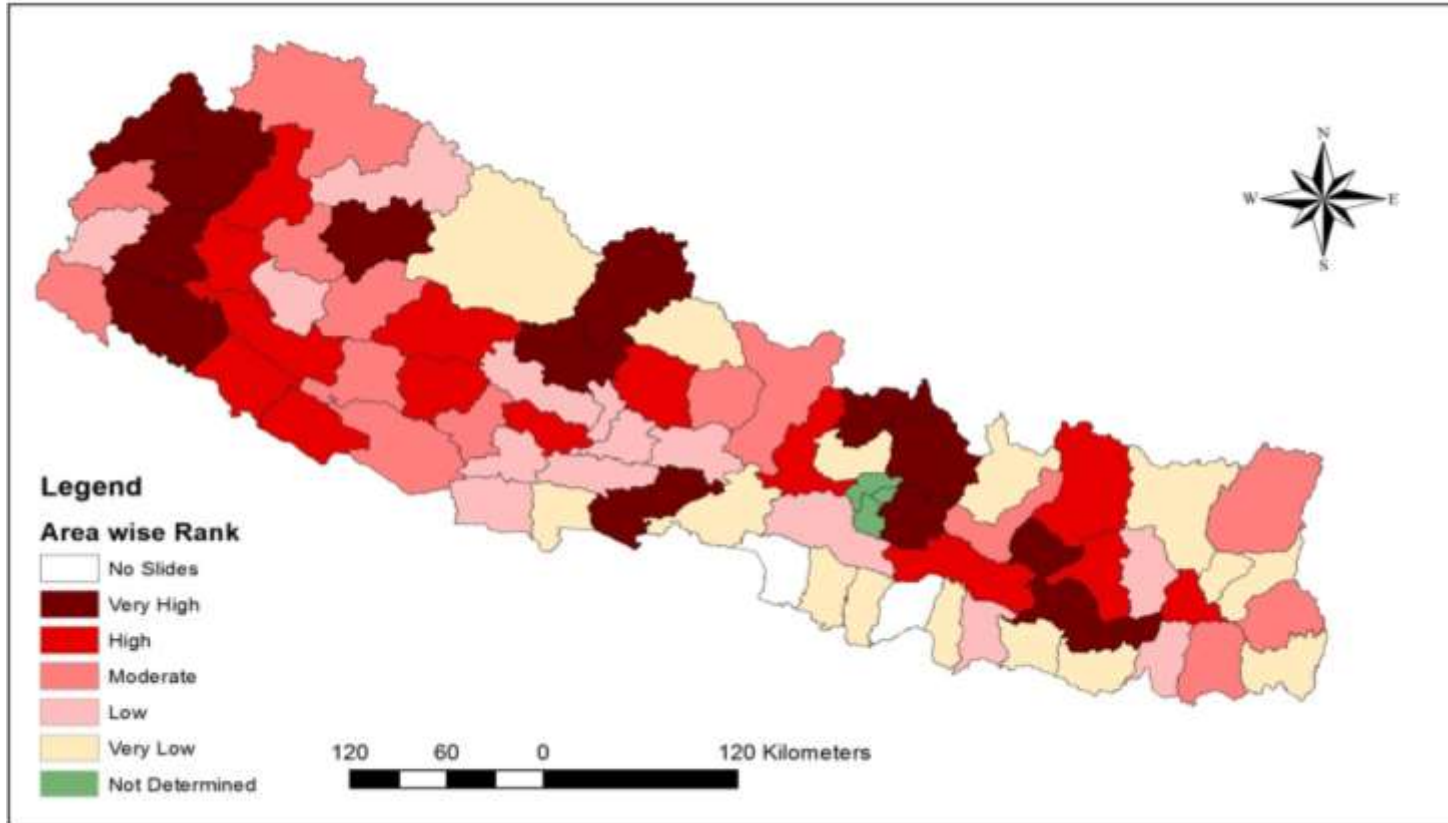
RANK MAP IN TERMS OF NUMBER



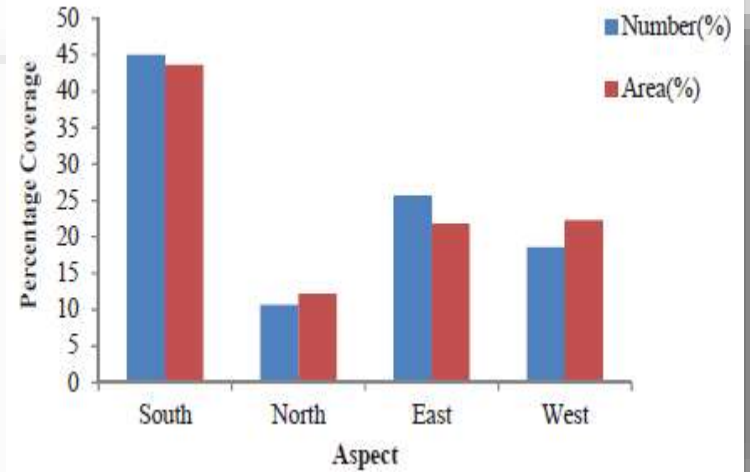
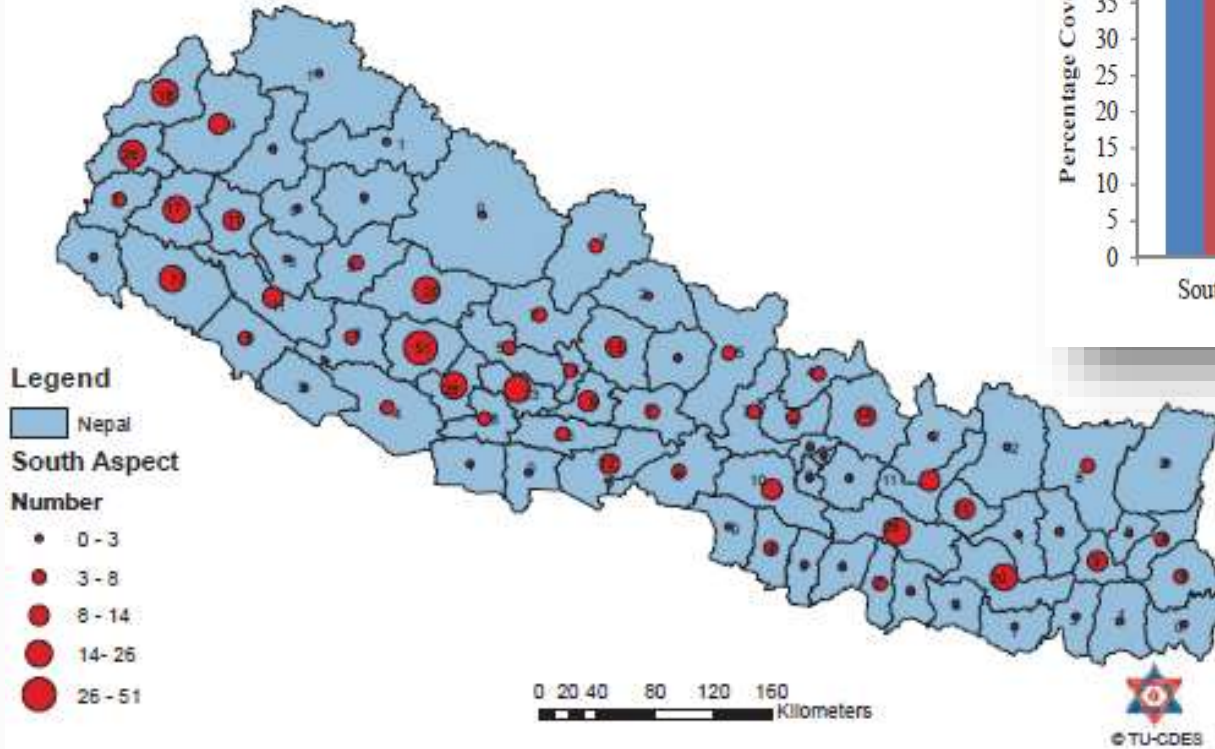
LANDSLIDES IN AREA PER DISTRICT



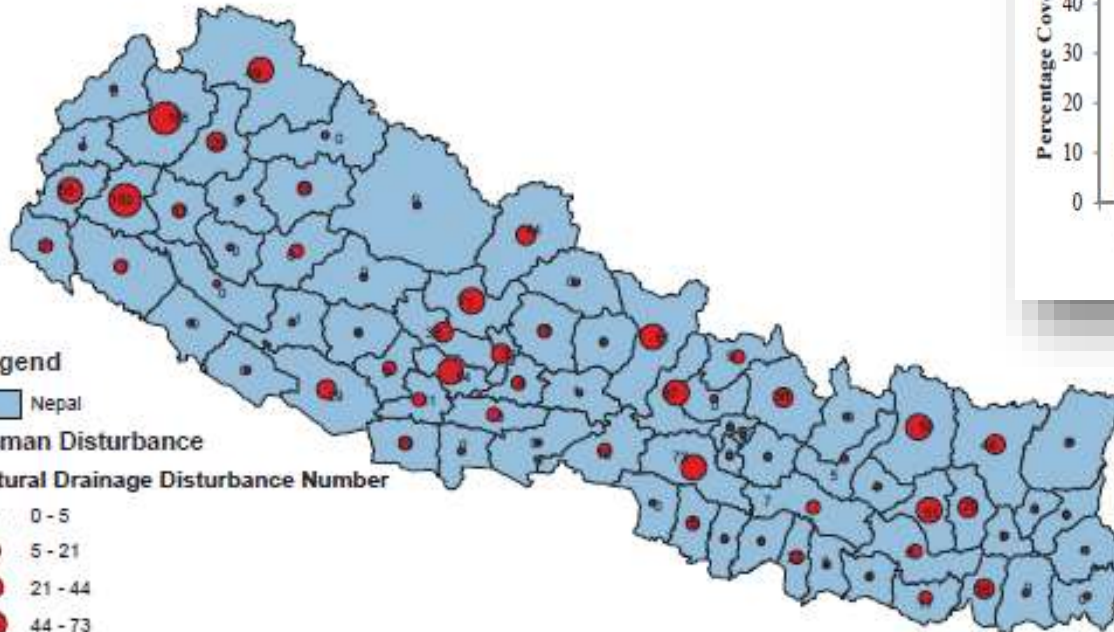
RANK MAP IN TERMS OF AREA



LANDSLIDE AND ASPECTS



LANDSLIDE AND DISTURBANCE TYPES



Legend

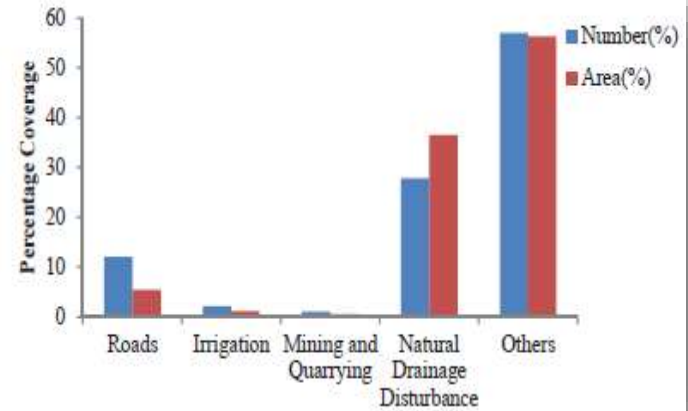
Nepal

Human Disturbance

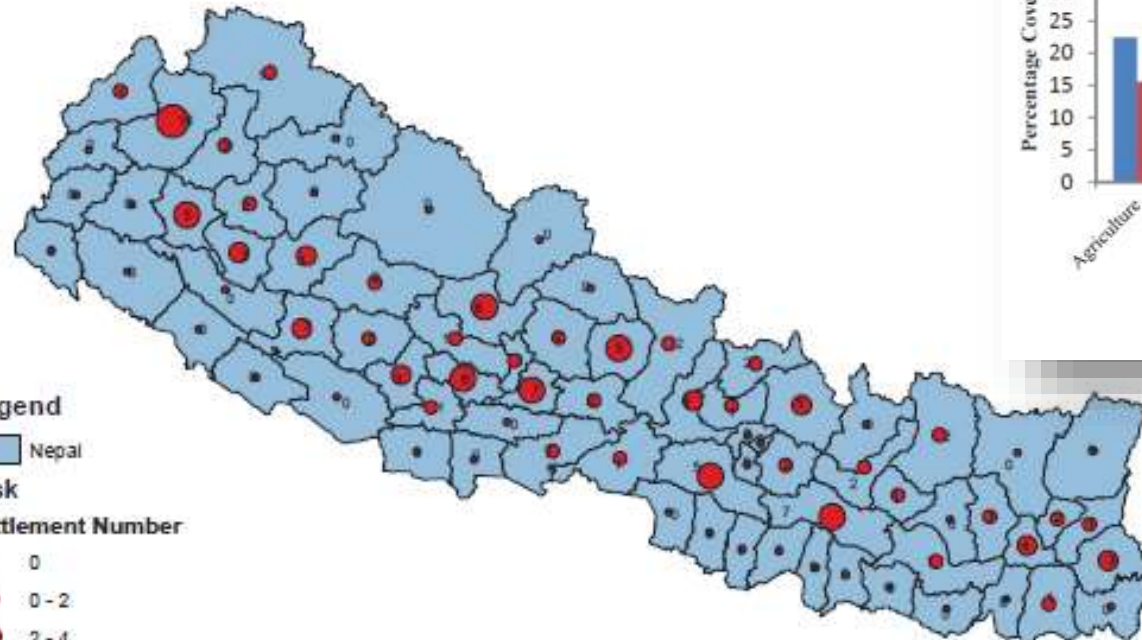
Natural Drainage Disturbance Number

- 0 - 5
- 5 - 21
- 21 - 44
- 44 - 73
- 73 - 188

0 20 40 80 120 160 Kilometers



LANDSLIDE RISK AND SETTLEMENTS








Legend

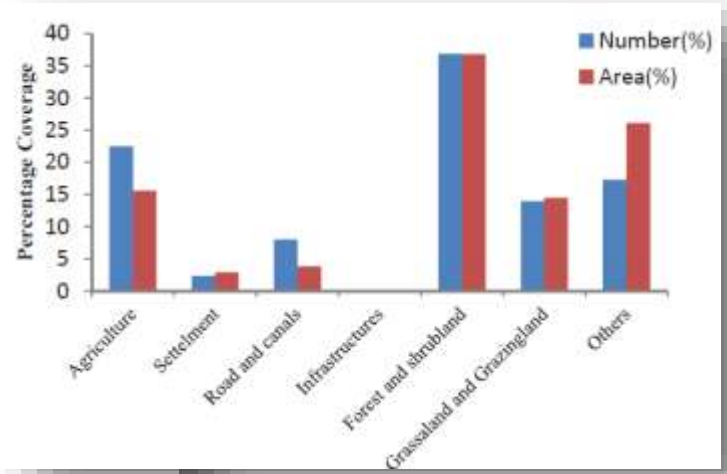
 Nepal

Risk

Settlement Number

-  0
-  0-2
-  2-4
-  4-7
-  7-16

0 20 40 80 120 160
Kilometers



CONCLUSION

- Documented landslides were classified according to their geological and morphological features, by involving 13 graduates of TU-CDES
- Total landslide patches (>1 sq km): 5003; Highest number in Rolpa (258) followed by Bajhang (212), Baitadi (176) and Jumla (175); Lowest in Jhapa, Rautahat and Siraha (8); Landslide area: Highest in Jumla (8,014,039 sq. m); Lowest in Jhapa with (19,175 sq.m)
- Aspect effect: South contained highest number/area (43%) of the total landslide
- Land use and land cover type: Highest number of landslide in shrubland (782) and dense forest (779); Forest and shrub-land was at highest risk (1844 and 1125 landslides)
- Disturbances: Road contributed 603 patches of landslides.

ACKNOWLEDGEMENTS

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