

# FIG

Kathmandu, Nepal 14-16 November

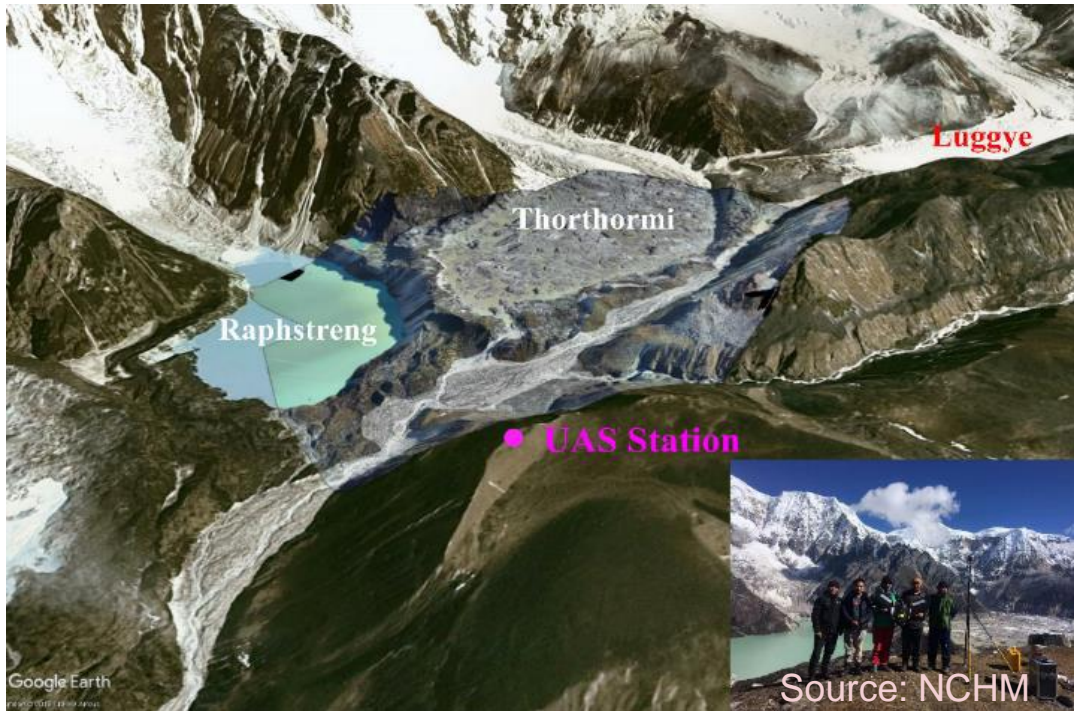
# REGIONAL CONFERENCE 2024

*Climate Responsive Land Governance and Disaster Resilience: Safeguarding Land Rights*



*Presented at the FIG Regional Conference 2024, 14-16 November 2024 in Kathmandu, Nepal*

## “Highland residents relocate as GLOF fear looms”



<https://kuenselonline.com/highland-residents-relocate-as-glof-fear-looms/>

July 15th 2024



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The FIG logo consists of the letters 'FIG' in a bold, white, sans-serif font, set against a red background with three vertical white stripes.

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## NATIONAL LAND USE ZONING (NLUZ): A Harmonized Approach for Climate-Responsive Land Governance.

### Authors

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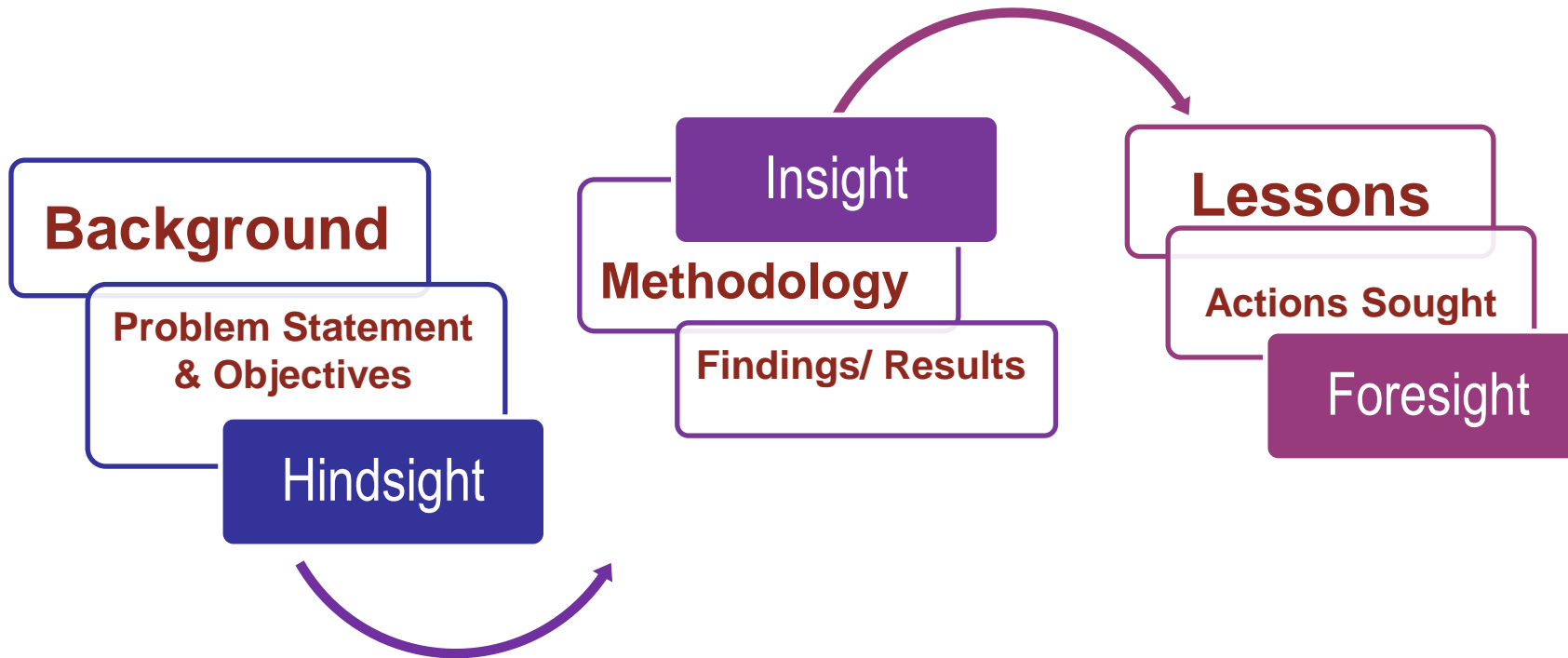


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## Outline





## Background

- GNH pillars, domains and indicators.
- Constitutional requirements to ensure 60% forest coverage.
- SDGs link to land use harmonization.
- Require zonation of PAs comprehensively (NBSAP, 2014; 2024).
- Require identification and prioritization of land uses and demarcation; ecological carrying capacity; land conversion plan and integration of food & nutrition security plan (BSoE, 2016).
- Require zoning of vulnerable areas of natural hazards (BNAPA, 2006).
- Concerns
  - Country's glaciers are estimated to have lost about 1.3% of their area each year.
  - Competing and conflicting land uses are high vs. limited arable land.
  - Poor land use costs a nation 9% equivalent of the GDP (UNCCD, 2018).



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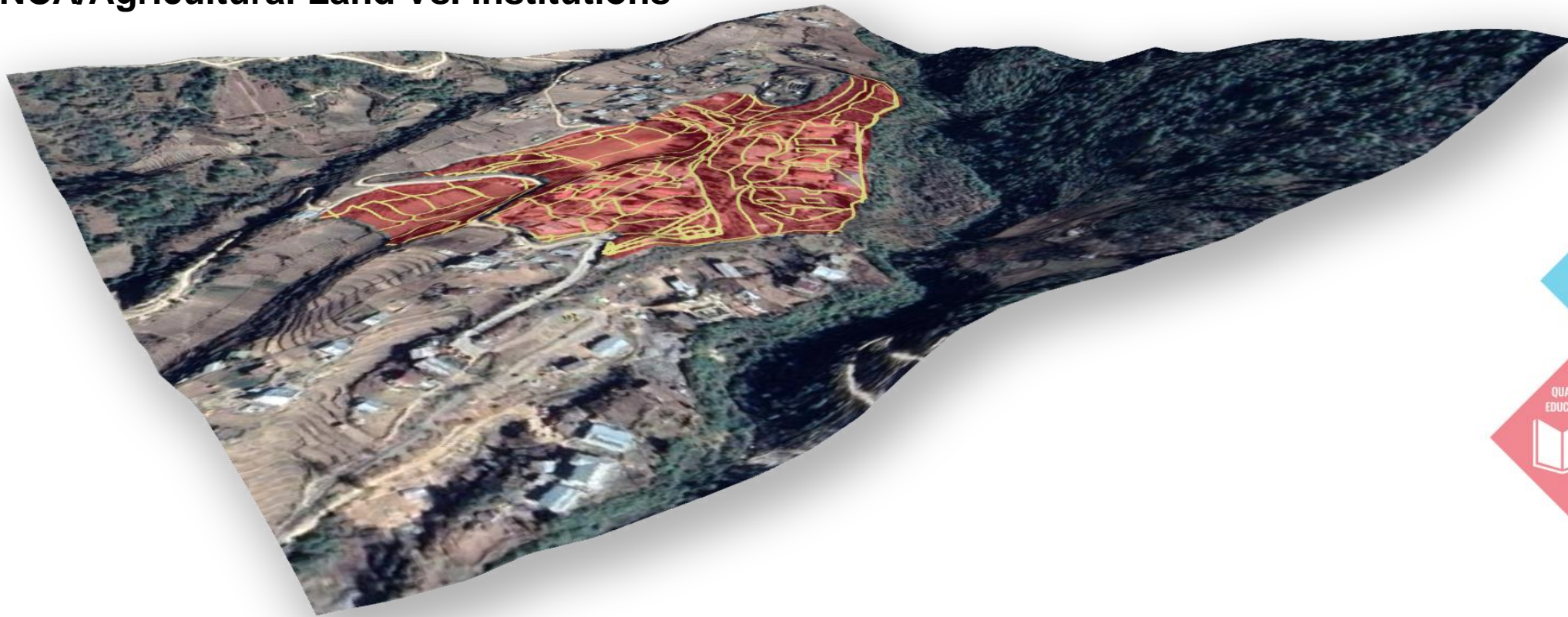
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## Instances of land use conflicts

### NCA/Agricultural Land Vs. Institutions



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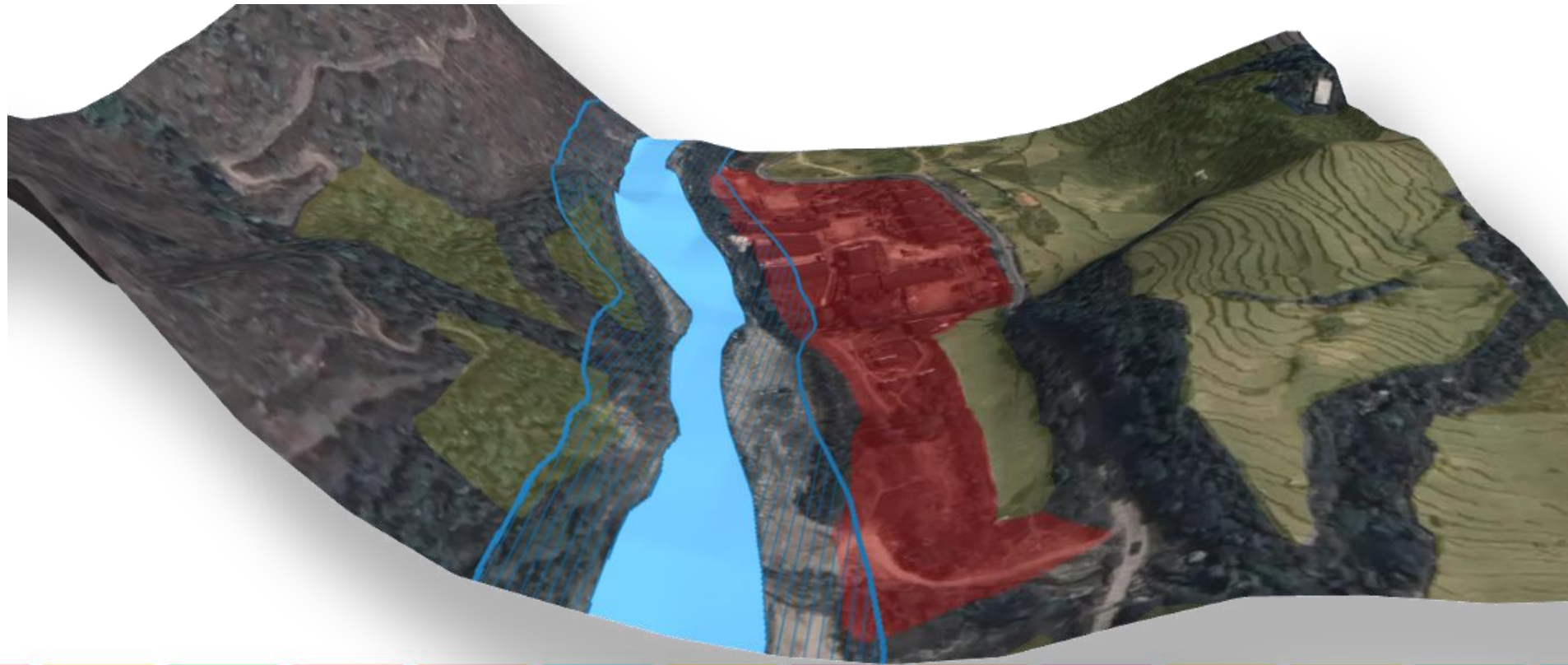
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## Instances of land use conflicts

### Settlement Vs. Hazard and Risk Buffer



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## Instances of land use conflicts Settlement/ Institution Vs. NCA



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## Instances of land use conflicts

### Settlement Vs. Industrial



2010



2022



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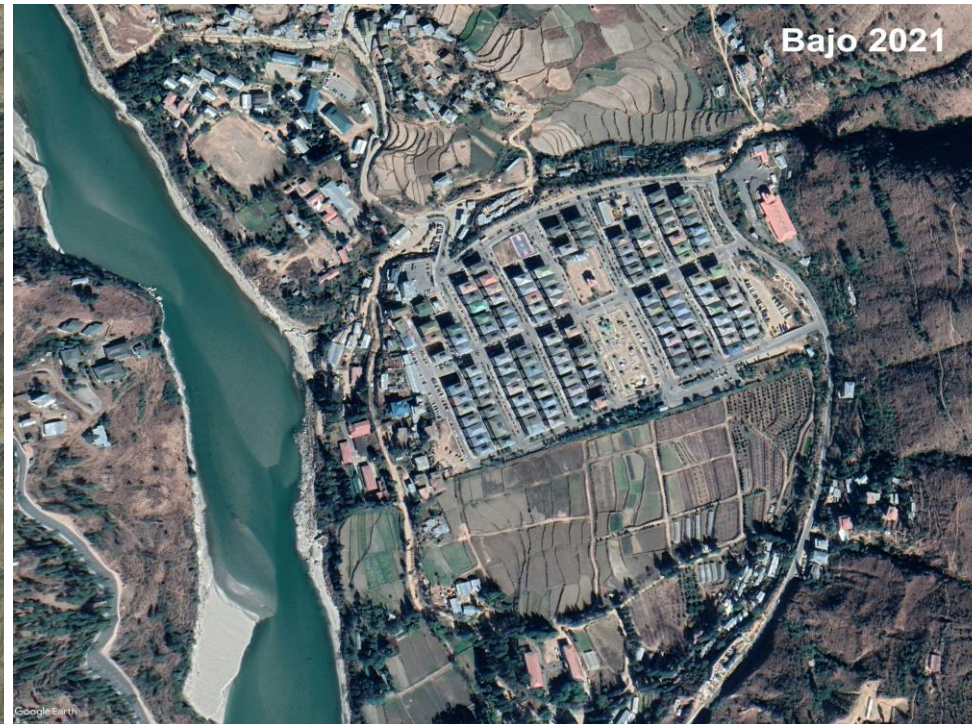
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## Instances of land use conflicts

### Agricultural Land/ GLOF Risk Vs. Urban



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## Problem Statement

Effectively harmonizing land uses due to competing and conflicting interests among various stakeholders is a challenge, making it difficult to manage diverse land uses in a climate-responsive manner.

- No unified platform to support spatial decision making process;
- Limited national spatial envisioning, code/ordinances/policy; and
- Land requirements met haphazardly.

## Objectives

Assess NLUZ initiative as an approach to CRLG, fostering unified land use system (SDSS) that enhances climate responsive, resilience and harmony.





## Methodology

### 1. International Standpoint

- 1.1. Land Use Zoning
- 1.2. Land Use Harmonization
- 1.3. Land Use & CRLG.
- 1.4. SDG Examinations

Over 500 studies are likely available in academic journals, governmental and intergovernmental reports, and research databases that examine the link between land use zoning and climate-responsive governance.

'Ecosystem-Based Adaptation (EbA), Climate-Smart Agriculture, landscape approach, Ecological Red Line Policy'

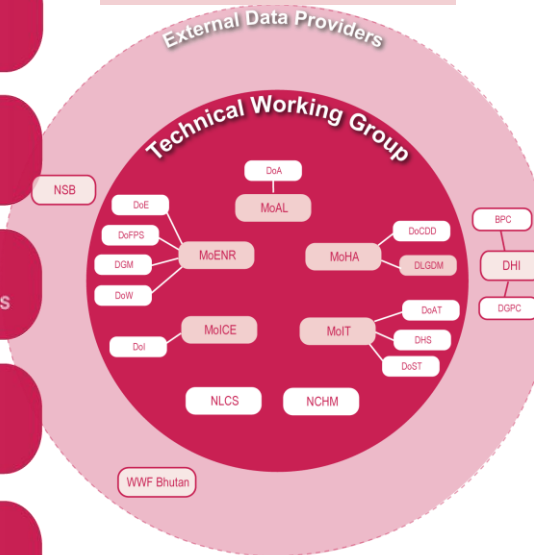
### 2. National Standpoint (NLUZ baseline)

#### 2.1. LULC 2020

#### 2.2. Geospatial

- 1 **Cleaning**  
Data Acquisition & Validation
- 2 **Platform**  
Spatial Data Inventorization
- 3 **Parameterization**  
Defining Feature Datasets & Zones
- 4 **Validation**  
Geo Processing & Analysis
- 5 **Report**  
Visualization & Zone Outputs

#### 2.3. Stakeholders



### 3. Land Use Conflict Assessment



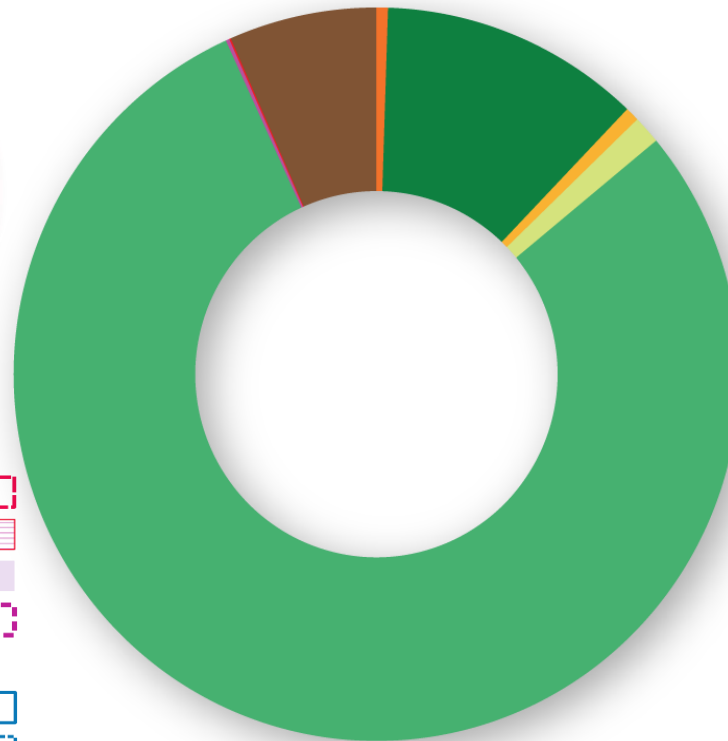


## Findings (Land Uses)

9 Macro Zones  
23 Micro Zones  
23 Nano Zones

### Right Of Way / Buffer

Heritage	
Road	
Powerlines	
Flight Funnel	
<b>Hazard and Risk</b>	
Rain Induced Flood	
Glacier Lake Outburst Flood	



- 6.59% Agriculture
- 0.07% Cultural
- 0.16% Industrial
- 79.18% Nature Conservation Area
- 1.24% Rangeland
- 0.63% Rural Settlement
- 11.16% Sustainable Forest Management Area
- 0.50% Urban





## Findings (Land Use Conflicts)

Macro Zones & Conflicts	Agriculture	Culture	Industrial	NCA	Rangeland	Rural Settlement	SFMA	Urban	Total Zone Area
Agriculture	418561.253								
Culture	314.200	4688.512							
Industrial	115.628	0.200	10260.717						
NCA	31,100.747	562.123	292.065	5032772.23					
Rangeland	1.366	0.000	0.000	66,821.229	78740.372				
Rural Settlement	0.174	156.944	13.265	5,076.572	0.000	39810.305			
SFMA	22,386.889	405.674	595.324	79,463.192	0.000	3,392.172	739432.446		
Urban	1,890.826	738.963	523.179	1,311.249	0.000	1,546.606	1,571.707	31,908.851	

Conflict Area	Agriculture	Culture	Industrial	NCA	Rangeland	Rural Settlement	SFMA	Urban	Total
Powerline_ROW	2,025.304	7.234	95.213	2,071.780	0.000	141.685	1,337.037	242.128	5,920.381
Road_ROW	1,334.337	9.341	60.046	2,703.264	0.000	305.421	2,617.724	0.000	7,030.133
Flood Hazard Zone	104.696	0.031	205.209	0.000	0.000	11.832	93.405	106.729	521.902
Flight Funnel Zone	219.241	0.287	84.950	0.000	0.000	23.663	168.499	3.159	499.799
Heritage Buffer Zone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	194.727	194.727
<b>Total</b>	<b>3,683.578</b>	<b>16.893</b>	<b>445.418</b>	<b>4,775.044</b>	<b>0.000</b>	<b>482.601</b>	<b>4,216.665</b>	<b>546.743</b>	<b>14,166.942</b>

**Macro to macro:**  
436,560.588 acres

**Buffer to buffer:**  
14,166.942 acres



- Conflicts & impact ranging from medium to high with limited/ unclear existing control mechanism.



## Findings (NLUZ for CRLG)

- **General:** State land release and management based on NLUZ would ensure harmonized CRLG.
- **Mitigation:** Comprehensive risk and hazard overlying analysis (GLOF & RIF) can support targeted mitigation strategies (case in Lunana – GLOF at source).
- **Adaptation:** Have informed decision-making and awareness, to protect critical infrastructure and settlements, and not only reduces potential flood damage but also supports sustainable land use practices.
- **Planning:** The innovative strategy (SDSS) would allow comprehensive evaluation of different land uses that coexist or ensure none-negotiability prioritizing climate resilience through the incorporation of environmental protection and disaster-related data (vulnerable and environmentally sensitive areas prior to land release).
- **Preparedness:** Real time data sharing with disaster management agencies using the NLUZ's geospatial database (SDSS/NSDI) would facilitate better EWS, rescue and reconstruct.



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## SDG 6: Clean water and sanitation

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

6.3.2 Proportion of bodies of water with good ambient water quality.

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes Transforming our world.

6.6.1 Change in the extent of water-related ecosystems over time.

## SDG 7 Affordable and clean energy

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

7.2.1 Renewable energy share in the total final energy consumption.

## SDG 11 Sustainable cities and communities

11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

11.3.1 Ratio of land consumption rate to population growth rate.

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

## SDG 13 Climate action

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.1.1 Number of countries with national and local disaster risk reduction strategies.

## SDG 15 Life on land

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

15.1.1 Forest area as a proportion of total land area.

15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type.

## SDG 16 Peace, justice and strong institutions

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.

16.7.2 Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group.

**NLUZ: Overlaying analysis of water sources and watershed areas.**

**NLUZ: PSMP integrations and solar farming areas.**

**NLUZ: Integration and overlying analysis of CNDP and regional human settlement plans.**

**NLUZ: GLOF and RIF risks overlying with other land uses.**

**NLUZ: 52% PA and 69.7% forest land use integration into other land uses; rationalization of unzoned areas (35.07%).**

**NLUZ: Institutional coordination and harmonization in land uses.**

## Findings (NLUZ for SDGs)



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## Actions Ahead

- Continued efforts in harmonized land use strategies (collab) to reduce land use conflicts, improve data accuracy, and streamline decision-making across sectors, redefining and incorporating climate considerations into land uses. Adopt an integrated land use planning framework through SDSS and predictive models for all.
- Adaptive and dynamic land use zoning to regularly update zoning maps to reflect changing climate conditions and emerging environmental data, that ensure that land use planning remains relevant and responsive to the evolving climate landscape.
- Recommended to develop comprehensive and advanced models to assess how harmonized land use zoning reduces vulnerability to climate change.
- Seeking international/ individual experts and collab.

