



Strengthening Mountain-Lowland Connections in the HKH Region

Need for a transformative change
(recrafting and replacing failing system, institutions
and infrastructure) **in Sustainable
Mountain Development**

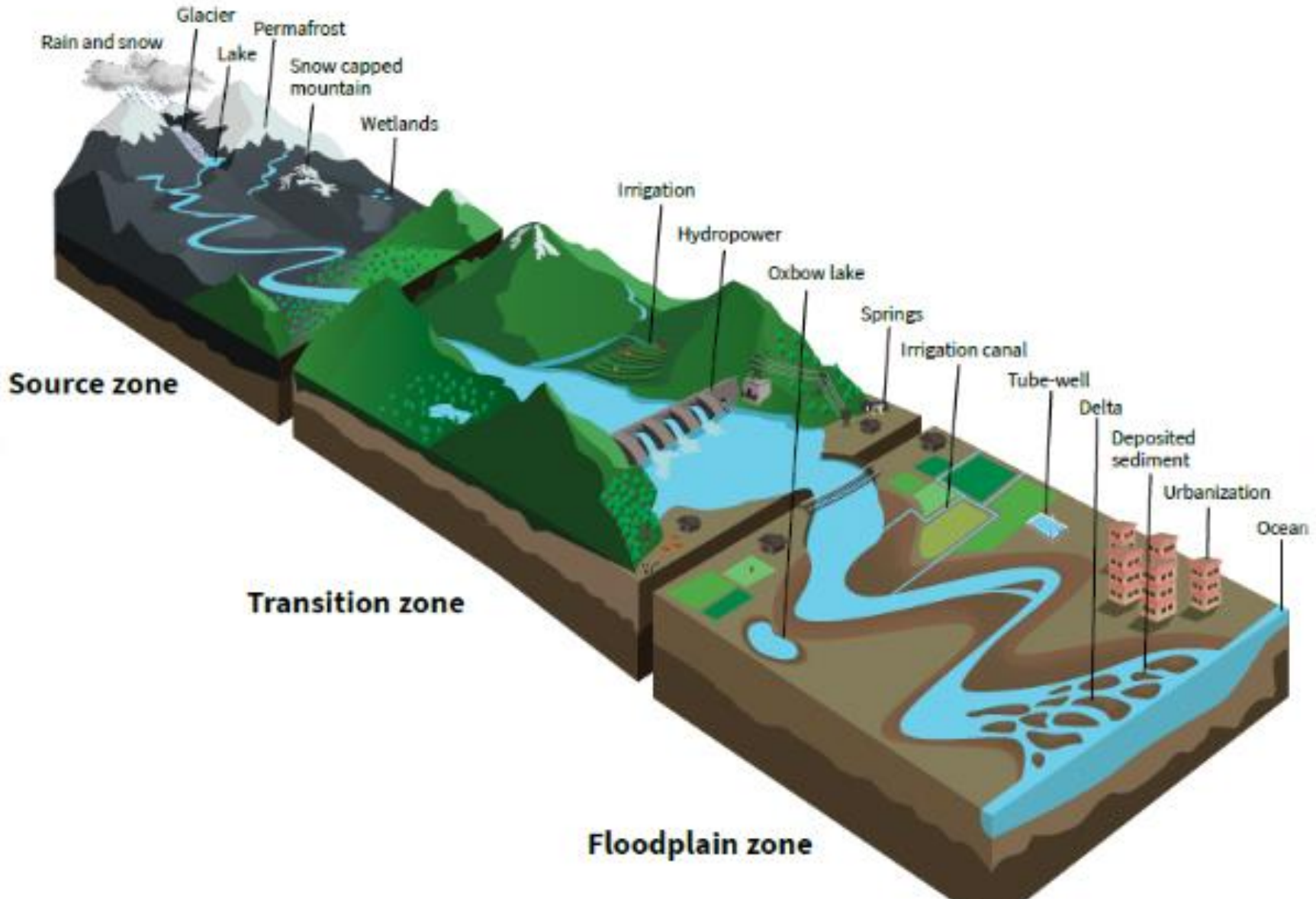
Madhav Karki, IUCN/CGED/IPBES/IOF & Nagdev Yadav, CDAFN

What is Mountain-lowland (M-L) or Upstream-Downstream connections?

- **Two-way connections of people, goods & services, knowledge and technology**
- **Multi-scale: micro-, meso-, and macro-scales** (e.g. river basin).
- **Cross-sector coordinated** (Mosaic landscape: domestic water use, ecosystem services, irrigation, hydro-power, eco-tourism, supply chain).
- **Multi-disciplinary**: Natural, biophysical and socio-economic disciplines and knowledge system;
- **Interdependent**: (Info. formation and Communication Technology (ICT), Markets; Tourism etc

An example Mountain-Lowland ecosystem

(Credit: ICIMOD)



River Basin/Sub-basin/Watershed: appropriate scales to manage M-L connections

- **Hydrological catchment** containing different sub-basins, watersheds and sub-watersheds,
- **Mosaic landscape** with natural, modified terrestrial and fresh water ecosystems such as forest, agriculture and wetlands
- **Habitat of diverse living beings** co-producing and coexisting through dynamic internal and external interactions
- **Complex and diverse ecosystems** with different structures and functions

Current status of M-L connections in Nepal

- **Unsustainably used; unwisely exploited.**
- **Human use of land have exceeded the natural capacity**
- **Unhealthy and undesirable consequences:** *Land slides, river pollution, soil erosion and dam sedimentation, drying of surface and underground water sources, invasion of alien species, floodplain alteration and habitat destruction.*
- **Possible Reasons:** Uncoordinated decision-making, unscientific management and not following ecosystem management principles

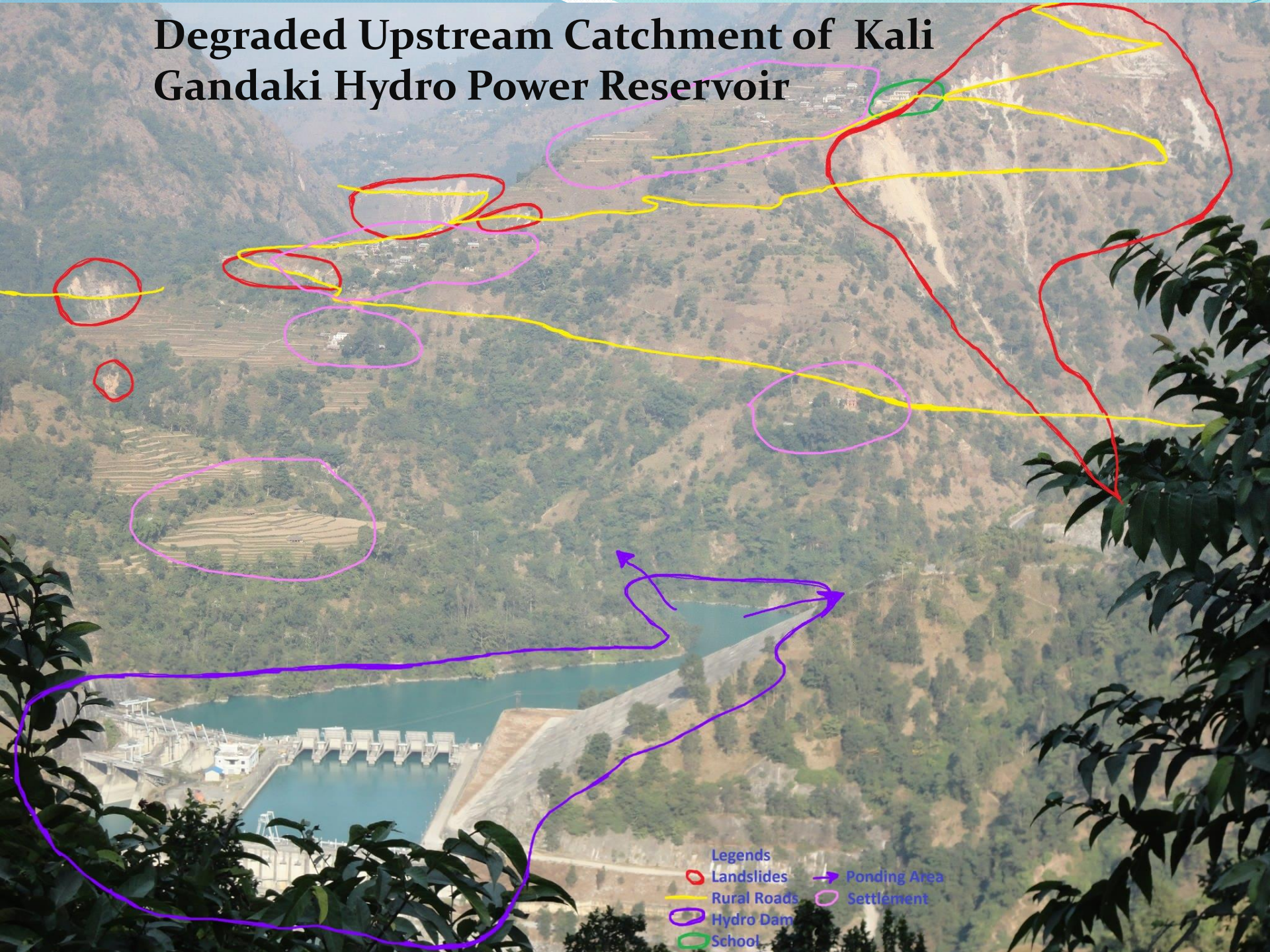


M-L ecosystem services are in a dangerous decline







- Most of the ecosystem service production (ES) are declining;
- **Only the production of food, energy and siltation** are increasing;
- **Future supply** of ecosystem goods and services are at risk.
- **Too Much Too Little Water** situation **more frequent**



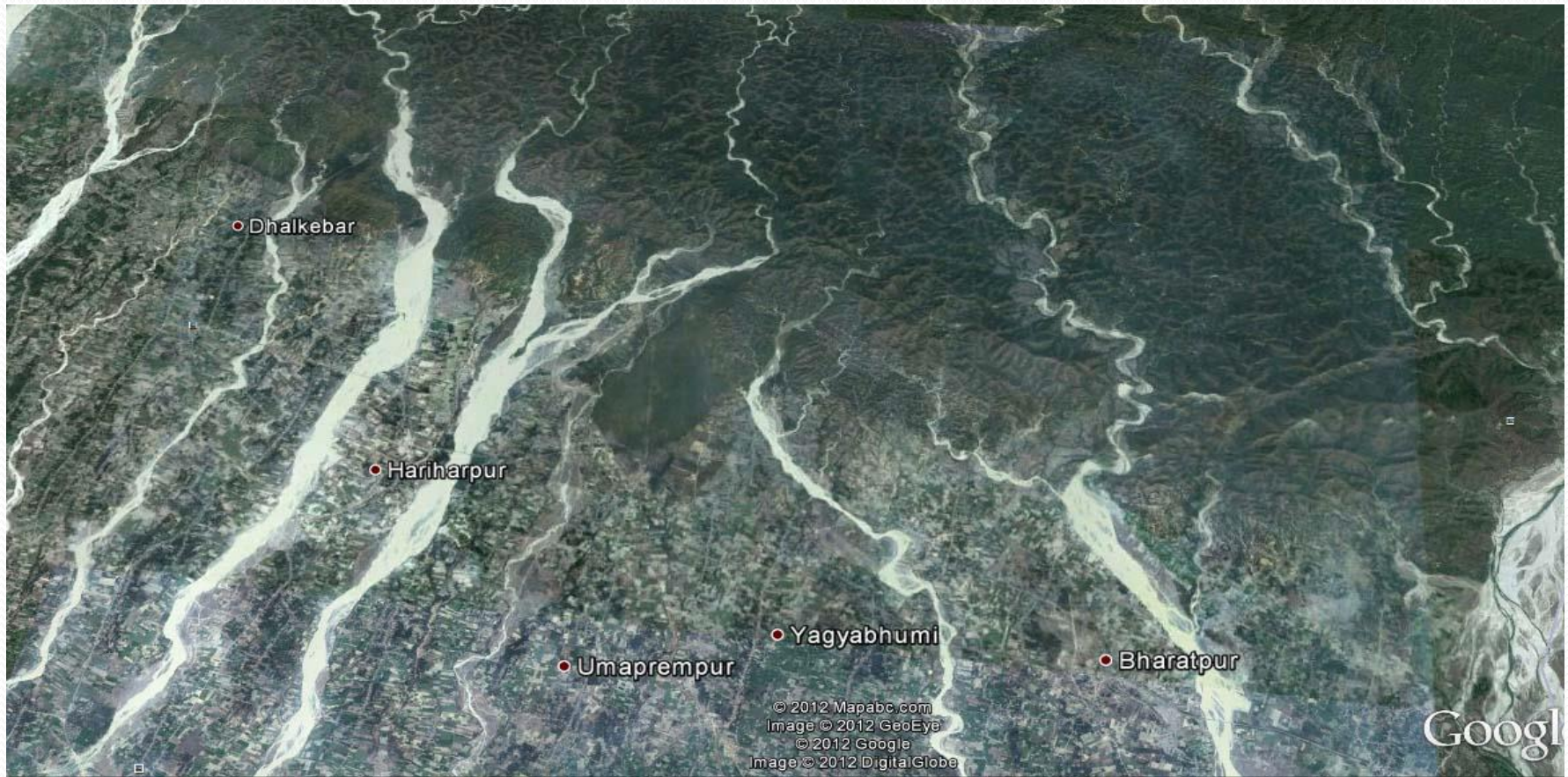
Degraded Upstream Catchment of Kali Gandaki Hydro Power Reservoir



Legends

-  Landslides
-  Rural Roads
-  Hydro Dam
-  School
-  Ponding Area
-  Settlement

Churia Hills and Bhabar Lowland Connections in Dhanusa District, Nepal



Churia Hills and Bhabar Lowland Connections in Mahottari District, Nepal





Flash Flood



River bank erosion

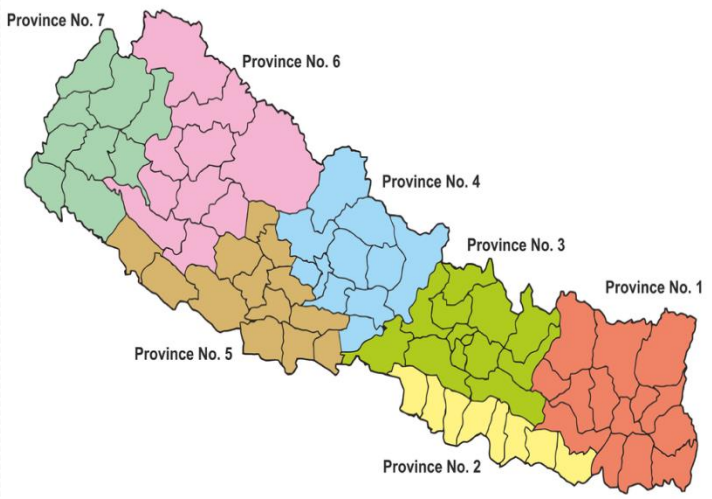


Siltation of downstream riverbeds and land areas



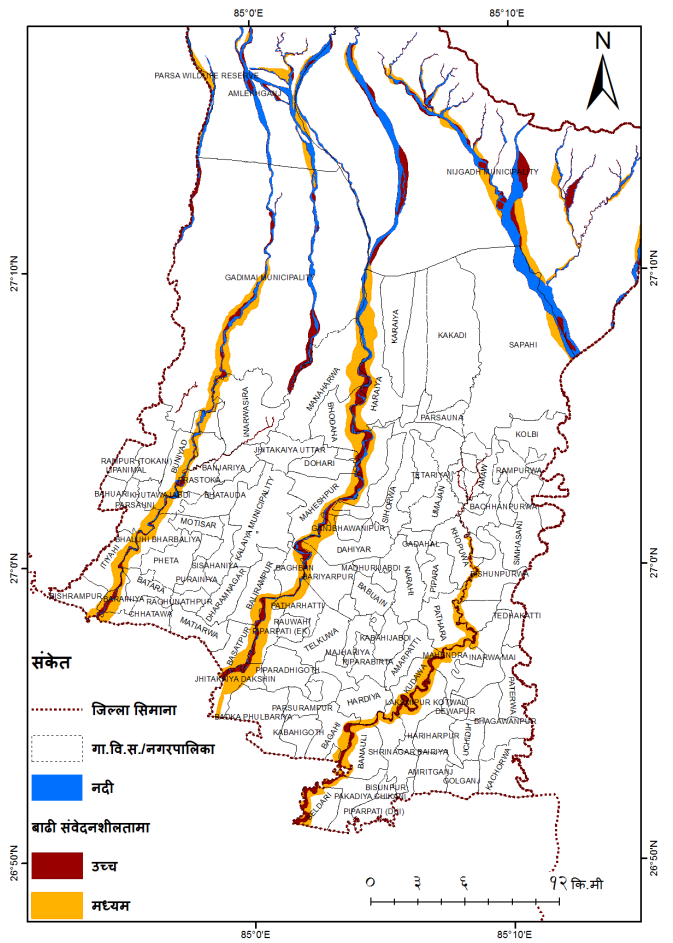
Debris filled Rice field

Mountain_Lowland challenges in Nepal (Politically divided, hydrologically connected)



LAL BAKAIYA RIVER

Makwanpur district (Bagmati)
Bara and Rautahat district
(Madhesh)



Traditional (Water Focused) Vs. Modern (Multiple Use) Management Approaches

Traditional River Basin Planning Approaches	Modern Strategic River Basin Planning
<ul style="list-style-type: none">▪ Infrastructure development goal (focused on irrigation and/or hydro-power)	<ul style="list-style-type: none">▪ Conservation, protection and sustainable production of all ecosystem services
<ul style="list-style-type: none">▪ Largely engineering based planning approach	<ul style="list-style-type: none">▪ Long term & integrated upstream-downstream planning & implementation
<ul style="list-style-type: none">▪ Focused on single issue (water demand); (in Nepal hydropower)	<ul style="list-style-type: none">▪ Focus on all major issues (environmental, economic and social)
<ul style="list-style-type: none">▪ Technical solutions are given higher priority;	<ul style="list-style-type: none">▪ Multi/trans disciplinary planning and interdisciplinary implementation

Principles of Strategic Upstream-Downstream Management in Mountain Landscape

- **Proper understanding of the drivers of change** (Climate, Socioeconomic, Demographic, Pollution);
- **Understanding of complex system need innovative solutions** (business as usual is not an option);
- **Planning based on sustainability framework** that balances social, economic, environmental, institutional and governance factors (**5-pillar**)
- **Integrated and Cross-linked** (cross-sector, cross-scale, cross-disciplinary) and mainstreamed planning for sustainable use and benefit sharing of resources

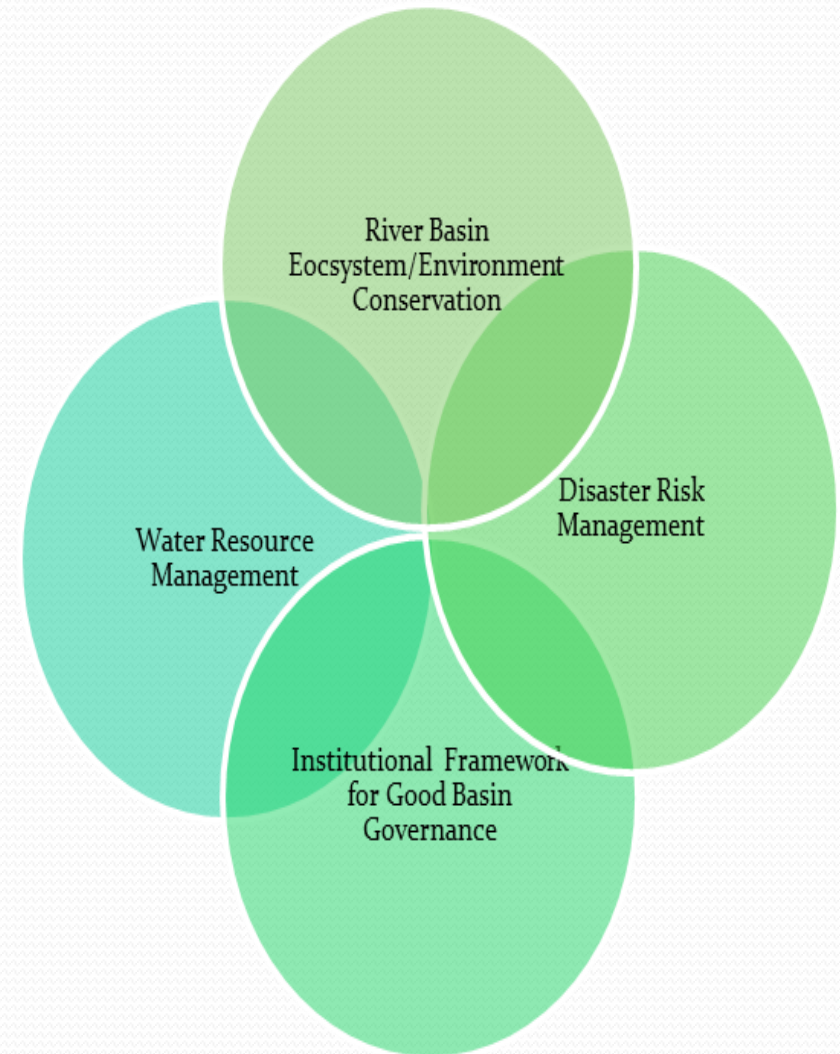
Proposed Approach of Strategic Basin (2)

- **Maintaining environmental flow through better basin water management**
- **Long-term maintenance of EGS by improving ecosystem health**
- **Cooperative and complimentary governance of basin wide resources** among local, provincial and federal government
- **Sustainable use and management of basin EGS** by minimising trade-offs and increasing synergy
- **Multi stakeholder participation and meaningful and active engagement** of all stakeholders;
- **Continuous sytemic, human, technical and instituional capacity development**
- **Cooporation and Co-production in implementation** sustainable production and efficient use of basin

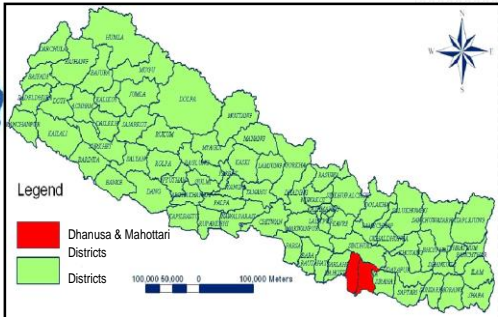
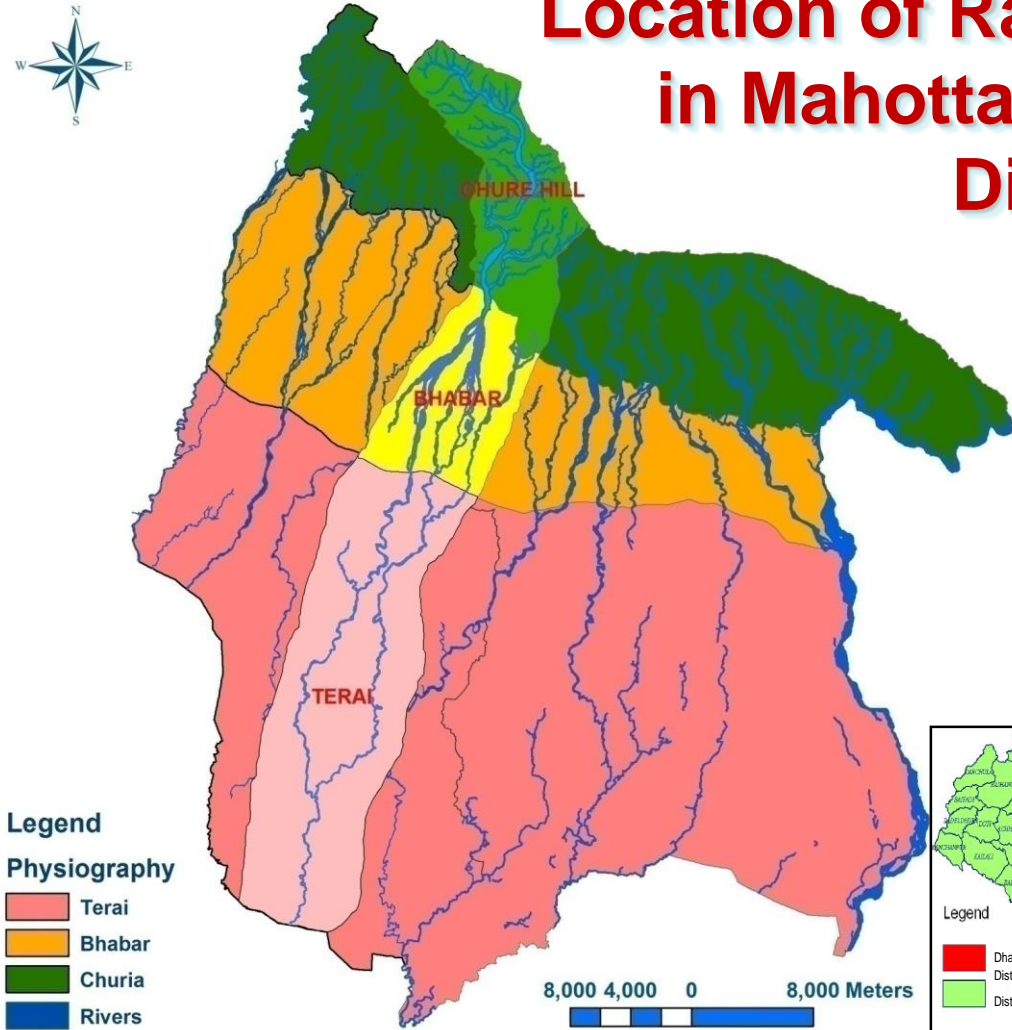
Key themes to be considered in strategic Mountain-Lowland ecosystem management

Based on Nepal's situation, the following thematic and cross cutting areas can be considered in strategic planning:

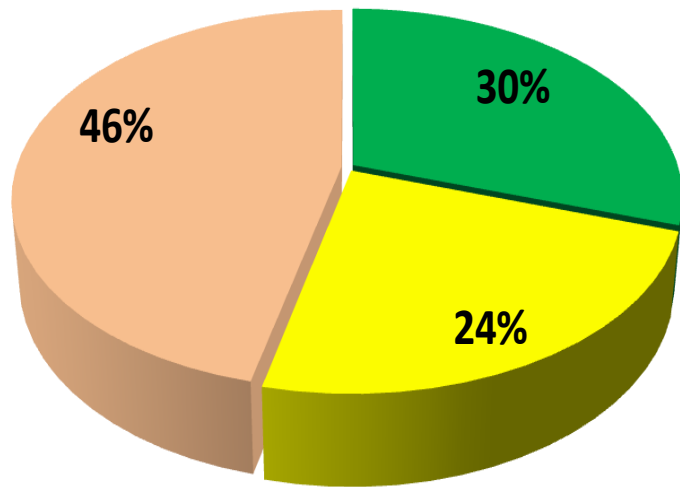
- Ecosystems Conservation
- Disaster Risk Management
- Water Resources Management
- Institutional Framework for Good Basin Governance



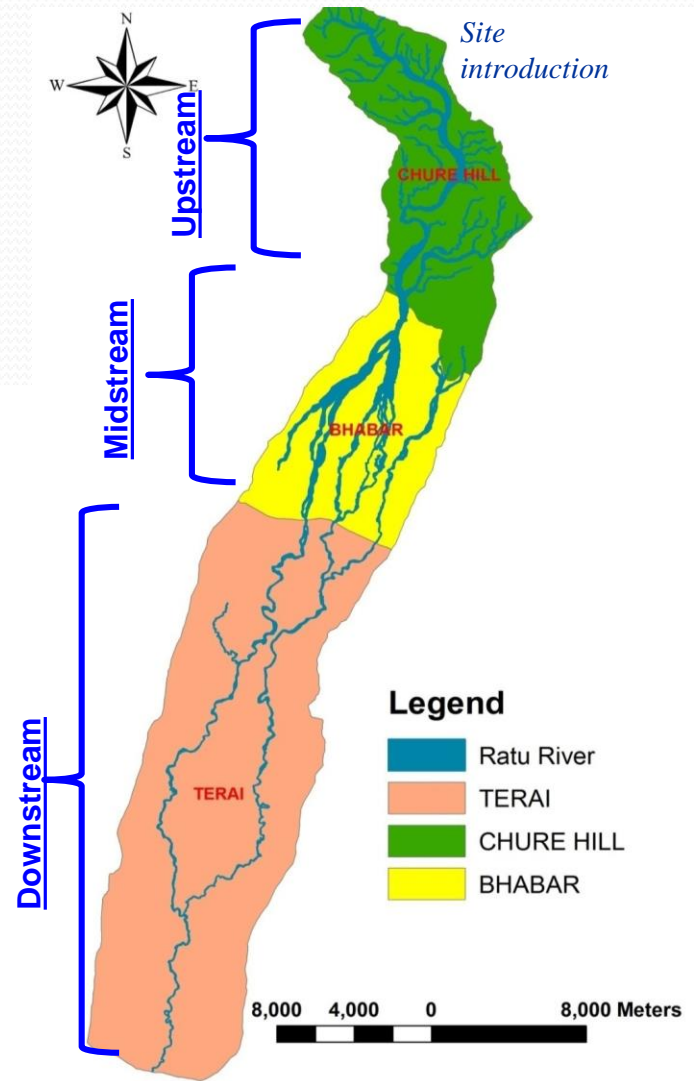
Location of Ratu River System in Mahottari and Dhanusa Districts



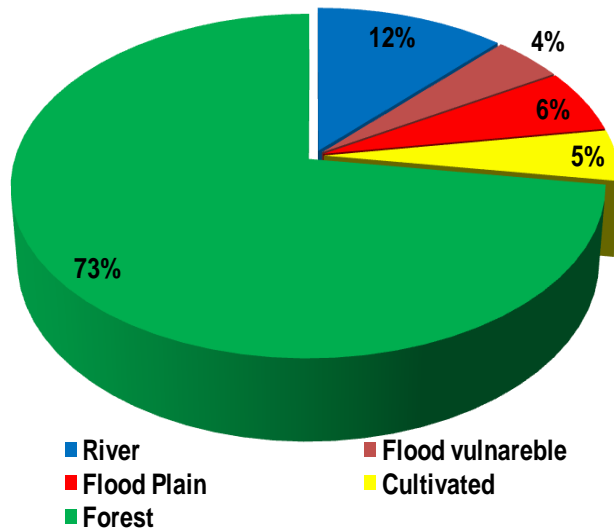
Physiographic Regions in Ratu River System



■ CHURE HILL ■ BHABAR ■ TERA I



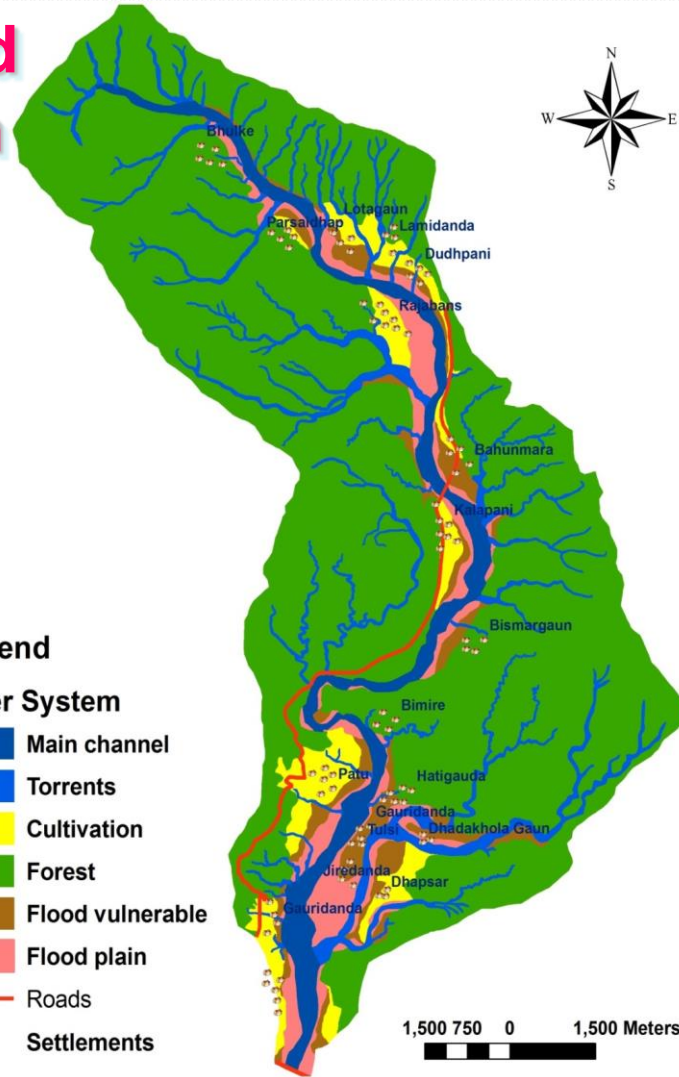
Upper Ratu Watershed in the River System



Legend

River System

- Main channel
- Torrents
- Cultivation
- Forest
- Flood vulnerable
- Flood plain
- Roads
- Settlements



Model 1 (Rain Water Harvest Photos)



Model 1 (Surface Water Harvest Structure)



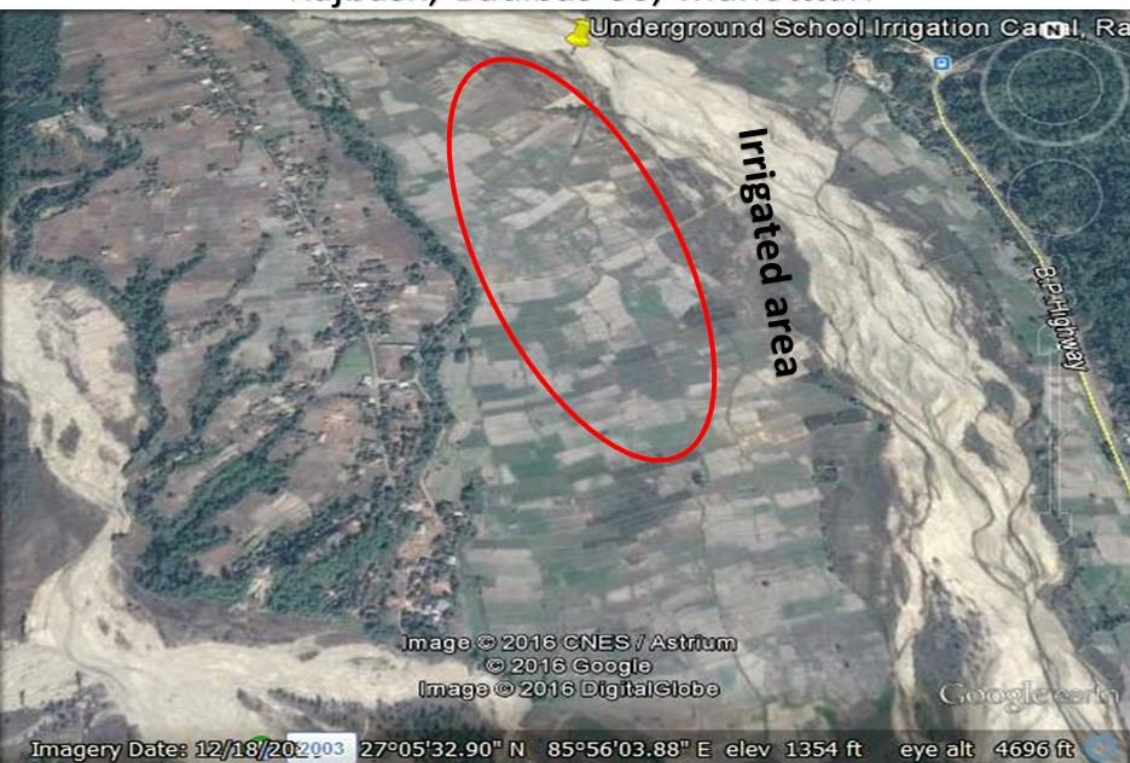
Conserved Water Ponds)



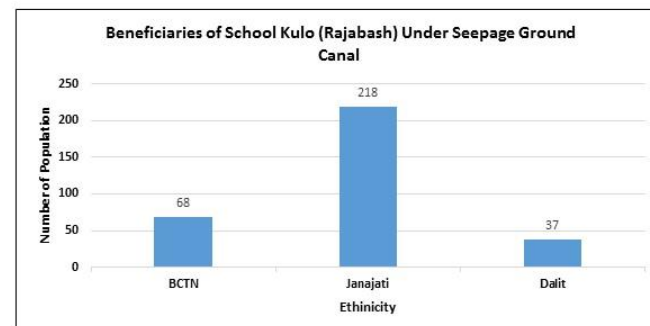
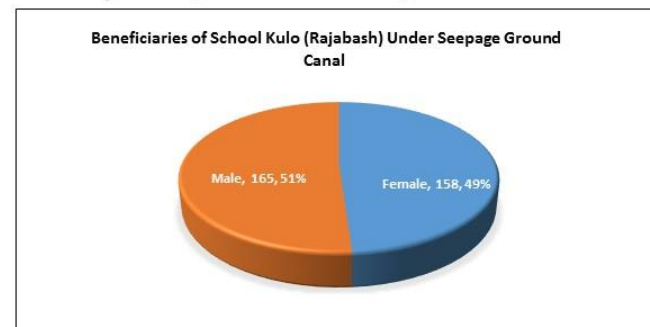
Model 2 (Raising of Seepage Water for Irrigation- location & beneficiaries in Mahottari)



Under Ground Seepage Canal for Irrigation Rajbash, Badibas-06, Mahottari



Under Ground Seepage Canal for Irrigation Rajbash, Badibas-06, Mahottari



Model 2 (Raising of Seepage Water for Irrigation and Drinking)



Revitalised Agriculture in the lowland



Soil erosion and debris flow control in upland



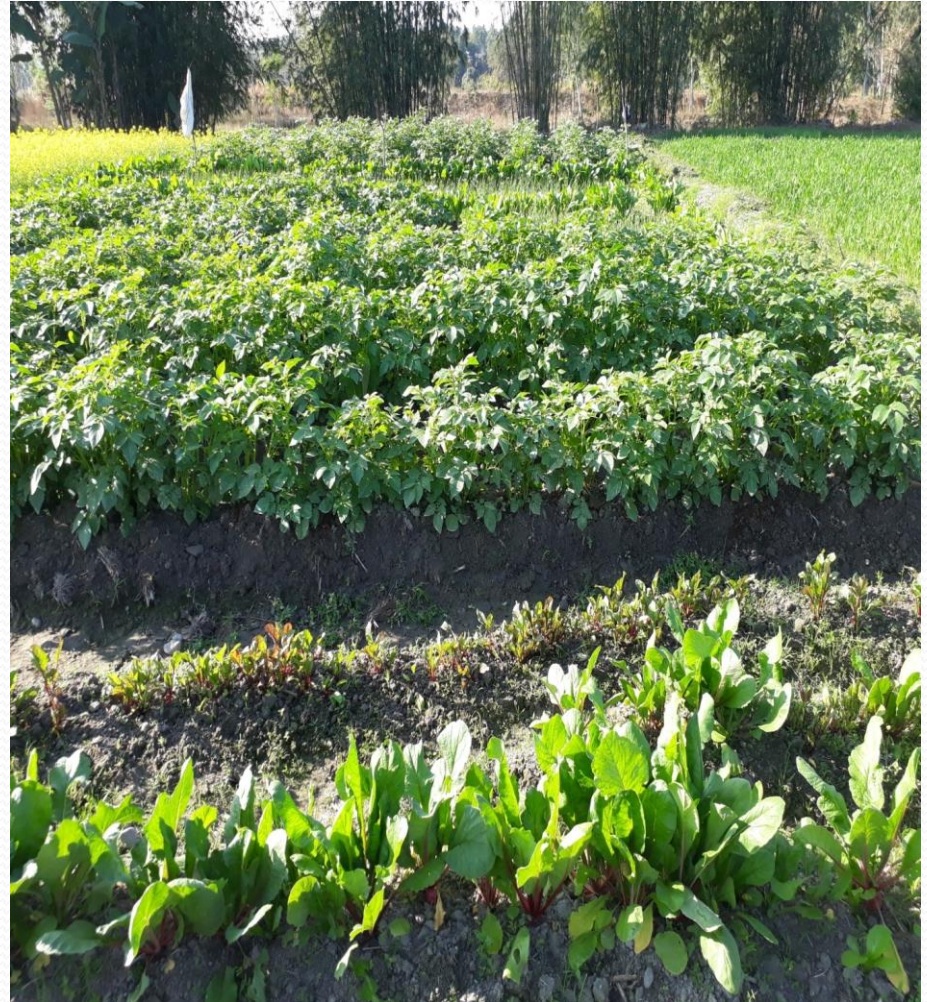
Rehabilitated farms in downstream



Restored Rice Fields in downstreams



Nature Positive Farming and Food System)



Training and Demonstration of Drip Irrigation system in Chure area



Producing for Home and Markets for Nutrition, Cash and Empowerment



Pathways for women's empowerment..

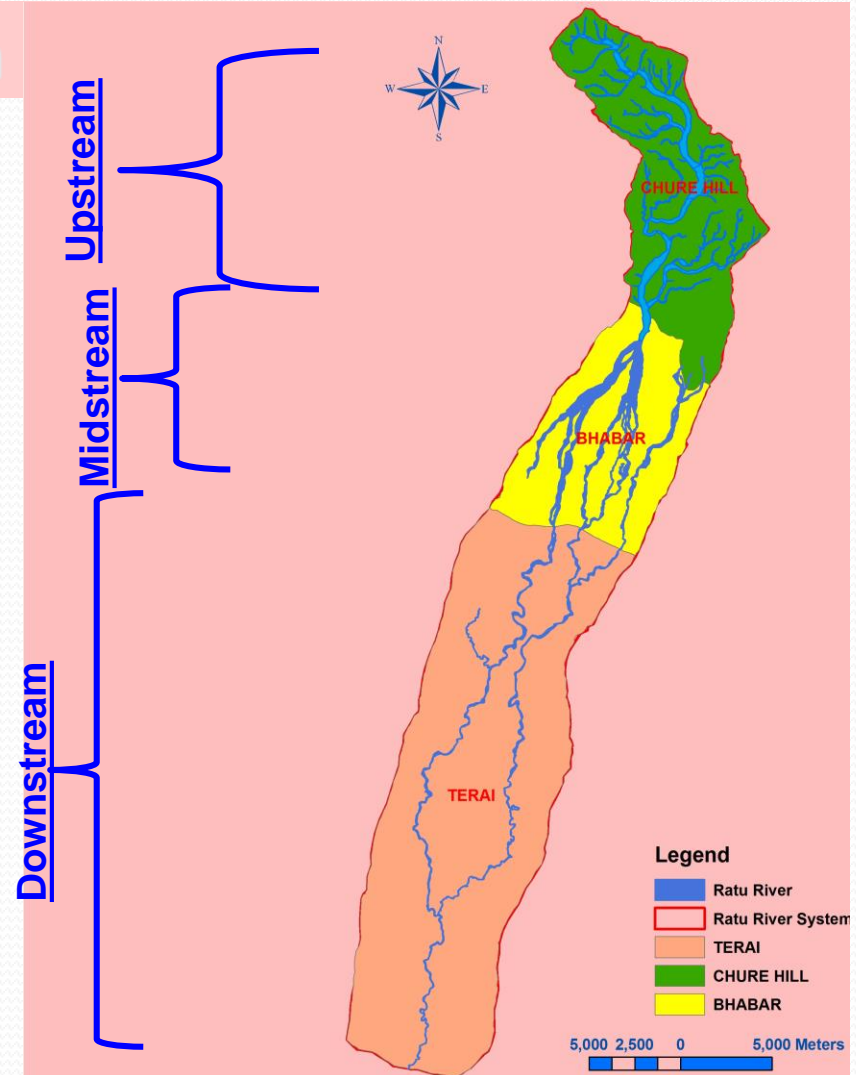


Early Warning System Establishment

Upstream
Disaster Management
Committee

Midstream
Disaster Management
Committee

Downstream
Disaster Management
Committee





Conclusion



Climate

change, socioeconomic
change, political change



**Multiple Use of
ecosystem goods
and services**



**Livelihood, Economy,
Prosperity**

Take Home messages for sustainable ML connections:

1. Build Resilient Mountain/Hill-Ecosystems
2. Respond to multi-dimensional vulnerability
3. Take decision through a) integrated knowledge management; b) networking and c) good governance and equitable sharing of benefits



**Thank you for your
attentive listening**