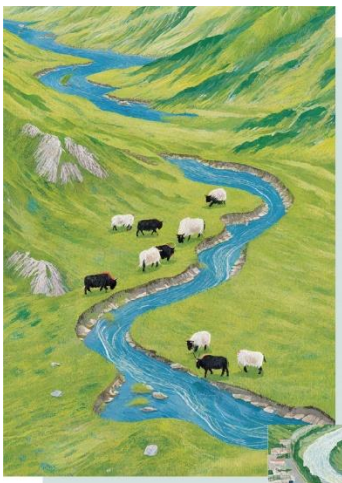
Framing landscape adaptation:

integrating cross-scale sustainability and resilience for scenario planning in China

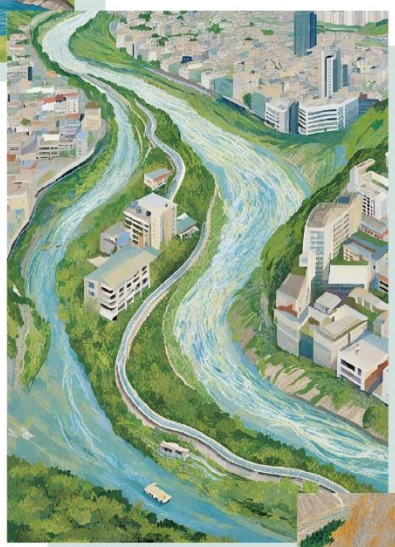
2024.10.17

SUS-RES Group

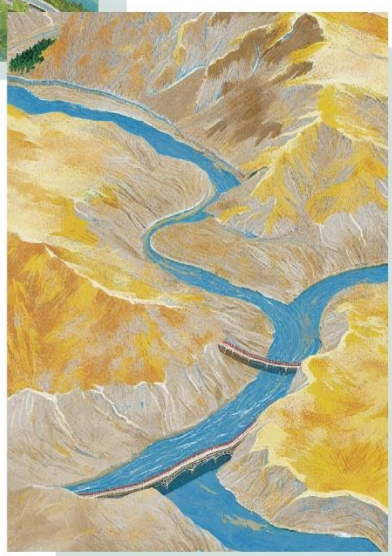
Contents



UPSTREAM



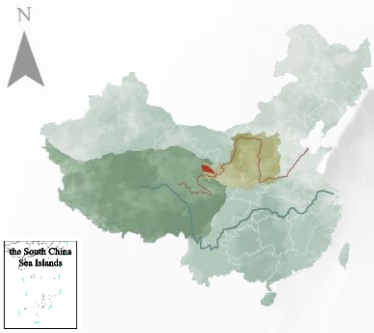
MIDSTREAM



DOWNSTREAM

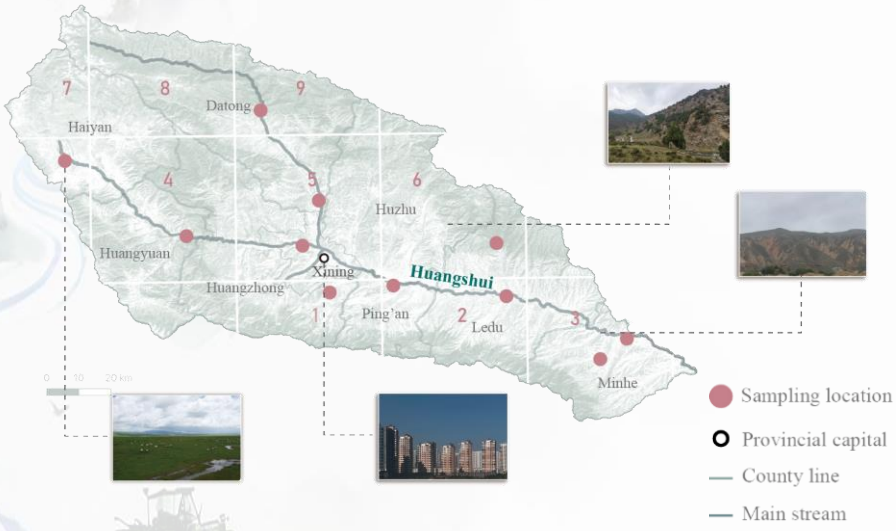
Introduction

Location and characteristics



- This study investigates the Huangshui River Basin, which is located at the transition between the Qinghai-Tibet Plateau and the Loess Plateau. This basin serves as a significant tributary and a major water source for the upper reaches of the Yellow River.

- This basin is a highly typical area of ecological vulnerability and population concentration. Over the past two decades, climate change and human expansion have significantly impacted the basin.



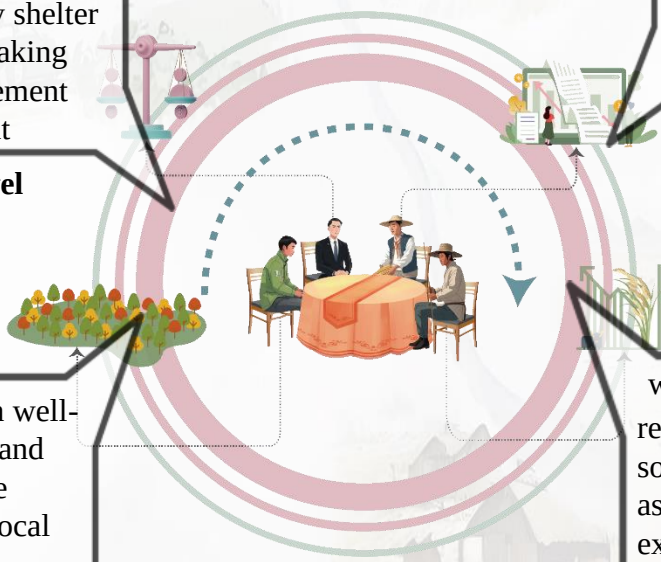
Divergent perspectives

This region serves as an ecological security shelter for our country, making ecosystem management critically important

National level

This region should fulfill national goals while also promoting the coordinated development of our entire province.

Provincial level



We prioritize human well-being in this region and strive to improve the living standards of local residents.

Local level

while maintaining ecosystem resilience, we aim to enhance the social welfare of local residents as much as possible and meet the expectations of both national and provincial authorities.

Our group

Procedure

Field works

1.Three 2-3 week field surveys

In-depth field observation

Interviews with local villagers

Workshop

2. Extensive field observations in:

- Drought-prone areas
- Disaster-prone regions
- Ecological resettlement villages
- Key ecological restoration projects

Google Earth Engine

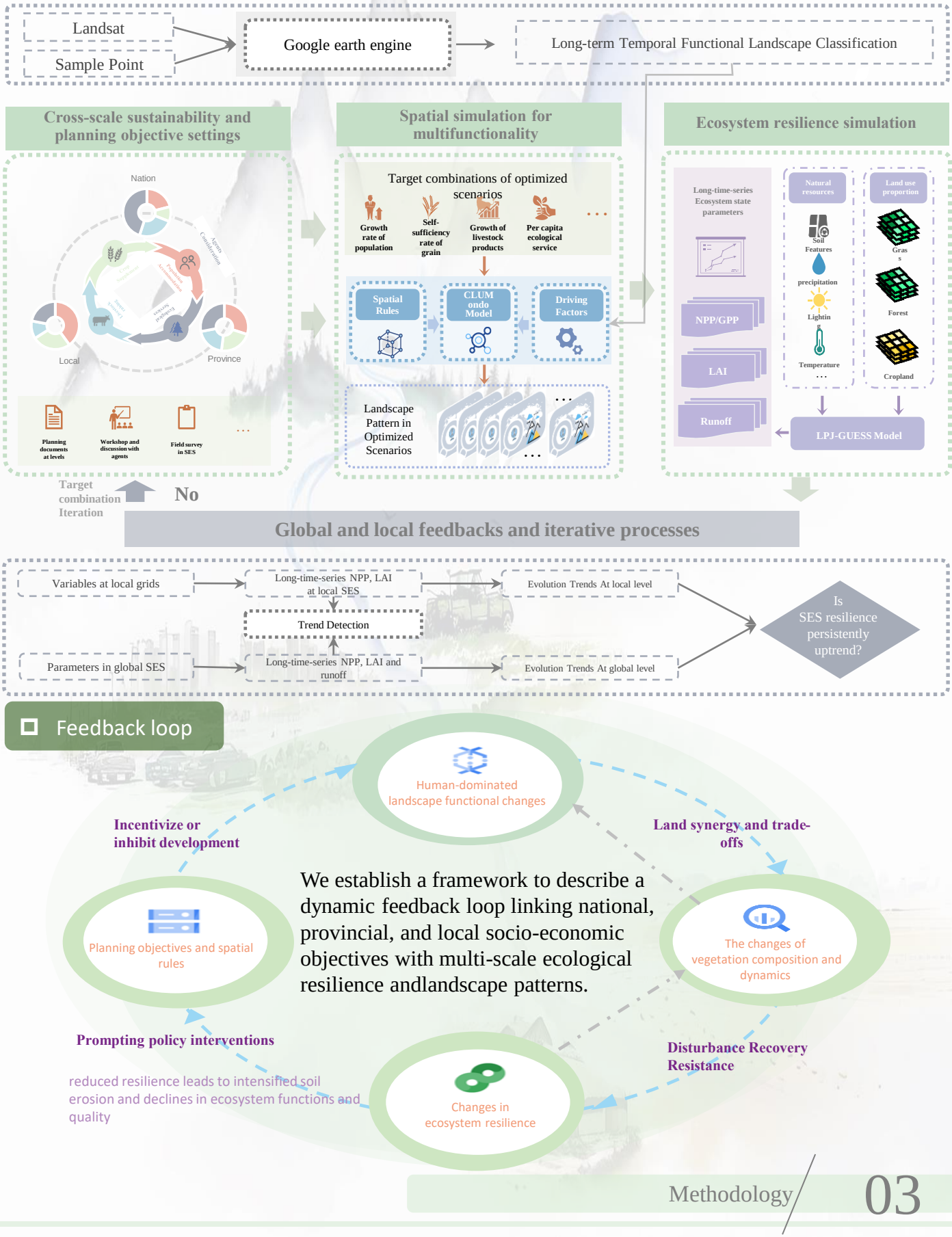
Using the Google Earth Engine platform, we analyzed long-term land system changes in the basin from 1990 to 2020, investigating the drivers behind these changes.

Stakeholder Engagement

1. Roundtables with government agencies
   - Central government agencies
   - Qinghai provincial departments
   - Local governments (Xining and Haidong)
   - County and township authorities
2. Workshops with land stakeholders
   - Large-scale landowners
   - Community leaders
   - Village administrators
   - Individual farmers and herderss

Methodology

Framework

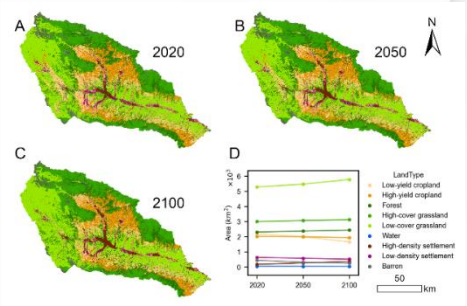


Feedback loop

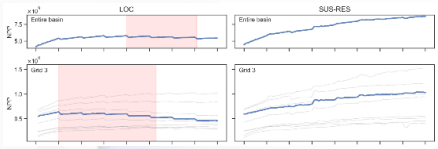
We establish a framework to describe a dynamic feedback loop linking national, provincial, and local socio-economic objectives with multi-scale ecological resilience andlandscape patterns.

Results

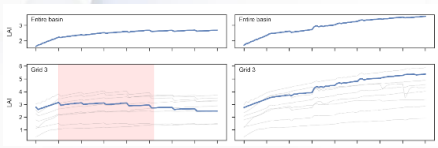
Desired scenario (SUS-RES)



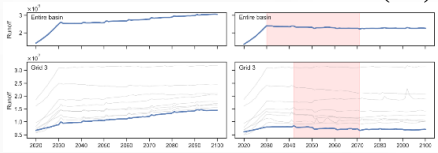
Analyzed long-term land system changes in the basin from 1990 to 2020



Net Primary Productivity (NPP)



Leaf Area Index (LAI)

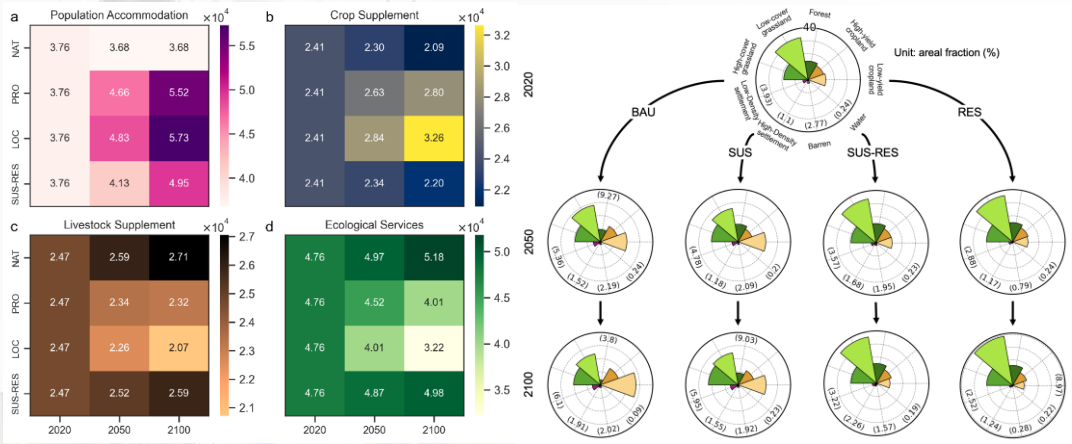


Runoff

"The CLUMondo model to simulate future landscape configurations" and making "to 2050 and 2100"

Scenarios comparison

The conflicts emerging from differing socio-economic goals across various governance levels

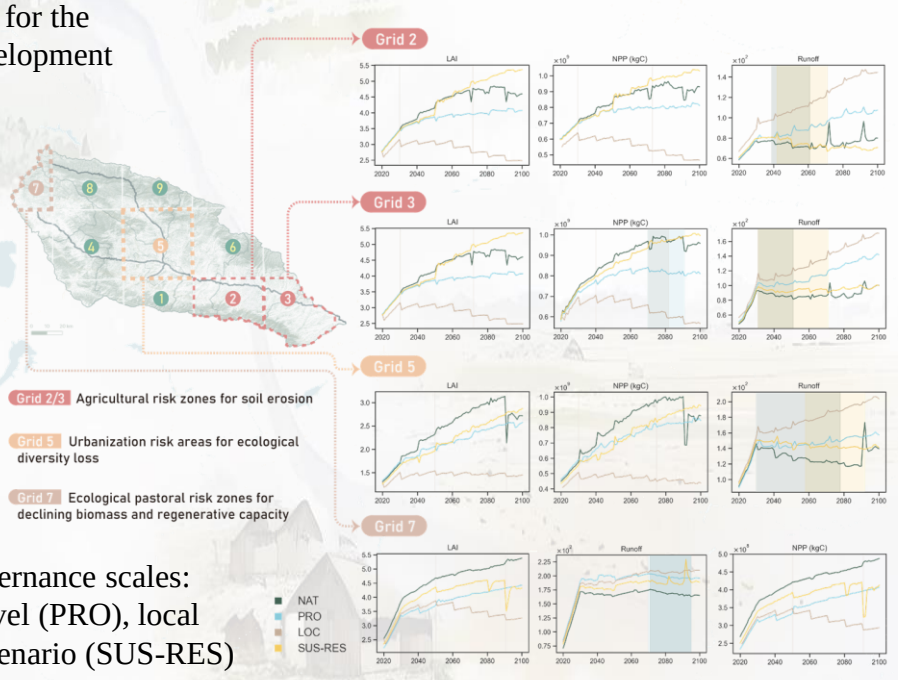


The basin: a critical ecological shelter at the national level, an economic hub for the province, and a center for local development

Aims: balancing socio-economic goals with ecological resilience across multiple governance scales

Four scenarios

- NAT (National level)
- PRO (Provincial level)
- LOC (Local level)
- SUS-RES (Cross-scale scenario)



Four scenarios across different governance scales: national level (NAT), provincial level (PRO), local level (LOC), and the cross-scale scenario (SUS-RES)

Acknowledgments

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This study demonstrates socio-economic goals can be pursued in a way so that they do not compromise ecological resilience, if we plan and manage carefully.

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