

# A Multidimensional Assessment of Ecosystems and Ecosystem Services in Barshong, Bhutan



ICIMOD

FOR MOUNTAINS AND PEOPLE

Mountain ecosystems provide benefits (ecological, socio-cultural, and economic) to human society, but their importance is not fully understood. Under the European Union-funded Rural Livelihoods and Climate Change Adaptation in the Himalayas (Himalica) initiative, the Royal Society for Protection of Nature (RSPN) and the International Centre for Integrated Mountain Development (ICIMOD) carried out a study to understand the state and dynamics of major ecosystems in Barshong, Bhutan, and their value for communities. The results will help plan development strategies.



## Methodology

### Study site

The study was carried out in the Barshong gewog in the Tsirang dzongkhag in south-central Bhutan in the Eastern Himalayas. Most of the site (total area of 21.2 km<sup>2</sup>) is under forest cover, mainly broadleaf and chir pine, with the rest being used for agriculture. The local community relies mostly on agriculture and animal husbandry for their livelihoods.

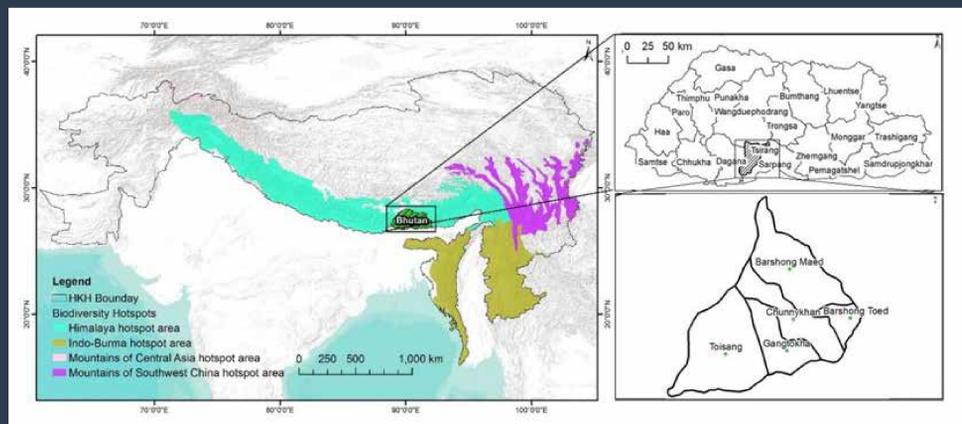


Figure 1: Study area

## Key findings

- The people of Barshong gewog depend on freshwater, agriculture, and forest ecosystems for their livelihoods. These ecosystems provide 22 provisioning services, 14 regulating services, four supporting services, and six cultural services.

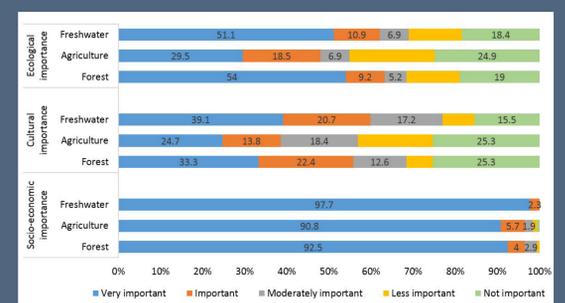


Figure 3: Perceived importance of major ecosystems

- People assigned a high social value to freshwater, agriculture, and forest ecosystems because they are important for livelihoods; a high ecological value to forest and freshwater ecosystems because of their biodiversity and their importance to water and air purification and nutrient enrichment; and a high cultural value to the freshwater ecosystem as water is deeply entwined with the values of Bhutanese culture.
- Agricultural land, fallow land, forest, bare area, and water bodies are Barshong's main land-cover types.
- There is a very subtle change in land use and land cover categories and the flow of ecosystem services over 25 years (1989–2014).

## Methods

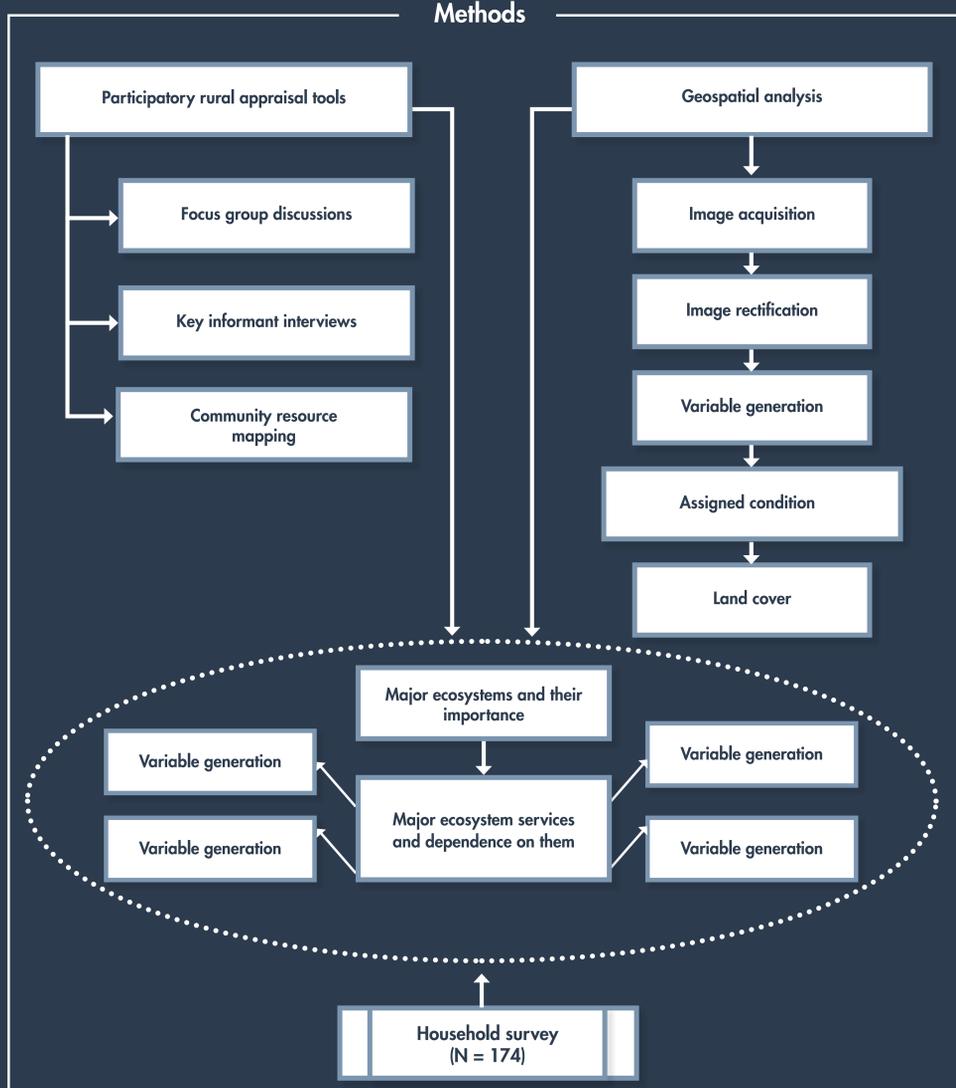


Figure 2: Overall methodological framework of the study

Source: Kandel et al., 2018

## Land use and land cover change analysis

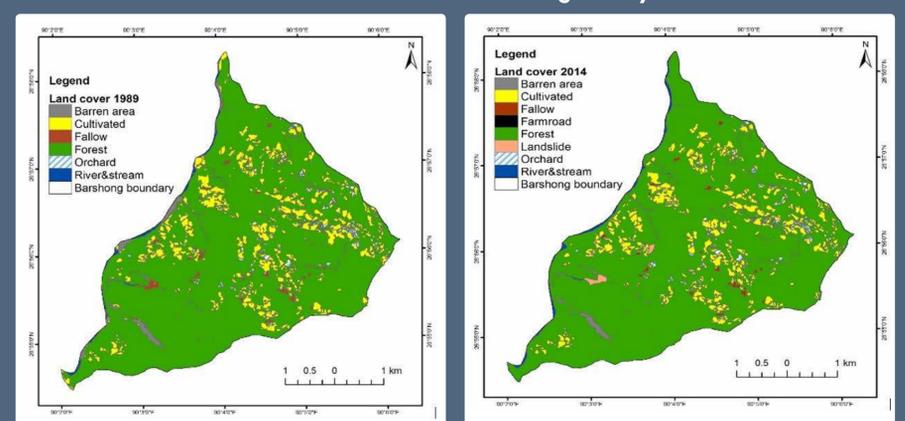


Figure 4: Land cover types in 1989 and 2014

## Changes in the flow of ecosystem services (1989–2014)

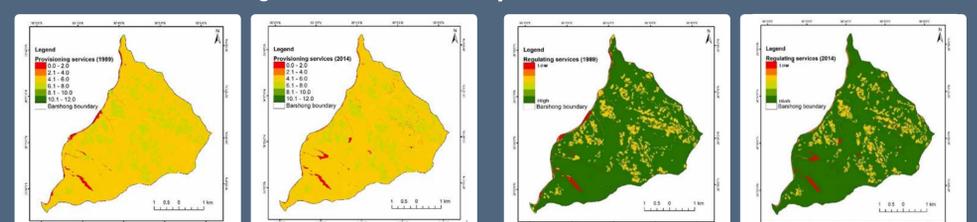


Figure 5: The flow of provisioning services in 1989 and 2014

Figure 6: The flow of regulating services in 1989 and 2014

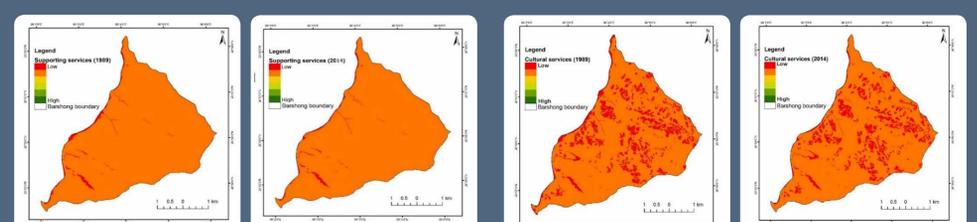


Figure 7: The flow of supporting services in 1989 and 2014

Figure 8: The flow of cultural services in 1989 and 2014