

Summary

08-09-2007

Harald Bugmann: "Global Change Impacts on Mountain Ecosystem Services: Implications for Biodiversity and Policy

Flavia Geiger

Mountain ecosystems are of high importance to humanity because they provide several crucial ecosystem services on a local, regional and global scale: e.g. drinking water, carbon storage, protection from natural hazards, food and fiber. Due to a large number of different ecosystems within a small area (altitudinal gradient, different aspects), biodiversity within mountainous regions is often high.

There exist two key drivers affecting mountain ecosystems: land-use and global change. During the 19th century overexploitation of forest areas resulted in many single-species and even-aged forests. This resulted in a decreased protective function of the forests. However, after extensification since 1950 wood volume increased which in turn influences ecosystem services.

Simulations of future changes were done with RHESSYS, LPJ-GUESS and LANDCLIM:

Major changes will be an increased water runoff in winter, an earlier and lower runoff peak in spring because of decreased water storage and less water in summer. Carbon storage in mountain forests will first of all increase and later decrease (up to 2080) due to increasing deforestation. Implications for policy and biodiversity due to these changes are:

- ↑ carbon storage (through forest area increase) → landscape diversity decreases
- ↑ carbon storage (due to biomass increase) → decrease in light, decrease in species diversity
- ↑ carbon storage (catchment scale) → lower runoff, unknown effect on species diversity
- land-use changes tend to lead to a reduced biodiversity (species, landscape)
- however, changes in disturbances (e.g. fire) may counteract these land-use changes

Discussion points:

- LANDCLIM: Ignoring continuous change of species composition (assumption of immediate migration of species)
- LANDCLIM: missing dispersal and regroupment limitations (not enough knowledge about new species)
- Nature conservation areas are often chosen because of their bad accessibility