

Science for Environment Policy

New ecosystem service accounting method developed and applied on the ground

The use of important ecosystem services, such as carbon storage or hunting, can be estimated through ecosystem accounting methods, a new study demonstrates. The researchers tested models that could help policymakers to understand the capacity of ecosystems to generate ecosystem services, and how these services are used over time.

Ecosystem accounting combines environmental and [economic](#) concepts to address policy questions regarding [sustainable development](#)¹. The need to develop such accounting systems was recognised more than 20 years ago at the United Nations Conference on Environment and Development in Rio de Janeiro. In this study, researchers used an ecosystem accounting approach to show how human use of the benefits provided by ecosystems are balanced against the availability of such benefits.

The researchers focused on nine key ecosystem services in the county of Telemark, in southern Norway. Around 170 000 people live in this region, which encompasses fjords, [forests](#), [lakes](#) and sparse highland plateaus, representing the broad range of landscapes found in Norway as a whole. The services studied include: moose hunting, sheep grazing, timber harvesting, carbon storage in forests, hiking, prevention of avalanches, locations for second homes, and the cultural benefits of near-natural areas without infrastructure such as roads, railways and power lines.

By mapping the areas where each ecosystem service was potentially available—for example, rate of tree regrowth was used to determine capacity for timber harvesting—the researchers demonstrated the 'spatial capacity' for the ecosystem services in Telemark. They then mapped how the ecosystem services are actually being used.

Their method represents a form of ecosystem accounting where those services for which usage is above capacity level are considered to be overused, whereas those with usage below capacity level are underused. The results show that moose hunting was a slightly overused ecosystem service, while sheep grazing was considered underused. In this latter case, the researchers calculated that in certain areas ecosystems could provide fodder for up to 51 more animals per km².

The researchers concede that the present models are rather simplistic. For instance, while their estimates of capacity for second homes assume that suitable cabin space is available in areas where there are already cabins, in reality, land owners and local government could allow for development elsewhere. They conclude that, while useful for ecosystem accounting purposes, the spatial resolution of the ecosystem service mapping is insufficient for land use planning purposes.

The study does provide a potentially useful set of requirements for ecosystem accounting, such as establishing whether and to what extent different ecosystem services conflict with each other. Maps, such as those produced in this study which show balances between ecosystem capacity and use, could be of real benefit to policymakers to understand whether valuable ecosystem services are being depleted, at both county and national level.

Telemark's case study provides a concrete example of how Natural capital Accounting, as developed by the European Commission and the European Environment Agency as part of the EU initiative on Mapping and Assessment of Ecosystems and of their Services², can be applied on the ground and support better informed decision-making at a local level.



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Contact:
matthias.schroter@wur.nl,
david.barton@nina.no

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1. <http://www.unccd2012.org/ind ex.php?page=view&type=700&n r=109&menu=23>

2. Maes J, *et al.* (2013) Mapping and Assessment of Ecosystems and their Services. An analytical framework for ecosystem assessment under action 5 of the EU biodiversity strategy to 2020. Publications office of the European Union, Luxembourg.