How can we measure the contribution of ecosystems to our prosperity?

July 7 2014

Systematic measurements of the condition of ecosystems and their contribution to our prosperity are vital in a world undergoing rapid environmental change. Changes in ecosystems and the climate are often irreversible and the depletion of natural resources is limiting our options. But what is the economic importance of ecosystems, what is sustainable, and more importantly: how can you measure these factors? We need to

understand more about how ecosystems are changing and the impact of our economic practices, says Professor Lars Hein, Professor (holding a personal chair) of Ecosystem Services and Environmental Change at Wageningen University.

Working with PhD students, UN agencies, and a range of partners in different countries, professor Hein wants to shed light on the link between ecosystems and people, building on among others the Millennium Assessment and the TEEB studies that addressed the human impacts of ecosystem change. In his inaugural address entitled 'Ecosystem Services and Environmental Change – From ecosystem accounting to environmental management', he focused on the ecosystem angle. Ecosystems can range from intensively farmed agricultural land to unspoiled natural forests. Which services or benefits do they provide us with, and how can we measure their value using an accounting approach? Hein uses the term 'ecosystem accounting' to describe this concept of measuring and analysing natural capital in terms of its value to mankind. If we can integrate the ecological and economic value into a practical model that demonstrates the relationship between mankind and the ecosystems around him, we will be in a better position to improve the way we use these ecosystems and monitor the sustainability of our practices. The results will enable us to devise strategies for better ecosystem management, says Hein.

Our ecosystems have undergone significant changes over the last millennium, changing dramatically in the last century. This is particularly true in the tropics, where processes such as deforestation and desertification are taking place. Many of these processes are irreversible. Changes in ecosystems are also affecting their beneficial capacities for mankind. So how can we monitor these changes to ensure continued use of the services with a minimum impact on the ecosystems themselves?

Producing palm oil

Together with partners in Indonesia, Hein studied palm oil plantations in Indonesia. Palm oil is a lucrative agricultural product, which generates high returns for the population. But producing palm oil is taking its toll on society and the environment. Hein and PhD candidates devised a model to integrate a large number of ecosystems (including the availability of groundwater, records of CO2, rice crops, but also the protection of orang-utans) and the economic value generated by these ecosystem services, with the ecosystem 'palm oil production'. "This provided a great deal of information about the effect of changes in one service on another service", says Hein. "You may, for example, discover that increasing production in one area has little impact and is therefore acceptable, while the same change in another area would have more negative implications due to a loss of ecosystem services." With PhD student Roy Remme, Hein is also working in the Dutch province of Limburg, mapping seven ecosystem services, including recreation, agriculture, livestock farming, carbon and particulate matter records.

Work on developing 'ecosystem accounting' will continue and should eventually result in an approach that is fully consistent with the system of national accounting used to generate economic indicators, such as the Gross Domestic Product. This will allow us to measure and manage our increasingly scarce natural capital into the future, in much the same way as we measure the value of man-made capital, such as infrastructure or industrial parks.

Provided by Wageningen University