GRACIELA M RUSCH, CO-ORDINATOR OF THE FUNCITREE PROJECT, DISCUSSES THE ROLE OF ECOLOGY WITHIN THE ECOSYSTEM SERVICES FRAMEWORK

Evaluating Nature

The concept of ecosystem services (ES) has emerged from the need to integrate economic development and sustainability by bridging ecological and economic values. In the past 50 years, much of the natural resource-based economic growth has occurred through intensification and more effective food production systems. This development has been successful in increasing the production of food and other valuable goods such as timber and other fibres.

However, important side effects of this management have not received much attention, at least not until the past two decades, and it is only in recent years that the science of sustainability is gaining momentum with the potential to actually change some paradigms of economic growth.

Several recent assessments have shown how higher extraction of goods from Nature and production intensification have resulted in changes in the states and processes of ecosystems, such as the impoverishment of species and their genetic variation, drastic changes in food webs and in species assemblies with consequences on carbon and nutrient cycles.

Degradation trends

At the moment, the border between ecology and economics is a dynamic research area; however, the development within the specific fields has been fairly asymmetric, with significant focus on questions about economic valuation and accounting. In contrast, the development within the fields of biology and ecology has been slower, in part due to scepticism among natural scientists as to the monetary valuation of Nature and to a notion that an anthropocentric and utilitarian view of Nature may not be effective in producing the changes that are needed to revert current degradation trends.

The role of natural scientists and the scientific development of the ecological dimension are essential for both the overall theoretical progress in the field and for the applicability of the ES framework to define strategies of economic growth that are more compatible with life systems. Some important tasks ahead are to identify the critical and most proximate functions that sustain a particular ES, to search for indicators or proxies that can describe the capacity of the natural system to maintain these functions, and to assess how the management of land, marine, and fresh water systems affect this capacity.

Proxies of ecological function

The field of functional ecology opens new avenues to explore the question of indicators of ecological function. The approaches developed in this area aim to characterise organisms according to characteristics that are related to functions, such as those involved in carbon and nutrient acquisition in plants. Exploring eco-physiological similarities among

species enables the identification of the emergent properties in organisms that can be linked to particular responses to the environment, for example strategies to cope with drought and/or nitrogen scarcity. Furthermore, these strategies are often linked to specific effects on other organisms, through food webs and through changes in bio-geo-chemical processes that affect, for example, carbon storage and nutrient mineralisation and availability in soils, all of which have a clear bearing on the provision of ES.

Although currently most of the focus in this field has been on trait indicators of plant persistence and recruitment, the approach has also been applied to other problems, for example the functional characterisation of pollinating insects and river sediment micro-fauna. Similarly, and with a broader scope in the approach, the relationship between structural characteristics of organisms and/or organism groups and particular functions with importance for the provision of ES can be explored.

Re-introducing biodiversity

In this way, enhancing functional diversity will be associated with the provision of multiple ES. For example, in tropical silvopastoral systems, farm practices can enhance the activity of dung beetles that improve the physical and chemical properties of the soil. Similarly, the introduction of trees with different characteristics enables the diversification of the provision of ES, such as shade for livestock, fodder in the dry season and fruit production.

Dr Graciela M Rusch
Senior Research Scientist
Norwegian Institute for
Nature Research – NINA
Co-ordinator, Funcitree

phone +47 93 00 85 03

email graciela.rusch@nina.no
browse www.nina.no