Cross-scale Assessment of Biodiversity: Opportunities and Limitations of the Natural Capital Index (NCI) Framework

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Biodiversity depletion is a local process and species extinction rates depend on the size of area under study, but it is certainly taking place worldwide. Underlying causes of biodiversity loss are a mix of global, regional, and local pressures, such as climate change, pollution and land use change. Although many efforts have been undertaken to assess the condition and trends of species biodiversity by focussing on one specific geographical level, less attention has been given to the integration of biodiversity assessments simultaneously carried out at different scales. Without the knowledge of cross-scale interactions between causes and consequences, biodiversity loss is difficult to understand. The expectation is that complementary information between scales may increase knowledge and improve decision-making processes.

Neither a major experience nor an international-accepted methodology of integral biodiversity assessments that focuses on links between scales, could be found in literature. However, from recent modelling and indicator development, lessons can be learned; being the basis of experimental learning by doing. The Natural Capital Index (NCI) framework was taken up for this purpose. It was developed by the Dutch National Institute for Public Health and the Environment (RIVM), with the aim to support the SBSTTA-CBD panel on biodiversity indicator development. The NCI has been carried out so far at three levels of space: globally in the *Global Environmental Outlook 3*, regionally in Europe, and nationally in the Netherlands. The systematisation of the experience, which consists of a participatory methodology for looking back into what happened, offers the route to answering the question—wheter the conceptual framework of the NCI is able to integrate effectively the results of biodiversity assessments at different geographical, temporal, and institutional scales. Integration is here referred to linkages of pressures variables and impact measures between scales as well as stakeholder involvement in learning processes.

In this paper, special attention is given to limitations and opportunities of the NCI methodology, possible pitfalls for general cross-scale biodiversity assessment, and suggestions for methodology. We will start with making our choice for concepts of biodiversity change explicit. Then, the NCI is explained briefly. Results of assessments at three levels of space are presented and followed by an evaluation of the NCI framework focussing on integration between scales. Fundamental topics for cross-scale analysis were extracted from literature. Finally, conclusions are drawn for short-term application in global assessment of the Millennium Ecosystem Assessment and for long-term application under the UNEP-CBD umbrella.

Mapping of Management Practices to Address Local Ecological Knowledge — Cross-scale Learning from Cases in Sweden and Tanzania

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In the Millennium Ecosystem Assessment, it is acknowledged that human well-being is dependent on the capacity of ecosystem to provide services. In this paper, we apply the hypothesis that management practices based on local ecological knowledge and understanding (LEK, sensu Olsson and Folke, 2001) can enhance the capacity of local ecosystem to serve human needs.

Local knowledge is often practical, tacit, and, thus, difficult to address directly. We present mapping of management practices as an approach to address and incorporate LEK in assessments and management plans for ecosystems. The starting point was a study of practices for agroecosystem management among smallholder farmers in northern Tanzania. The result was shared with local farmers in east-central Sweden, who found many similarities in their way of management, in spite of different socio-economic and biophysical conditions. This led to a comparative parallel study in Sweden, a cross-scale analysis of local practices for managing ecosystem services.

In the Mbulu Highlands of northern Tanzania, farming is constrained by hilly topography, relatively poor soils, and unpredictable rainfall. Semi-structured interviews and participatory mapping techniques were used for mapping practices applied to deal with these constraints. In Roslagen in east-central Sweden, the short cropping season, comparatively poor and stony soils, and local dry spells in