An objective measure of value in biological entities for sustainable management and planning

Olga Lyashevska

For sustainable development to succeed, biodiversity value must be properly incorporated in decision making. A range of monetary valuation techniques within the conventional economic framework has been applied to assign value to a biological entity (Christie et al., 2006). Monetary value of biodiversity is interpreted as compensation for a direct and indirect impact on the welfare of humans as a result of biodiversity change (Nunes and van den Bergh, 2001). However it is subjective and fails to reflect the importance of entities in supporting sustainability. Some of the major shortcomings are (Chee, 2004):

1. value depends on consumer preferences and does not reflect true value and
2. it fails to reveal complex interaction of ecosystem.

Therefore an alternative approach to biodiversity valuation based on the scientific information must be developed. It is anticipated that this new approach will be both objective (i.e. assessment that is independent from the assessor) and unbiased.

The concept of information content is a starting point in search of objective measure of biodiversity. It is one of the fundamental components of any object. Based on this idea any biological entity also contains some information. This information content can be defined, quantified and used as a measure that predicts the intrinsic value of a biological entity. Intrinsic value is generally defined as a value of biodiversity on its own (Nunes and van den Bergh, 2001) which is independent of its value to anyone or anything else. Further following information theory, information content averaged per unit space will give a measure of information intensity. It is hypothesized that by looking at information intensity it will be possible to construct an objective measure of biodiversity. It is also anticipated that information intensity will give a unifying quantity that can serve as a surrogate for value of biological entities.

Thorough literature review will provide data on different measures of biodiversity (e.g. species richness, composition, genetic information). Statistical meta-analysis will be used to reveal any existing patterns and correlation among these measures. More specifically a multidimensional value (i.e. vector sum of information measures) will be analyzed by means of multivariate statistics.

Based on the results of statistical analysis a new theory of biodiversity value will be constructed and tested. Finally, a link between monetary value of bi-

ological entities and scientific value will be made, and if possible an exchange rate between these two variable will be calculated. Therefore this study will be largely theoretical based on statistical and philosophical approaches as well as information theory in a broad sense. By conducting this research author hopes to make a useful contribution into the current state of knowledge on biodiversity valuation.

References

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