SPECIAL PANEL:

Accounting for biodiversity - Beyond the dollar - I

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Panel abstract:

The concept of ecosystem accounting is presently being developed by the UN Statistical Office in close cooperation with the World Bank and the European Environmental Agency. A number of accounts in physical units are being considered, like carbon accounts, landscape accounts and biodiversity accounts and indices. These accounts in physical units will then be assessed in terms of priority and importance of ecosystem services. Principles of monetary evaluation will be part of the discussion. The important discussion is if and in what way this type of economic assessment may contribute to better policy decisions, and how policy targets may be supplemented with information based on biodiversity and ecosystems, in a way that may change the overall conclusions of the policy analysis based on standard economic evaluation procedures only.

A metric for biodiversity accounting, applied to Australia, is the topic of the paper by Jane McDonald, where she calls for a true interdisciplinary culture in ecological economics, in order to move "beyond the dollar". A biodiversity-based accounting, instead of measurement in monetary or physical units, will drive a new level of integration between the ecological and economic disciplines, as statisticians and economists will be forced to deal with the complexity of ecosystems in a fit for purpose unit, rather than a pre-defined economic measure. The construction of biodiversity accounts opens the opportunity to analyze ecological, economic, and social information in applications previously impossible. In application of environmental accounts, based on biodiversity metrics, ecological economics can push the edge of innovation.

This topic is followed up in the paper by Joachim Spangenberg on the distinct logics of economics and ecology, and the pitfalls involved in applying monetary valuation to ecosystem complexity, with far-reaching consequences for biodiversity conservation policy.

The issue of ecosystem services is followed up in the paper by Iulie Aslaksen, Erik Framstad and Per Arild Garnåsjordet where the relationship between biodiversity indices and ecosystems services is discussed in terms of the Nature Index recently developed in Norway.

There is no doubt that economic analysis will always be an important part of biodiversity policy analysis and even more important in analyzing the selection of policy instruments. On the other hand, a biodiversity policy on a national level must take into account also other types of ethical considerations and policy objectives. How can policy objectives and management targets, that will have to reflect aggregate measures of physical and biodiversity-based indicators for local and regional ecosystems, be expressed, and how may they be applied to supplement and modify the economic evaluation?

The possible synergies between protection of biodiversity and carbon storage in boreal forest is the topic of the paper by Per Arild Garnåsjordet and Bjart Holtsmark. The policy analysis will be based on environmental management target expressed in terms of data from a carbon storage model, supplemented with data on forest biodiversity from the Nature Index for Norway.

In order to implement a defined biodiversity policy based on an extended type of analysis, integrating ecological, economic and ethical concerns, there is a need to create a political and public support. The challenges involved also in this part of the process need to be examined. This is the topic of the paper by Ørnulf Seippel reporting from a survey of how concerned people in Norway are with respect to biodiversity loss, with an analysis of what explains the differences in attitudes. View of nature, trust in science and the local/central dimension are important factors for how people see the biodiversity issue.

Finally, the perspective of biodiversity in developing countries is discussed in the paper by Tor-Björn Larsson, Townsend Peterson, Rania Spyropoulou and Jean-Louis Weber on possibilities and potentials for integrated biodiversity measurement, assessment and policy in developing countries.

"Accounting for biodiversity - Beyond the dollar"

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Abstract:

The criticism that the environment is not integrated into decision making is often squared at policy makers, ecologists and economists alike. Policy makers are seen to make ad hoc, knee jerk, and politically motivated decisions in relation to the environment. Ecologists are accused of not providing scientific information in a definitive way conducive to making decisions. And economists perhaps have been guilty of viewing the environment through an economic filter, constraining information to where it fits in conventional economic constructs.

In this paper we propose environmental accounts as the platform for presenting information on the environment in a format amendable to decision making, as well as for integrating information on the environment with economic information. We concentrate on accounting for biodiversity; an issue that has historically lacked traction in traditional ecological economics but its global status and decline is seen as urgent in the scientific community. Accounting for biodiversity suffers from all the elements that makes these transdisciplinary approaches difficult – it is difficult to measure, it is difficult to define, it largely falls out side of economic boundaries, and we even find it difficult to articulate any benefit we derive from it, and seem to fail if we try and quantify and value the goods and services of biodiversity.

Biodiversity is unlikely to fit neatly into a single accounting approach and it is difficult to find an analogy in economic accounts to guide us. Therefore we reviewed potential approaches for biodiversity accounting from traditional asset approach with stock and flow accounts, to more experimental accounting systems looking at biodiversity as a component of an ecosystem account for which a standard is not yet developed.

Accounting for biodiversity is largely underdeveloped because biodiversity is difficult to measure. In this regard, the impetus falls on the shoulders of science. The latest attempts at accounting for the environment do incorporate physical accounting to supplement monetary accounts but still, physical accounts are neither fit for purpose for measuring biodiversity nor are they necessarily policy relevant. We devised two simple metrics of biodiversity to populate accounts, one derived from monitoring data and the other from remote sensed data, both from Australia. The criteria for these metrics are that a) it must be simple b) based on existing data c) measure change over time and d) be comparable.

It is significant progress to have a biodiversity account populated, to have a standardized format for measuring the change in our ecosystems. It is that change that is at the centre of our management and intervention efforts. We need to understand the magnitude of the change and finally, attribute that change. Adopting a science-based measure of biodiversity, instead of a monetary or physical unit, for accounting is an innovation required to create a true transdisciplinary culture in ecological economics – a ecological unit embedded in an economic framework. This simple shift will drive a new level of integration between the disciplines, as statisticians and economists are forced to deal with the complexity of ecosystems in a fit for purpose unit, rather than a pre-defined economic measure. The onus will be on the ecologists to articulate the science in a clear and meaningful way despite the uncertainty. Policy makers will have to be brave enough accept a system that will by default expose accountability in the management of the environment – a failing that would not be accepted in any other sector.

The construction of these biodiversity accounts opens the opportunity to analyze ecological, economic

and social information in applications previously impossible. We discuss several such applications, including linking spatially explicit biodiversity information with key economic indicators and measuring the 'biodiversity return' for each dollar of investment. We encourage significant attention in this area. It is in the maturity and development in the applications of environmental accounts where ecological economics can push the edge of innovation. This in turn will create the demand for robust scientific units of measure and the need for well-designed accounts.

"The distinct logics of economics and ecology"

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Abstract:

The paper points to the risks incurred by using monetary valuation in trade-off analyses and other decision support systems. The logic of economics and of ecology is different. As a result, the economic optimum, even with non-market costs are included, is not necessarily the same as an ecological optimum. It may even include the loss of useless and thus not valuable ecosystems or species.

Economics and ecological science constitute different disciplinary optimisations which can coincide, but usually will not. Ecological valuation tries to determine with scientific methods which processes in an ecological system are important (and in this sense valuable) ***for*** *the system*, while economic valuation calculates the (monetary) value allocated to the transaction of elements ***of*** *the ecosystems* or their outputs (exchange values). If traded on markets, their economic value can be determined.
The diverging logic can be illustrated by the different optimisation objectives:

Economic value	*ecological value*
Maximises returns	*maximises resilience*
Functions = service potentials	*functions = biological traits*
Subjective value	*inherent, objective value*

Economic valuation has problems with scales, dealing with non-linear changes, the design of efficient but credible incentives (e.g. in PES), and the mapping of institutions, governance and the nature of the political economy, and with the diversity of aspects of biodiversity (in TEEB valuation was focussed on species state and abundance).

For instance, pollination is important for most plants and thus for most ecosystems. The value of honey bees has been one of the most intensively analysed cases, based less on the value of the honey they produce, but more on their contribution to pollination and the market value of the fruit dependent on this act. However, some questions still remain unsolved:

- Pollination can be a disservice for the economic system (Sagoff 2011) as well as a service – so who's valuation is to be applied in decision support, e.g. in trade-off analysis, in particular when making projections into the future?
- The world's cereals are pollinated by wind. What is the value of wind, who should be paid (or at least taxed) for that service, and how should an effective wind protection policy look like?

What is a "real value"?

Economists and ecologists easily agree that the “real value” of nature has not been taken sufficiently into account in policy decisions, and that this needs to be changed. But when agreeing, are they talking about the same thing, the same “values”?

Monetary values are exchange values in markets, and there is no way to define “real values” in physical (i.e. non-monetary) terms to correct the “artificial” prices in a market economy. The ability of the market system to integrate dispersed information into the price is a different mechanism of information generation than scientific analysis of system characteristics: both are important, both are disputable, and their relation is anything but linear.

Conclusion

These arguments make economic valuation highly questionable as a basis for trade-off analysis and political decision making. Economic information turns out to be one relevant, but not decisive and no way all-encompassing contribution to biodiversity and ESS conservation policy decisions, with nonmarket valuation characterised by methodological problems, science-theoretical inconsistencies and practical uselessness. Conservation biology and policy arguments carry more weight, and Ecosystem Management, including a prominent role of ESS, offers a more comprehensive methodological framework than economics can offer. framework than economics can offer.

“Biodiversity indices in the context of ecosystem services: The Nature Index for Norway”

Iulie Aslaksen; Erik Framstad; Per Arild Garnåsjordet

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Abstract:

The assessment and valuation of ecosystem services is a topic of great political and scientific interest, as expressed by the comprehensive frameworks of the Millennium Ecosystem Assessments (MEA) and The Economics of Ecosystem Services and Biodiversity (TEEB). However, the complexity of the relationship between the ecosystem services and the biodiversity that supports them raise numerous challenges for conceptualization in ecological terms and practical implementation (Mace, Norris and Fitter 2011).

Ecosystem services can be seen as a concept employed to bring biodiversity further up on the political agenda. The difficulty of conveying the importance of intact nature and biodiversity into political and economic decision-making unless qualities of nature carry a price-tag, may reflect that “economists and policymakers speak the same the language” (ten Brink 2006). For this reason, monetary valuation of ecosystem services is widely advocated for pragmatic reasons. However, within ecological economics, criticism has been raised against an “excessive” pragmatism, as strong focus on monetary valuation of services useful to humans may overshadow other values of nature, and the idea of trading biodiversity off-sets does not sufficiently address the issues of political vs. financial power and the distribution of benefits and loss (Spash 2008). Hence, it remains to discuss a fruitful synergy between “economic discourses” and “ecological discourses” as a basis for developing a robust biodiversity policy.

In this paper, we first outline some challenges involved in conceptualizing the key role of biodiversity in

providing ecosystem services, in the context of the Nature Index recently developed in Norway as a tool for biodiversity measurement (Certain and Skarpaas et al. 2011). We then report, as the main contribution of this paper, some preliminary results from the attempt to identify ecosystem services in the context of the Nature Index for Norway, based on interviews with experts responsible for each of the major ecosystems.

The Nature Index for Norway is a framework for integrated biodiversity measurement, with a similar conceptual basis as the Natural Capital Index, the GLOBIO Index, and the Biological Intactness Index (Alkemade et al. 2009, ten Brink et al. 2002, Scholes and Biggs 2005). The Nature Index summarizes the state of more than 300 biodiversity indicators. For each indicator the current state (measured on a relative scale from 0 to 1) is compared to a reference state of value 1, representing a given interpretation of intact ecosystems. The indicators are representative of biodiversity in 9 major ecosystems (or biomes), comprising terrestrial and marine ecosystems: ocean bottom, ocean pelagic, coast bottom, coast pelagic, open lowland (representing extensively used agricultural areas with high biodiversity), mires and wetlands, freshwater, forest, and mountain. Intensively used agricultural land and built-up areas are not included.

This paper reports from a study, where experts responsible for the data of the Nature Index were asked to consider to what extent the biodiversity indicators included in the Nature Index can be interpreted as expressing ecosystem services. It is an ongoing process to develop the framework of the Nature Index in order to represent ecosystem services, and here we are only reporting preliminary results. However, the interviews with the experts provided reflections on this topic that are valuable for further development. The interviews were structured around the standard approach of distinguishing between supporting, provisioning, regulating, and cultural services (Millennium Ecosystem Assessment). Our study clearly indicates that many biologists and ecologists find the distinction between supporting and regulating services arbitrary, and that the ecological processes between these two categories need to be more explicitly described, as also suggested by Mace et al. (2011). The distinct differences between marine and terrestrial ecosystems, e.g. in the key role of the secondary consumers in the trophic structure of marine ecosystems, need to be considered more explicitly. The category of cultural services should be specifically addressing the value of indicators for research, education, and as indicators for threats to biodiversity. Finally, the researchers pointed out that a framework for ecosystem services needs to express in some comprehensive way “the value of a forest” as a collective ecological entity, e.g., for recreational purposes, over and above what can be captured by the indicators alone.

The study gives valuable input for how other indicators should supplement the Nature Index in order to capture ecosystem services.