

## **A NEW FRONTIER IN ECOLOGY AND ECONOMICS: ACCOUNTING FOR BIODIVERSITY**

JANE ALEXANDRA MCDONALD\*  
*UNIVERSITY OF QUEENSLAND.*

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 outlined in the System of Environmental-Economic Accounts (SEEA), 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 such as tonnes of wood or volumes of water 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 standardised 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, attributing 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.