



Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv



Review

Environmental reporting and accounting in Australia: Progress, prospects and research priorities



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HIGHLIGHTS

- Capacity to produce nation-wide environmental reports and accounts is reviewed.
- Several reasons for the lack of environmental data can be identified.
- Six priorities are suggested for research to help create better information.

ARTICLE INFO

Article history:
 Received 3 September 2013
 Received in revised form 10 December 2013
 Accepted 10 December 2013
 Available online xxxx

Keywords:
 Environmental information
 Australia
 Environmental accounts
 Natural capital
 Natural resources
 Landscape ecology

ABSTRACT

Despite strong demand for information to support the sustainable use of Australia's natural resources and conserve environmental values and despite considerable effort and investment, nation-wide environmental data collection and analysis remains a substantially unmet challenge. We review progress in producing national environmental reports and accounts, identify challenges and opportunities, and analyse the potential role of research in addressing these. Australia's low and concentrated population density and the short history since European settlement contribute to the lack of environmental data. There are additional factors: highly diverse data requirements and standards, disagreement on information priorities, poorly measurable management objectives, lack of coordination, over-reliance on researchers and businesses for data collection, lack of business engagement, and short-term, project-based activities. New opportunities have arisen to overcome some of these challenges: enhanced monitoring networks, standardisation, data management and modelling, greater commitment to share and integrate data, community monitoring, increasing acceptance of environmental and sustainability indicators, and progress in environmental accounting practices. Successes in generating climate, water and greenhouse gas information appear to be attributable to an unambiguous data requirement, considerable investment, and legislative instruments that enhance data sharing and create a clearly defined role for operational agencies. Based on the analysis presented, we suggest six priorities for research: (1) common definitions and standards for information that address management objectives, (2) ecological measures that are scalable from local to national level, (3) promotion of long-term data collection and reporting by researchers, (4) efficient satellite and sensor network technologies and data analysis methods, (5) environmental modelling approaches that can reconcile multiple data sources, and (6) experimental accounting to pursue consistent, credible and relevant information structures and to identify new data requirements. Opportunities exist to make progress in each of these areas and help secure a more sustainable future.

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1. Introduction

1.1. Background and objective

By one estimate, the global population uses natural resources at a rate more than 1.5 times greater than the rate of renewal (Galli et al., 2012). Australians use natural resources at more than twice this average rate (WWF International et al., 2010). If serious consequences are to be averted, economic progress must be decoupled from ecological depletion and degradation (Rockström et al., 2009). There are different approaches to improving the economic efficiency of natural resource use, but all require relevant, credible, up-to-date and comprehensive information on the condition of our natural resources and ecosystems, and on the ways in which people interact with these. The collection and provision of environmental information in Australia has been a slow journey but appears to have reached a crossroads, with several current government initiatives currently attempting to improve the evidence base for policies with environmental objectives or impacts. This has coincided with considerable advances in environmental science, technology, and analysis methods. So far, there does not appear to have been a systematic attempt to compare or integrate government and research activities, and analyse how research can help overcome obstacles on the road to comprehensive, nation-wide environmental information relevant to public and policy needs. Our goal was to address this gap: we review Australia's environmental information history (Section 2) and current capacity to produce nation-wide environmental accounts and reports (Section 3). From these, we interpret the main challenges and opportunities that the demand for national scale environmental information creates (Section 4) and suggest priorities for the research community (Section 5).

1.2. Scope and terms used

Providing environmental information in a structured way is varyingly referred to as environmental accounting, reporting, monitoring, or assessment, but these terms are not defined in any universally accepted or mutually exclusive way. Here, we define 'environmental information' as any quantitative data about the condition and functioning of ecosystems and the availability and use of the goods and services that they produce. We generally focus on water, vegetation biomass, carbon,

and measures of general ecosystem health, but will occasionally discuss other aspects.

'Environmental accounting' can be seen as distinct from environmental reporting in that it provides information in the form of accounts, which impose particular standards and constraints on the definition, format, analysis and presentation of the information. Environmental accounting has its origin in the notion of 'natural capital', as a form of production capital that needs to be maintained to provide ecosystem goods or services into the future, rather than viewing it as an unchangeable quantity (Schumacher, 1973). Environmental accounts can be used to quantify the depletion or restoration of natural capital (the 'stocks') in the course of supplying goods and services (the 'flows') (Costanza et al., 1997; United Nations Statistics Division, 2013b; Weber, 2011). Accounting standards force a degree of rigour, for example through the definition of spatial and temporal accounting units and accounting terms, and promote comprehensiveness and consistency over time. An important advantage of structured accounts is that data can be progressively aggregated to higher levels to best suit the information user (Fig. 1). Environmental accounts can be designed to align with economic and social accounting frameworks and concepts, providing insight into the contribution of the environment to the economy, the impact of the economy on the environment, and the economic efficiency of

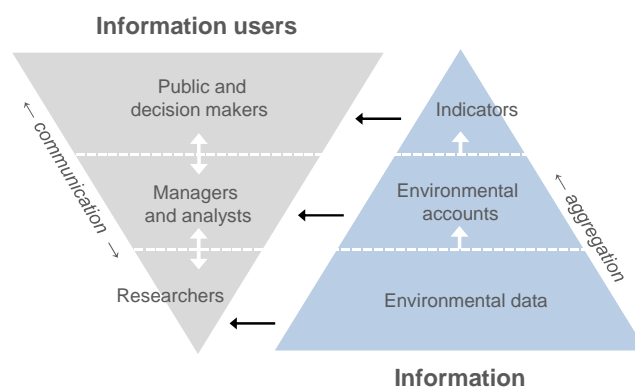


Fig. 1. Diagram illustrating how environmental data, of greatest value to a relatively small number researchers, can be summarised into structured accounts that are valuable to a larger group of managers and analysts, while the broader public and decision makers may prefer aggregated headline indicators (after Vardon et al., 2012).

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