Environmental indicators for reporting

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Introduction

There are many definitions of environmental indicators. They can be described as physical, chemical, biological or socio-economic measures that best represent the key elements of a complex ecosystem or an environmental issue (Saunders et al 1998). Another definition (although not so useful for State of the Environment reporting) is a "direct or indirect measure of environmental quality that can be used to assess status and trends in the environment's ability to support human and ecological health." (National Air and Radiation Indicators Project).

The OECD defines an indicator as a parameter, or a value derived from parameters, which points to, provides information about, or describes the state of a phenomenon/environment/area, with a significance extending beyond that directly associated with a parameter value. The OECD has also defined general criteria for the choice of indicators –they should be: policy relevant, analytically sound and measurable (OECD 2003).

Environmental indicators can be developed for other purposes such as tracking the results of policy settings and programme implementation. Although the purpose may vary from the framework and indicators used for State of the Environment (SoE) reporting, it is sometimes possible to use SoE indicators to track the environmental results of a programme and other indicators to track environmental performance actions. Environmental performance indicators for policies, programmes or initiatives need to be clearly related to the objectives they are meant to measure.

There are many sets of environmental indicators proposed, developed or in use in Australia. For example, the Commonwealth and the States and Territories use the natural resource management (NRM) monitoring and evaluation framework, the Commonwealth has indicators for progress towards the goal of sustainable agriculture, the states and territories use sets for state of the environment (SoE) reporting, the Australian Bureau of Statistics uses indicators for communication of their statistical data, and Sydney Water uses environmental indicators for their environmental indicators compliance reports. There are also some occasions when indicators are used on a 'one-off' basis.

Use of indicators

The purpose of developing and using indicators for State of the Environment reporting is to be able to track changes in the pressures acting on the environment and the condition of the environment. Indicators need to provide information on how aspects of the environment have changed both over time and spatially.

As well as indicators that assess changes in the condition of the environment and in the pressures that are affecting the environment, there is also a need for response indicators that attempt to identify and evaluate societal responses to these pressures and changes of condition. Response indicators are particularly relevant for assessing the performance of a policy, programme or initiative, where large-scale changes in the condition of the environment resulting from the response action may be slow to reveal themselves.

Where data for an indicator are not available, alternative or 'surrogate' indicators can sometimes be informative. For example, the heritage values of a historic building are related to its original and subsequent uses, its age, its context, and whether the building has been sympathetically renovated. All of these actions may change or alter the heritage values to such an extent that the heritage values may have been compromised. Assessing changes in heritage values is difficult. One way to assess heritage values is to survey a selection of historic buildings. A survey has been carried out (Pearson and Marshall 2006) to provide a simple overview of the continued existence, condition, integrity and use of a sample of the nation's historic heritage. These aspects are surrogates for an assessment of the heritage values of a particular building.

Characteristics of indicators

There is a so-called "SMART" concept of indicators which can be summarised as:

- Simple (easily interpreted and monitored),
- Measurable (statistically verifiable, reproducible and show trends),
- Accessible (regularly monitored, cost effective and consistent),
- Relevant (directly address issues or agreed objectives, such as those of the Matters for Target for biodiversity conservation), and
- Timely (provide early warning of potential problems).

Other important characteristics of indicators are that they should be administratively practical and cost-effective to populate.

Use of environmental indicators in national SoE reporting

At the conclusion of the first independent Australian State of the Environment Report in 1996, the then State of the Environment Committee recommended that environmental indicators be developed to ensure a much greater rigour in the reporting process and to communicate trends in the environment to decision-makers. From 1996 to 1998 a process of developing indicators was undertaken, resulting in the development of a total of 454 indicators for the seven SoE themes, covering indicators of pressures on the environment, the state (or condition) of the environment and responses to those pressures.

The next Australian State of the Environment Report in 2001 attempted to use all these indicators but failed because many of them were impractical, and because it was not clear what many of the indicators were trying to assess. In many cases, data were not available to populate the indicators. A follow up process through the former Australia and New Zealand Environment and Conservation Council (ANZEEC) between the States and Territories and the Commonwealth established a smaller 'core' set of 75 indicators but even efforts to report at a national level on this smaller core set were not altogether successful. The methodology for many of these indicators had still to be developed and others incorporated elements of up to four of the original indicators.

Australia's third independent State of the Environment Report, due in 2006, will report using a reduced number of environmental indicators – about one half of those used for *SoE 2001*. A framework has been developed to identifying the issues within each theme on which information is needed and why.

2006 State of the Environment Report

A fundamental aspect of the *SoE 2006* process has been the development of a Data Reporting System (DRS), (http://www.deh.gov.au/soe/DRS) a data management system for the storage and display of the data compiled and used for the 2006 State of Environment Report. The DRS is an on-line system where the data is stored and links are made to relevant websites for further information. The data for each indicator used in the *SoE 2006* themes are displayed in an indicator template on the website.

The Resource Planning and Development Commission, Tasmania gave permission for the Australian Government Department of the Environment and Heritage to use and develop their application, originally developed for Tasmanian State of the Environment reporting.

Challenges associated with the use of indicators

The plethora of indicators

A search on Google on environmental indicators for Australia brings up 650 000 references. There are indicators for neighbourhoods, for cities, for shires, and for states and territories to report on their environments.

Australia also has international reporting obligations and has developed or uses sets of environment indicators for these purposes. For example, the Convention on Biological Diversity is developing environmental indicators and the OECD has been developing and using environmental indicators since the early 1980s.

The plethora of environmental indicator sets and the associated administrative arrangements (both within organisations and across jurisdictions) has set up unrealistic expectations that agencies are able to report using all these environmental indicators. The reality is that, even when indicators are agreed and data are available to populate them, expertise and specialist knowledge are still required to interpret data results and a another range of expertise is needed to interpret the implications of the data for policy-making purposes.

There is no one institutional agency that has responsibility for the development, management and review of environmental indicators, nor their specialist interpretation to ensure policy-makers can use them in relevant decision-making processes.

Review of indicators

Indicators need to be periodically reviewed to ensure that those used are the most relevant in a changing policy and environmental context. Only experience will determine whether indicators are useful and whether they can be simplified. In other words, environmental indicators have a life cycle – they need to be developed, used and discarded if they are not deemed to be relevant for an environmental issue or if they are unnecessarily difficult to populate.

There is a tension between reviewing and discarding indicators and building long-term datasets to populate the indicators. Indicators are only useful for showing changes in the environment where time series data are available. The ongoing use and refinement of indicators is a continuous balancing act between the two objectives of getting the most informative indicators and getting time series data on the indicators already in existence.

Not all indicators used at a national scale are suitable for use at a jurisdictional or regional scale. There may be some that can be aggregated up from a regional scale to a national scale and some that cannot. The indicators being developed for the National Monitoring and Evaluation Framework for implementation by the 57 Natural Resource Management regions are examples of indicators that will mostly be used at a regional scale.

The reality is that data may not be available at suitable scales for aggregation or disaggregation to populate environmental indicators. Constant changes to the information collected and reported, and the methodologies used for its analysis continue to challenge the capacity for developing a consistent set of robust indicators across Australia for national reporting purposes. While many reporting organisations have benefited from the lessons learned and sharing of indicator development across Australia, there is still no systematic collection of data to populate indicator sets that are agreed as important at a national scale.

Development of indicator sets

Attempts to develop indicator sets often fail to gain broad support because their developers invest too much effort in specifying the indicators and not enough in understanding the issues and objectives for which the indicators are intended to inform. It is especially useful if performance indicators can be designed to suggest changes in direction for the reporting organisation, or for the target audience of a report. Past experience demonstrates that much effort has been invested in identifying indicators that represent only ‘raw’ datasets without ensuring each indicator is capable of communicating or ‘indicating’ something useful to its audience.

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