



Methods

Significance of environment in the assessment of sustainable development: The case for south west Victoria

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ABSTRACT

The assessment of sustainable development is often based on the three pillars of sustainability model using social, economic and environmental indicators. It is thought that by measuring the performance of each system, information can be gained about the sustainability of the whole system. However it seems there has been no attempt to evaluate if such an assumption is true. During the development of a sustainability assessment framework for south west Victoria, Australia, it has become evident that this approach to sustainability assessment does not provide an accurate assessment of system sustainability. The project found that environmental indicators were considered the most important for assessing regional sustainability. As a consequence, the assessment produced shows that in south west Victoria, sustainability is largely determined by the condition of the environment. This finding highlights the current disconnection between the theory and reality of sustainability. Here, we describe a framework for sustainability assessment that attempts to re-connect theory to practice.

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1. Introduction

Since the release of Agenda 21 (United Nations, 1992) a significant effort has been employed at the global, national and local scales to select indicators and develop indices to assess progress toward sustainable development (Bossel, 2001; Wilson et al., 2007). This is demonstrated by over 800 sustainable indicator activities that are listed on the Compendium of Sustainable Development Indicator Initiatives (IISD, 2008). Indicators are seen not only as means to collect and collate information about the sustainability of social, economic and biophysical systems with the view to better inform decision making and policy formulation, but also as a means for communicating sustainability.

Although there is wide agreement that sustainability indicators are a useful tool for progressing sustainability (Bell and Morse, 1998; Gahin et al., 2003; Parris and Kates, 2003), there is still little agreement on which indicators to use and their broad nature and characteristics (Bell and Morse, 1998). Parris and Kates (2003 p559) concluded in their assessment of sustainability indicators that ‘...there are no indicator sets that are universally accepted, backed by compelling theory, rigorous data collection and analysis and influential policy’. This is mainly because of the ambiguities in the definition of

sustainability and this has led to a large volume of work devoted to indicator development producing very wide and varied systems of indicators and indices that are often characterized by poor or absent theoretical underpinning (Mitchell et al., 1995). Thus, ‘sustainability indicators sets’ are frequently simply social and economic indicators selected from pre-existing lists brought together with indicators derived from state of the environment reporting with little to no modification (Mitchell et al., 1995).

Developing tools for sustainability evaluation must have a theoretical underpinning to give them legitimacy (Parris and Kates, 2003). The challenge is however, that the sustainability paradigm and the emerging field of sustainability science are in their early days. However, a number of models of sustainability have been proposed (Bell and Morse, 2001; Gilbert, 1996; Harger and Meyer, 1996; Izac and Swift, 1994; Liverman et al., 1988; Moffatt, 1994; Pinfield, 1996; Rennings and Wiggering, 1997) and used as the basis for the development of assessment tools based on indicators. The most commonly used models are the three spheres (Mebratu, 1998; Mitchell, 2000), prism of sustainability (Valentin and Spangenberg, 2000) and pressure-state-response (OECD, 1993). These models generally involve cataloguing indicators into pillars of sustainability (social, economic, environmental and institutional) or into two types: state indicators and driving force indicators or ‘cause and effect’ indicators (Bell and Morse, 2001). Once the data are collected for the indicators, they are then brought together in differing ways to give an assessment of sustainability. However, few, if any, of these models have been tested with data to see if they actually reflect the reality of sustainability. It is assumed that the model describes the sustainability

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of the system, and thus, the assessment produced using the model will assess the system's sustainability. In fact, evaluation of sustainability assessments is rare but increasingly important to improve the efficiency and effectiveness of sustainability assessment tools and to inform and progress the theory of sustainability (Wallis et al., 2007). As this need is being recognised examples of evaluations are beginning to emerge (Graymore et al., 2008; Ramos and Caeiro, 2010; Wilson et al., 2007).

Thus the aim of this paper is to contribute to the debate and thinking on sustainability assessment by evaluating the connection between the theory of sustainability and practice of sustainability assessment. To do this the paper begins by providing a background to the various models developed to conceptualize sustainability and a critical review of how they have been applied to sustainability assessment methods. It goes on to use a sustainability assessment project undertaken in south west Victoria, Australia, to demonstrate that although attempts are made to base the assessment on the current models of sustainability, the reality is that in practice this is a challenging process. An overview of the Regional to Catchment Scale Indicators Project carried out in the south west region of Victoria is provided. An evaluation of the project process then provides an insight into how the contextual nature of sustainability plays a role in determining the most appropriate model for a particular region. Thus, we argue that a common approach be taken to sustainability assessment development based on current theory, in a way that supports theory building and assists decision making for sustainable regional management, as per Baumgärtner et al. (2008).

2. Models of Sustainability Used to Frame Sustainability Assessments

A plethora of conceptual models and principles of sustainability exist to help frame sustainability assessments. Examples include the pressure-state-response (PSR) framework used for state of the environment reporting (OECD, 1993), differing versions of the three pillars of sustainability that form the basis of triple bottom line reporting, PICABUE framework of sustainability principles (Mitchell et

al., 1995), Bellagio principles (Hardi and Zdan, 1997), basic orientors (Bossel, 1999), prism of sustainability (Valentin and Spangenberg, 2000) and the human–ecosystem linked system (Prescott-Allen, 2001). These models evolved from the Brundtland (1987) definition of sustainability, ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’, and the Pressure-State-Response framework that had been used for environmental monitoring into three pillars (spheres or domains). These models thus added social and economic indicators to environmental ones. As the theory of sustainability was debated, models on which sustainability assessments are framed have diversified into three main streams:

1. The pillar models with interacting or interdependent dimensions;
2. The human–ecosystem linked models, which are based on the concept of carrying capacity; and
3. Principles of sustainability, which concentrate on the essential elements necessary for achieving sustainability.

The development of the three spheres, pillars, domains, and the triple bottom line models of sustainability (Fig. 1) emphasizes sustainability as three dimensional: environmental, social and economic. These models describe sustainability as three equal systems or parts, that are completely separate, as in the triple bottom line (Fig. 1a) and pillars (Fig. 1b) models, or with some interaction, as in the spheres model (Fig. 1c). The sustainability assessment methods developed using these models are often just sets of economic, social and environmental indicators assessed in isolation. As such, Hardi and Zdan (1997) advocate the use the Bellagio Principles to guide the development of the indicator set, since the assessment should consider the well-being of the social, ecological and economic sub-systems and the interaction between the parts.

In a number of instances the pillar model has been extended to include a fourth pillar (Fig. 2d), as well as the interactions between these dimensions. Valentin and Spangenberg (2000), for example, developed the prism of sustainability (Fig. 2a) as a model for adopting indicators using broad community participation to define goals for sustainability,

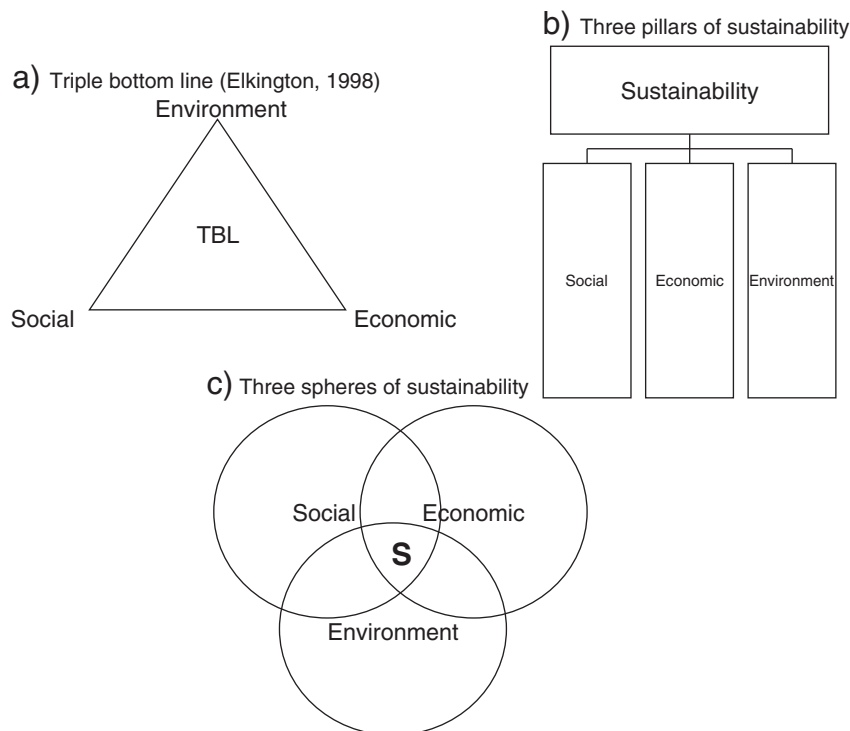


Fig. 1. The three dimensions of sustainability models: a) triple bottom line (Elkington, 1998); b) three pillars of sustainability; and c) three interacting spheres of sustainability.

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