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METHODS

Conceptualizing sustainable development
An assessment methodology connecting values, knowledge, worldviews and scenarios

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ABSTRACT

Sustainability science poses severe challenges to classical disciplinary science. To bring the perspectives of diverse disciplines together in a meaningful way, we describe a novel methodology for sustainability assessment of a particular social-ecological system, or country. Starting point is that a sustainability assessment should investigate the ability to continue and develop a desirable way of living vis-à-vis later generations and life elsewhere on the planet. Evidently, people hold different values and beliefs about the way societies sustain quality of life for their members. The first step, therefore, is to analyze people's value orientations and the way in which they interpret sustainability problems i.e. their beliefs. The next step is to translate the resulting worldviews into model-based narratives, i.e. scenarios. The qualitative and quantitative outcomes are then investigated in terms of associated risks and opportunities and robustness of policy options.

The Netherlands Environmental Assessment Agency (PBL) has followed this methodology, using extensive surveys among the Dutch population. In its First Sustainability Outlook (2004), the resulting archetypical worldviews became the basis for four different scenarios for policy analysis, with emphases on the domains of transport, energy and food. The goal of the agency's Sustainability Outlooks is to show that choices are inevitable in policy making for sustainable development, to indicate which positive and negative impacts one can expect of these choices (trade-offs), and to identify options that may be robust under several worldviews. The conceptualization proposed here is both clear and applicable in practical sustainability assessments for policy making.

1. Introduction

Begin to make order, and names arise.
Names lead to more names –
And to knowing when to stop.
Lao Tzu

The idea of sustainable development reflects one of the leading aspirations of humankind in the 21st century, not unlike the idea of socialism in the early 20th century and the Declaration of Human Rights after World War II. The words "sustainability" and "sustainable development," however, have got an eerie ring and risk becoming just another one of those buzzwords with a lifespan of a decade, at the most. Hence, the importance of working on appropriate operationalizations.

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Initially, the concept of sustainable development was thought to be applied by establishing an ecologically or environmentally desired or target value. A formal indicator of sustainability would then measure the difference in the actual and the desired time path of the selected variable, often related to some reconstructed pre-industrial "natural" situation. In the 1990s, the interference by social scientists and notably economists made it clear that the setting of such a desired or target value in relation to sustainable development, could not legitimately be based on ecological-environmental criteria alone. First, there was a choice to be made of which indicators to use — should not economic and social aspects be part of the decision-making, too? Second, if there is agreement on the indicators, their future desired or target levels have to be – at least partly – the outcome of a societal negotiating process that is informed, but not determined by scientific assessments of risks and uncertainties related to the possible crossing of critical thresholds. Moreover, such an outcome could be renegotiated at any moment, in the face of changes in knowledge and values. These considerations have led economists to argue that the quest for sustainable development can be founded on welfare economics and approaches, such as societal cost–benefit analyses. Scientists with a background in ecology but also in institutional economy and other social sciences tend to disagree, bringing in their own observations, concepts and theories.

It is against this background that the Netherlands Environmental Assessment Agency (PBL)[1] has developed its own methodology for sustainability assessment. The word "methodology" is understood here to be a context-specific combination of formal, analytical methods (tools, models) and participatory methods (expert elicitation, games). The objective of the methodology is to assist in the construction of more comprehensive and adequate models of (non-)sustainable development and to help politicians and citizens to formulate strategies for action. In this paper, we communicate the sustainability assessment methodology that was developed at the Netherlands Environmental Assessment Agency and was applied in its First Sustainability Outlook (MNP, 2004; van den Heiligenberg, 2005; Petersen, 2006a). The paper proposes a truly transdisciplinary methodology and starts with a sketch of the conceptual framework, followed by a reflection on the notions of values and beliefs. Subsequently, the construction of scenarios on the basis of worldviews and models is presented. We end with a discussion of how the methodology has been and can be used in (public) policy on sustainability issues.

2. Sustainable development and quality of life

Hundreds of definitions of sustainable development have been given since the notion emerged in the 1980s, as a desirable guiding principle for the world community. To highlight the inherent pluralism in this notion, we consider sustainable development to be a quest for developing and sustaining "qualities of life." In this way, it encompasses the subjective and objective dimensions of human well-being, inviting a truly transdisciplinary approach. Thus, people should act *here and now* in such a way that the conditions for a (decent/high) quality of life *later and elsewhere* will not be eroded. The nexus between sustainability and quality of life is the degree to which developing and/or maintaining a quality of life for a given (human) population has consequences which impair the options for developing and/or maintaining an aspired quality of life, later and/or elsewhere. Continuation and allocation are, thus, keywords around the kernel of the ends–means field of tension.

There is a long history of reflecting on the tension between ends and means. The keyword may be *scarcity*. Is scarcity an ontological fact or is it a social construct, pre-eminent in certain times and places? In ancient societies, needs surely structured social order to some extent: priests played a role in securing food during periods of bad harvests, while farmers and soldiers had a sometimes troublesome alliance in the search for food and security. In modern times, the ends–means connection has become looser and more complex for large parts of the population. Scarcity is increasingly seen as a socio-psychological construct, with values and knowledge as affective and cognitive mediators in ends–means configurations (Douglas et al., 1998).

The scientific discipline *par excellence* to deal with ends and means is economic science: the dismal science which "studies human behaviour as a relationship between ends and scarce means which have alternative uses" in the 1932 description of Robbins (1935). In welfare economics, the study of the ends–means relationship is operationalized by reducing human needs and wants to known preferences of individuals, with optimizing behavior under known constraints. Utilitarianism extended it to the societal objective of "the most happiness for the largest number of people." The formal notion of welfare is empty: it makes no value judgments about which ends are met. Its focus is on efficiency and means rationality – the optimization – and on regulation of individual behavior that is considered dangerous or undesirable by the community (criminal, immoral etc.) – the constraints. Behavior, if not regulated, gives rise to negative "externalities." The socialist and environmental movements were and are both, in a way, corrections of too narrow a notion of welfare.

The notion of welfare has also been criticized within economic science (e.g., Sen, 1982) for its insistence on the "neutrality assumption" – that is, that when states of affairs are compared their character should not matter directly; only individual welfares in those states matter – and now more attention is given, both in economics and in other social sciences, to the broader notion of "quality of life" or "human well-being" (e.g., Nussbaum and Sen, 1993; Dasgupta, 1993; Cobb, 2000; Costanza et al., 2007). As a concept, quality of life is less "empty" than the concept of welfare, where it recognizes that personal needs and wants are at least partly the outcome of continuous interaction among human beings and are intrinsically social and systemic (see, e.g., Douglas et al., 1998, p. 259).

An explicit attempt to operationalize a broader notion of quality of life has been given by Sen in what is called the

[1] The Dutch name of the agency is currently "Planbureau voor de Leefomgeving" (acronym PBL). The agency made part of the Dutch National Institute for Public Health and the Environment (acronym RIVM) until January 2006 and used as its Dutch name "Milieu- en Natuurplanbureau" (acronym MNP) until May 2008.