



## Methodological and Ideological Options

## The If, How and Where of assessing sustainable resource use

Frank Figge<sup>a,\*</sup>, Tobias Hahn<sup>a,1</sup>, Ralf Barkemeyer<sup>b,c,2</sup><sup>a</sup> KEDGE Business School (Marseille), Domaine de Luminy, BP 921, 13288 Marseille Cedex 9, France<sup>b</sup> Sustainability Research Institute, School of Earth & Environment, University of Leeds, Woodhouse Lane, Leeds LS2 9JT, UK<sup>c</sup> KEDGE Business School (Bordeaux), 680 Cours de la Liberation, 33405 Talence Cedex, France

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## ABSTRACT

In today's economies those who sustain the burden of resource use, those using resources and those providing resources are not necessarily identical. With this separation come three fundamental but interrelated decision-making perspectives on the sustainability assessment of resource use. These three perspectives correspond to the three assessment questions if, how, and where resources should be used. Most sustainability assessment approaches do not make their underlying assessment perspectives explicit. The goal of this paper is to provide structure and organisation to existing approaches. This structuring suggests that any discussion on the appropriateness and validity of different assessment approaches and their results must take into account the underlying assessment perspective. The three questions if, how, and where resources should be used correspond to the requirements of a sustainable resource use. While existing assessments do address the three questions in isolation, it is all the more important that the limitations and implications of focusing on a single perspective are spelled out. As the main contribution, the paper distinguishes the rationale of each assessment perspective and develops on their interlinkages and thus provides the context and structure for a more informed and fruitful debate on the assessment of sustainable resource use.

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*"So once you do know what the question actually is, you'll know what the answer means."*

[Adams (2005, p. 162)]

## 1. Introduction

Modern economies are characterised by a division of labour. Division of labour has been praised to bring about higher efficiency, increased wealth and even social progress (Smith, 1863, pp. 5–6). At the same time, the division of labour leads to a separation of the roles of the providers of resources and the users of resources. With the increase of environmental problems another effect comes to the fore. Groups that are neither the providers nor the users of resources can fall victim of the burden of resource use. These effects outside of the primary market transaction are referred to as externalities (Ayres and Kneese, 1969). In modern economies at least three groups are therefore involved in the utilization of resources: resource providers, resource users and the victims of externalities of resource use. Each of these groups represents a

decision-making unit with its specific perspective on the use of a resource. In the assessment of sustainable resource utilization these different perspectives lead to different results. The challenge is to distinguish the rationale of each assessment perspective and to develop on their interlinkages.

A growing body of methods assesses the sustainable use of resources (Bebbington et al., 2007; Krajnc and Glavic, 2005) focusing on (positive or negative) contributions towards a more sustainable development. Attempts were made to categorise the plethora of sustainability assessment methods, aiming at providing an overview (Gasparatos, 2010; Gasparatos and Scolobig, 2012; Gasparatos et al., 2009; Ness et al., 2007; Singh et al., 2009). These works pay attention to aspects such as the integration of the environmental, social and economic dimensions of sustainable development, the spatial level (global to local), the temporal dimensions (short term, long term), the perspective adopted during the assessment (reductionist, non-reductionist) and the focus of investigation (e.g., products, services, projects, firms, regions, nations). Yet, many assessment methods tend to refer to 'a decision maker' (e.g. Pohekar and Ramachandran, 2004; Söderbaum, 2007), occasionally also 'a policy maker' (e.g. Boulanger and Bréchet, 2005) who will be the user of the methods. Often they do not specify who that decision maker actually is and what rationale he adopts for the assessment of resource use (e.g. Pope et al., 2004). With the few exceptions like Finnveden and Moberg (2005), who mention decision types (such as strategic planning, capital investments, and design and development) and point to different types of comparisons (e.g., between alternatives or against a reference) or van Passel and Meul (2012), who

\* Corresponding author. Tel.: +33 49182 7922; fax: +33 49182 7983.

E-mail addresses: [figge@sustainablevalue.com](mailto:figge@sustainablevalue.com) (F. Figge), [tobias.hahn@kedgbs.com](mailto:tobias.hahn@kedgbs.com) (T. Hahn), [r.barkemeyer@leeds.ac.uk](mailto:r.barkemeyer@leeds.ac.uk) (R. Barkemeyer).<sup>1</sup> Tel.: +33 49182 7313; fax: +33 49182 7983.<sup>2</sup> Tel.: +44 113 343 7485; fax: +44 113 343 5259.

distinguish between a sector and a farm level, these aspects do not form central elements of their categorization framework. Having different decision-making units with different decision-making perspectives has implications for the assessment of sustainable resource use. Our argument applies to a wide range of assessment approaches with different characteristics. It applies for example to reductionist as well as non-reductionist approaches. Irrespective of the question whether information on sustainability is reduced to a single factor or not, the assessment of the information depends on the perspective of the decision maker.

The current lack of focus on the decision-maker's perspective considerably hinders the application of a suitable method as well as the sound interpretation of results. Misunderstandings or misconceptions of what is being (or should be) measured in order to solve a particular assessment problem ensue when the decision-maker's perspective is not made explicit (e.g. Figge and Hahn, 2009). Three studies on the sustainability assessment of resource use can be used to illustrate the diversity of approaches and results. Tol (2008) provides an overview on estimates of the marginal damage costs of carbon emissions and finds a large spread of such estimates. Zhang et al. (2008) assess the eco-efficiency of 30 provinces in China using a data envelopment analysis. They find that six provinces use the nine environmental resources in a technically efficient way, while lagging provinces reach only around 20% of their technical efficiency of resource use. Figge and Hahn (2005) find that British Petroleum's use of eight economic, environmental, and social resources falls short of the average market efficiency of resource use in the British economy by a factor of 5.6 corresponding to a loss of £72 bn of GDP p.a. These three exemplary studies focus on different approaches to the problem of assessing the sustainable use of resources. A comparison and discussion of the results between studies based on different approaches is difficult if the fundamental underlying rationale of the different approaches is not taken into account.

This paper identifies three distinct actor roles that occur in the context of resource use and develops and defines three fundamentally different, but interrelated assessment questions of resource use, namely the questions if, how and where resources should be used. In this way the paper specifies the decision-making perspectives and explanatory power of different assessment approaches. A conceptual framework explicates the interconnections between the three perspectives.

The remainder of the paper is organised as follows: The next section provides the conceptual framework by identifying three fundamental actor roles. This framework leads into three perspectives regarding the If, How, and Where-questions of sustainable resource use that are used to structure the debate. Section 3 discusses the main implications of the argument for the field of sustainability assessment and Section 4 concludes the paper.

## 2. Conceptual Framework: If? How? Where? Structuring the Assessment of Resource Use

Two observations build the starting point for our categorisation of sustainability assessments: First, a key function of sustainability assessments is to support decision making (Ness et al., 2007) and second, the division of labour in modern economies leads to the involvement of different decision-making units in the use of resources. A resource can be defined as something that is scarce and required to contribute to the well-being of society. This broad notion of resources is based on an anthropocentric, i.e. actor oriented perspective from which a resource is "...essentially anything an actor perceives as valuable" (Frooman, 1999, p. 195). Therefore, our definition includes stocks and flows (El Serafy, 1991) as both can be scarce and contribute to societal well-being. The first criterion – scarcity – lays the basis for the need to maintain the resource stock for the future, for instance through a limited resource use by being efficient. The second criterion – social well-being – reflects the anthropocentric perspective that is inherent to the notion of sustainable development (U.S. President's Council on Sustainable Development, 1994). Such a broad resource definition includes not only resources that are used up in

production or consumption processes, but also unwanted outputs such as harmful emissions (for a similar perspective see also Pearce and Turner, 1990).

Quite fundamentally, economists commonly distinguish between productive and allocative efficiency (e.g. Hall and Lieberman, 2003, pp. 408). Productive efficiency is concerned with producing the maximum number of goods and services with a set amount of resources. "An economy is productively efficient when it is impossible to produce more of one good without producing less of some other good" (Hall and Lieberman, 2003, p. 412). Allocative efficiency is concerned with producing the right kind of goods and services in sufficient quantity. "An economy is allocatively efficient when there is no change in the quantity consumed of any good by any consumer that would be a Pareto improvement" (Hall and Lieberman, 2003, p. 418). In this paper, we are interested in the assessment of resource use and therefore in productive efficiency. Productive efficiency is a necessary condition for economic efficiency. "Economic efficiency is achieved when there is no way to rearrange the production or allocation of goods in a way that makes one person better off without making anybody else worse off" (Hall and Lieberman, 2003, p. 409).

Generally speaking, the use of resources should consider two aspects. First, the use of a resource must result in some kind of benefit with a higher benefit preferred to a lower benefit. Second, the use of a resource will generate some kind of burden. A lower burden is usually preferred to a higher burden. The subsequent framework for the assessment of sustainable resource use is based on the distinction of different actor roles and corresponding assessment perspectives.

### 2.1. Different Actor Roles

The existence of different decision-making units results in different decision-making perspectives and also in different rationalities that underlie different assessment approaches of resource use. At the same time, distinguishing between different perspectives reduces the complexity of an assessment situation and increases the explanatory power by defining the assessment question more clearly.

Here, we distinguish between resource users, beneficiaries and victims. Resource users have access to and exert technical control over resources. Beneficiaries are entitled to (at least a part of) any kind of benefit that accrues from the use of resources. Victims are exposed to any burden associated with resource use. These different roles can be assumed by the same actor or be distributed to different actors. The following discusses different settings of actor roles.

In the simplest setting resource user, beneficiary and victim are the same person (Fig. 1). This is typically the situation in a subsistence society without any major external damage. A farmer producing food using his own production factors, not causing any notable damage to the ecosystem outside of his property is an example in this context.

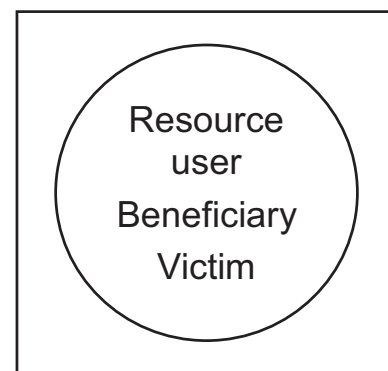


Fig. 1. Coincidence of resource user, beneficiary and victim.

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