

ANALYSIS

Sustainable development and social welfare

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Abstract

Sustainable development is a normative concept which involves trade-offs among social, ecological and economic objectives, and is required to sustain the integrity of the overall system. This is usefully formalized in terms of a social welfare function which is based on an aggregate of individual preferences and, as a prerequisite of intergenerational equity and overall system integrity, on a set of sustainability constraints. A ‘sustainability-based social value function’ is proposed to integrate these issues, and to go beyond traditional conceptions of sustainability that are either based on a value principle of maintaining some aggregate of capital (‘weak sustainability’), or stationary-state criteria of maintaining social, ecological and economic assets constant over time (‘strong sustainability’). Along with individual preferences and macroeconomic objectives, the proposed welfare function integrates principles of basic human needs (‘critical economic capital’), integrity of the ecosystem (‘critical ecological capital’) and the socio-cultural system (‘critical social capital’). This implies restrictions of the social opportunity space within which sustainable development can proceed and the new value function is defined. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Sustainable development encompasses economic, social, and ecological perspectives of conservation and change. In correspondence with the WCED (1987), it is generally defined as ‘development that meets the needs of the present without

compromising the ability of future generations to meet their own needs.’ This definition is based on an ethical imperative of equity within and between generations. Moreover, apart from meeting the basic needs of all, sustainable development implies sustaining the natural life-support systems on Earth, and extending to all the opportunity to satisfy their aspirations for a better life. Hence, sustainable development is more precisely defined as ‘a process of change in which the exploitation of resources, the direction of investments, the

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orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations' (WCED, 1987: 46).

This definition involves an important transformation and extension of the ecologically-based concept of physical sustainability to the social and economic context of development (Adams, 1990). Thus, terms of sustainability cannot exclusively be defined from an environmental point of view, or on the basis of attitudes. Rather, the challenge is to define operational and consistent terms of sustainability from an integrated social, ecological, and economic system perspective. This gives rise to two fundamental issues that need to be clearly distinguished before integrating normative and positive issues in an overall framework.

The first issue is concerned with the objectives of sustainable development; that is, 'what should be sustained' and 'what kind of development do we prefer'. These are normative questions that involve value judgments about society's objectives with respect to social, economic, and ecological system goals (cf. Barbier, 1987; Munasinghe, 1993; Khan, 1995). These value judgments are usefully expressed in terms of a social welfare function which allows an evaluation of trade-offs among the different system goals.

The second issue deals with the positive aspect of sustainable development; that is, the feasibility problem of 'what can be sustained' and 'what kind of system we can get'. It requires one to understand how the different systems interact and evolve, and how they could be managed. Formally, this can be represented in a dynamic model by a set of differential equations and additional constraints. The entire set of feasible combinations of social, economic and ecological states describes the intertemporal transformation space of the economy in the broadest sense.

To date, various definitions and stationary-state criteria of sustainability have been proposed. Many writers have been concerned with partial questions, such as technological assumptions and the substitutability of natural resources in economic transformation processes, and the resilience and criticality of ecological processes (cf. Pearce et al., 1994; Turner et al., 1994; Atkinson et al.,

1997). But, the social dimension did not receive the same attention, and has not adequately been integrated into formal analysis. Moreover, positive aspects of feasibility and the normative content of sustainable development have not been clearly distinguished.

Given these circumstances, the aim of this paper is to elaborate a social value function which is compatible with the general objective and system requirements of sustainable development. In the next section, I briefly review some fundamental principles of sustainability from an ecological-economic perspective. In Section 3, I present an extension of these principles to the social context, and provide a formal approach which includes distributional concerns and population growth. In Section 4, I address principles of basic human needs, and criticality of ecological and social capital. Building on this background, I formulate a 'sustainability-based social value function', which integrates individual preferences and system requirements of sustainable development. Concluding remarks about the use of this new value function and the feasibility of sustainable development follow in Section 5.

2. Ecological and economic interpretations of sustainability

Divergent interpretations and opposing definitions of sustainability are sources of confusion, rather than contributions that could help to reinforce the root idea of sustainable development. As a consequence, there is disagreement about the conceptual and operational content of 'sustainability'. This has resulted in different paradigms that are referred to as 'weak' and 'strong' sustainability principles, respectively (cf. Turner et al., 1994; Hediger, 1999).

In general, 'weak sustainability' is defined as an economic value principle which is founded within the body of neoclassical capital theory. It requires that some suitably defined value of aggregate capital — including human-made capital and the initial endowment of natural resources and social assets — must be maintained intact over time. However, this principle remains unclear. The ob-

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