Sustainable Development and TES

Sustainable development seeks to provide the best outcomes for the human and natural environments both now and into the indefinite future. The concept indicates a long time perspective and a holistic approach to setting goals of non-pollution and not wasting resources in societies. This perspective is highly valued by the journal, but it is also a difficult issue to cover when making a contribution to TES. The TES articles have to observe a certain form: including a problem, method, analysis and conclusion, all in a limited number of pages. How can one cope with the issue of future generations and a holistic approach without loosing readers' interest?

From the literature it is possible to identify different strategies when it comes to making sustainability operational in a scientific context.

The Use of Ecosystems and Resources

In this strategy a parameter is chosen and quantified in a materials balance perspective.

An example can be an energy flow in Danish agriculture and its development over a number of decades. The Energy output/input ratio is the energy output in human food compared with the amount of fossil energy spent, and the output/input ratio decreased during the investigated period. Energy is hard facts even though many parameters are difficult to calculate, there is no natural law that can discern which output/input energy ratio is environmentally optimal for Danish agriculture, or what sustainability in agricultural production is. However a situation where the same amount of fossil energy is spent as the energy output in human food does not seem to be ecological sustainable, but it is a political and social problem to decide which energy ratio will be appropriate and which parameters should be included in the energy flow. In addition to the problems of calculation, there are serious weaknesses in this energy approach because energy content does not say anything about toxicology, labour environment or quality of energy (Schroll 1994).

Quantified models are also used in life cycle assessment and ecological footprint analysis and they build on the fundamental condition that the Earth is finite and resources are limited. It is important that the chosen parameters can be quantified and submitted to politically decided goals concerning sustainability.

Strategies of Dividing Sustainability

In many practical cases a division of types of sustainability appears to be chosen, and after the analysis of each part a common conclusion is presented.

The Food and Agricultural Organisation (FAO) has identified three types of sustainability in the context of technical cooperation. A) *Institutional sustainability* where success criteria can be that a strengthened institutional structure continues to deliver the results of technical cooperation to end users, and adequate resources are provided after the technical operation ends. B) *Economic and financial sustainability* means that the cooperation continues to yield an economic benefit, and that sustainability may be at risk if the end users continue to depend on heavily subsidized activities and inputs. C) *Ecological sustainability* deals with the assessment of the benefits generated by the technical cooperation and if it leads to deterioration in the physical environment, or a fall in the well-being of the groups targeted and their society (Wikipedia 2006).

Sustainability can be applied to development projects. The dimensions of and the factors that can affect project sustainability are explored. Five dimensions of project sustainability - *economic, institutional, technical, social, and environmental* are identified. Many factors can affect a project's sustainability such as the partner government and donor policies, the partner participation and ownership, the awareness building and training, and the external political and economic factors and add to that the insufficient and explicit addressing and analysis of sustainability throughout the project

cycle, corruption, and inefficient participation from the donor's side. Seen from the theoretical perspectives, project sustainability has to do not only with the capacity of the directly involved partner stakeholders to maintain the achieved results after the aid intervention has come to an end, but also their capacity to produce the results by themselves and develop/reproduce them over a period of time (Nhi Quyen Le 2006).

Strategy of Genuine Saving

The Danish Economic Council used the concept "genuine saving" as a tool for dynamic sustainability. The starting point was to divide capital into three areas - *man-made* capital, *natural* capital and *human* capital – and the point is that an economic yardstick can measure these forms of capital. The Economic Council calculates the total capital of machines, buildings, and also the capital of nature, fresh air, knowledge and much more. The criterion for sustainable development is that the value of the total national capital is not declining. A consequence of the strategy is that substitution among man-made capital, natural capital and human capital is assumed to be perfect, and substitution of all kinds of natural capital can increase human welfare and wealth. A highway can replace precious nature and this activity can be a positive contribution to a sustainable genuine saving if it can be shown that the highway is more valuable than the impact on nature. A main problem with this kind of strategy is the pricing of nature and environmental impacts. The Economic Council states a number of reservations including that substitution presumes minor or modest changes in natural capital (Det Økonomiske Råd 1998). Relying on genuine saving as the criterion of sustainability may be problematic in times of rapid development if there are critical limits to the quality of nature.

A Strategy Using Sustainability Indicators

Indicators generally simplify in order to make complex phenomena quantifiable so that information can be communicated. "The need for sustainability analysis and particular for indicators of sustainability is a key requirement to implement and monitor the development of national sustainable development plans, as required by Agenda 21 agreed at UNCED in June 1992" (Dalal-Clayton 1993). A number of different schools have undertaken development of such a list of indicators. (Wikipedia 2006)

Yale and Columbia University have developed an *environmental sustainability index* (ESI). ESI benchmarks the ability of nations to protect the environment over the next several decades. It does so by integrating 76 data sets – tracking natural resource endowments, past and present pollution levels, environmental management efforts, and society's capacity to improve its environmental performance - into 21 indicators of environmental sustainability. These indicators permit comparison across the following five fundamental components of sustainability: Environmental systems; environmental stresses, human vulnerability to environmental stresses; societal capacity to respond to environmental challenges; and global stewardship. The core critique is comprehensive and points to, for example, that equal weighting of the 21 indicators underemphasizes climate change, and that countries with high per capita levels of natural resources score highly on the ESI (Environmental Sustainability Index 2005).

The indicators of general sustainability are often a mixture of quantifiable indicators and subjectively (ranked) indicators and these are sometimes ranked to one figure of sustainability. Ranking of sustainability into on figure makes the indicators and the outcome of the weighing less transparent for decision-makers as well as the public.

The Subject of Sustainability in TES

Sustainability is applied in different contexts and we have given a few examples. Sustainability is divided and made operational in different ways. A common yardstick energy and money is applied or many indicators are combined for a relative sustainability. In general, sustainability is used for comparison after time and space are defined. Obviously a common operational definition of sustainability is not discernible.

In earlier issues, authors have approached sustainability but often as a general phenomenon that points to a positive situation. In the article "Sustainable Work – Concepts and elements of Practice" the authors develop a common vision of sustainable environmentalism and social sustain-

able working life through a rough outline of a concept of sustainable work (Hvid et al. 2002). Sustainability is to be found in other articles published in TES, but certainly not in a way which covers the strategies mentioned above.

Therefore, we invite scientific papers where sustainability is an integrated part of the method and where the methods advantages and disadvantages are carefully discussed so that TES can be an arena for improving the discussion on sustainability as a scientific and political tool.

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