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Günter Vornholz*

The Sustainable Development Approach

Given the ecological, economic and social problems around the world, the search is on for a new, alternative concept capable of showing a way out of these global problems. A concept with a claim to have a vital contribution to make, which has been under discussion since the 1980s, is that of sustainable development.

The basic intention underlying the sustainable development approach consists in formulating objectives and strategies intended to provide solutions to the global ecological and development problems which are now becoming increasingly evident. It is also based on the assumption that the concept must apply globally, i.e. to industrial as well as developing countries, and that it must take the interests of future generations into consideration.

Origins of the Concept

Historically, the sustainability concept can be traced back to the German forestry industry in the 18th and 19th centuries. The concept as it then was evolved as a response to the devastating effects of the over-exploitation of forests, with a view to upholding a regular supply of timber and preserving the other functions of the forest. The present-day literature and legislation applying to the forestry industry is more specific about the concept. Two differing interpretations of sustainable forestry are currently in operation. In the static interpretation a given state persists for an indefinite period of time, e.g. the reserves of timber measured in cubic metres remain constant. Dynamic sustainability, on the other hand, focuses on the capacity to (potentially infinitely) uphold a given level of output, e.g. a given timber yield. In other words, the former definition concentrates on preserving stocks, and as such is a major precondition of the latter definition, which relates to the maintenance of flows.¹

The present-day consideration of the sustainable development concept harks back to the Club of Rome

report issued in 1972 and to the report entitled "Our Common Future" published by the World Commission on Environment and Development in 1987. The idea can be found in countless articles, papers and discussions today. It is worth noting, however, that although the approach as such is invariably positively received, various definitions and interpretations of it are in simultaneous use. Various international organisations (e.g. the World Bank, international business organisations or the ecology movement) use sustainable development as a title to describe their own conceptions of economic action.

Lack of a Uniform Definition

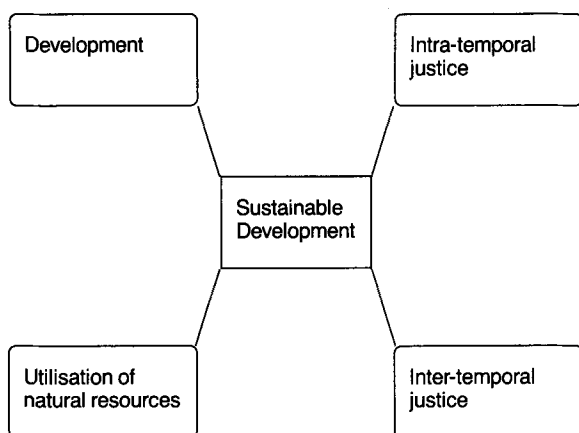
The sustainable development approach is difficult to tie down in analytical terms, since it is concerned with many-faceted development problems. Any generally recognised definition must take account of a tremendous variety of development objectives yet must also be analytically unequivocal. Nevertheless, there are also advantages in the wide variety of different view-points, for an interdisciplinary approach makes it possible to pick up on ideas originating from all sorts of scientific fields. It is thus quite possible that the approach as a whole could be expanded in various directions by taking findings from a number of fields of enquiry into account.

Although it has been the subject of discussion for many years, particularly in policy and programmatic fields, there exists so far no uniform definition of sustainable development. Yet although very general, sometimes deliberately vague definitions of the concept tend to be

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¹ Cf. W. Peters: Die Nachhaltigkeit als Grundsatz der Forstwirtschaft – Ihre Verankerung in der Gesetzgebung und ihre Bedeutung in der Praxis, Hamburg 1984.

Figure 1
Aspects of Sustainable Development



used, it is nevertheless possible to identify a number of common features. In her analysis of the sustainable development approach, Gardner arrives at a set of eight principles which she distinguishes as either substantive or process-oriented. Whereas the former group of principles is concerned with the fundamental objectives of development, the latter are concerned with the relations and strategies involved in establishing sustainability. However, as Gardner points out, the subdivision should not be regarded as final or as universally valid.²

I have divided the concept into a different set of analytical categories in Figure 1. Each of the four aspects in the diagram is regarded as a component of the sustainable development concept, though their relative weightings differ.³

Developments vs. Growth

The first aspect of the sustainable development approach lies in the very fact that development is normally discussed rather than growth. The concept assumes that development can take a form which is not capable of being upheld in the long term as it results in the destruction of natural habitats. Yet, on the other hand, it asserts that a form of development is possible – both in the developing and in the industrial countries – which can be sustained in the ecological, social and economic senses. These arguments follow the lines of the debate on growth which took place in the wake of the Club of Rome's report in the 1970s.

In this article, the distinction between growth and development drawn by Daly will be used, with growth defined as a "quantitative increase in the scale and physical dimension of the economy, i.e. the rate of flows of

matter and energy through the economy".⁴ In contrast to this, development is defined as a "qualitative improvement in the structure, design, and composition of physical stocks and flows".⁵ In other words, development signifies the coming to bear of potential and/or structural change. Contrary to the biophysical limits which necessarily apply to *growth*, no limits to *development* are seen within the scope of the sustainable development approach.

In the literature on the approach, development is normatively stipulated as a goal for society, and is defined as a positive change requiring further specification in a vector of particular social objectives. Social indicators are used as criteria for evaluating particular developments. These constitute an alternative way of measuring welfare, of which the capacity to generate economic output is just one indicator. Even so, it is still necessary to define the necessary components of sustainable development rather more closely. As one possible approach, Pearce et al. cite elements such as health, education, a fair distribution of income, and access to resources.⁶

Whereas economic growth is viewed critically from many quarters, the implicit assumption is at the same time almost taken for granted that development represents a positive process. Development as a concept is imbued with value judgements, and is associated with desirable changes. On the other hand, there is no agreement on what specific aspects are characteristic of development. As far as sustainable development is concerned, this is defined differently depending upon how a society's objectives are defined, and by whom. Such objectives can only be determined by discussion within society and, rather than being static, they are therefore subject to continual changes.

In some sections of the literature on sustainable development, this is frequently no more than a question of semantic distinctions. In many approaches, the same old, conventional ideas of economic growth are now presented as a new development model, or economic development is equated with industrialisation. The same criticism also

² Cf. J.E. Gardner: Decision Making for Sustainable Development: Selected approaches to environmental assessment and management, in: Environmental Impact Assessment Review, Vol. 9 (1989), pp. 337-366.

³ Cf. G. Vornholz: Zur Konzeption einer ökologisch tragfähigen Entwicklung. Eine ökonomische, theoretische Analyse der Bedingungen für die Erhaltung der natürlichen Lebensgrundlagen, doctoral dissertation, Marburg 1993.

⁴ Cf. H. Daly: The Economic Growth Debate, in: Journal of Environmental Economics and Management, Vol. 14 (1987), pp. 323-336.

⁵ Ibid.

⁶ Cf. D.W. Pearce, A. Markandya and E. Barbier: Blueprint for a Green Economy, London 1990.

applies to the use of the term “sustainable growth”, which is rejected as a self-contradictory term since economic growth cannot continue indefinitely within a finite global ecosystem.⁷

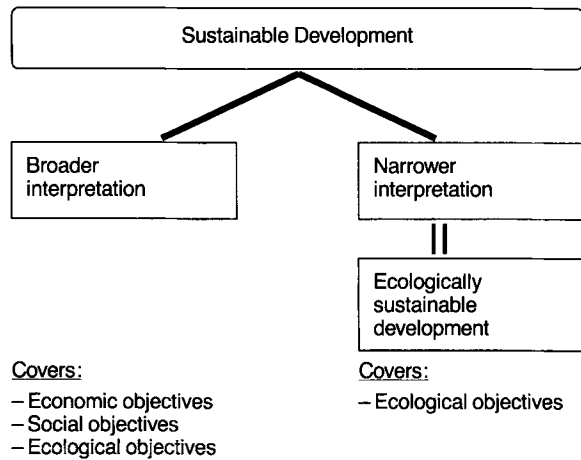
Other Focal Points

A second aspect of development as a social goal which is given intensive treatment in the sustainable-development literature is the problem of income and wealth distribution. The guiding principle is that of intra-generational justice, and the sustainable development approach treats this normatively, as the need to give favourable treatment to those groups which are socially weak.⁸ As in the “basic needs” strategy, therefore, one point of emphasis of development is the improvement of the living conditions of the poor, including the question of how the situation of so-called Third World countries can be improved.

A third specific field of emphasis in the sustainable development approach is the discussion devoted to the interests of future generations. Expressed in terms of the first aspect above, that means that the value of the development vector must not be allowed to decline over time. In the decisions it takes, today’s generation must bear responsibility for leaving the same potential quality of life to future generations as it had available for itself. Even though it is impossible to predict precisely what the interests of future generations will be, one can assume it is highly probable that their needs will not be significantly less than those of today’s generation. The wish to ensure the long-term survival of humanity means that this approach operates with an infinite time horizon. Thus the principle of inter-temporal justice ensures that future generations are no worse off than the present one.⁹ Whichever particular definition of the concept is used, this is manifested in the very use of the word “sustainable”.

The fourth aspect touched upon by definitions of sustainable development consists in the significance of the natural environment for the development process. Though there remains some controversy as to whether protecting the functions of ecosystems is a fundamental precondition of sustainable development or just one part of it, it is certainly an aspect to be found in all definitions, and the demand is that ecological functions be at least

Figure 2
Alternative Interpretations of Sustainable Development



preserved or, better still, improved. The need to preserve natural functions flows from the importance of ecosystems as an input factor for production and consumption, which means that a certain stock of “natural capital” has to be kept available for future generations (inter-temporal justice). Because of the incomplete knowledge of the interrelationships between the economic and ecological systems on the one hand and the interactions occurring within the ecological system on the other, special caution is called for in the utilisation of natural resources. The approach to nature inherent in present-day forms of economic activity is felt to be ecologically unconscionable.

Differing Interpretations

Another fundamental distinction that can be drawn between two different ways of interpreting the sustainable development concept, is illustrated in Figure 2. The comprehensive interpretation seeks development which is sustainable in the economic, social and ecological senses. A narrower interpretation applies the need for sustainability strictly to the ecological sphere, and focuses on analysing the conditions under which “optimum” management of resources and the environment can be achieved.¹⁰

A number of examples of the various ecological, economic and social objectives which go to make up the more comprehensive interpretation are provided by Barbier. An ecological objective, for example, might be preserving the variety of species or the robustness of existing ecosystems. Economic objectives might include an equitable distribution of income and/or wealth, or the fulfilment of basic needs. Social objectives could include cultural variety and democratic rights.

⁷ Cf. H. Daly: Toward some Operational Principles of Sustainable Development, in: Ecological Economics, Vol. 2 (1990), pp. 1-6.

⁸ Cf. D.W. Pearce, E. Barbier and A. Markandya: Sustainable Development: Economics and Environment in the Third World, Worcester 1990.

⁹ Cf. D.W. Pearce and R.K. Turner: Economics of Natural Resources and the Environment, New York/London 1990.

¹⁰ Cf. E.B. Barbier and A. Markandya: The Conditions for Achieving Environmentally Sustainable Development, in: European Economic Review, Vol. 34 (1990), pp. 659-669.

Both in the literature and in policy debates, opinion varies as to the significance of the various systems of objectives and as to the interdependencies among them. One side of the debate maintains that there is a hierarchy of such systems of objectives, with the achievement of ecological objectives forming an essential precondition for sustainable development. Nature and its resources, so the argument goes, form the habitat of humankind, so without them it will be impossible for future generations to survive. However, commentators on the other side of the debate point out that immediate, strict adherence to ecological restraint would mean the death of millions of people (especially in the developing countries). Thus, they say, truly sustainable development in the ecological sense is not possible, and the best that can be achieved is to ensure that the three different systems of objectives are properly weighed against one another.

A definition provided in the World Commission on Environment and Development's report will serve as a good example of the *comprehensive* interpretation of sustainable development:

"Sustainable Development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future."¹¹

The World Bank authors Goodland and Ledec propose a very general definition geared to the maximisation of welfare, describing sustainable development as:

"... a pattern of social and economic transformations (i.e. 'development') which optimizes the economic and other societal benefits available in the present, without jeopardizing the likely potential for similar benefits in the future."¹²

The FAO, meanwhile, applies its definition to agricultural development as follows:

"Sustainable Development is the management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in agriculture, forestry and fishery sectors) conserves land, water, plant and animal genetic resources, is

environmentally non-degrading, technically appropriate, economically viable and socially acceptable."¹³

In its report "The Global Revolution" published in 1991, the Club of Rome also addresses the concept of sustainable development, though it regards it as a utopian idea. The Club of Rome believes that economic growth is a necessity for the developing countries of the South, while the industrial countries of the North are more in need of qualitative growth.¹⁴

The report by the World Commission on Environment and Development calls for faster economic growth in the industrial and developing countries alike. An immediate criticism which can be made here is that a higher level of production is equated with increasing social welfare. The national product thus functions as the indicator of both economic and social success. A fundamental thesis of the report is that economic output ought to increase more quickly than the world population in order to overcome poverty, especially in the developing countries. It recommends exponential economic growth in the industrial as well as the developing countries as a strategy for eliminating worldwide poverty and fulfilling basic needs.⁵

It is simultaneously assumed that economic growth can in fact be achieved without increasing the consumption of raw materials and energy and without increasing the burden upon ecological systems. However, right up to the present day, economic growth has so far resulted in ecological systems' being overtaxed. This inevitably raises the fundamental question of whether a growth strategy of this kind could even come anywhere near ecological sustainability.

Utilization of Natural Resources

In the case of the narrower interpretation of sustainable development, i.e. focusing upon the ecological aspect, the main point is to determine how an optimum utilisation of nature's resources can be attained. This optimum utilization involves preserving ecological systems' capability to go on functioning, with the objective of conserving natural habitats for the long term on a comprehensive basis. Both from scientific and from ethical perspectives, a constant stock of "natural capital" is required to ensure ecological sustainability. If this precondition is examined in more specific terms, a number of more detailed rules and restrictions can be derived from it as regards particular natural functions.

¹¹ World Commission on Environment and Development: *Our Common Future*, London 1987, p. 40.

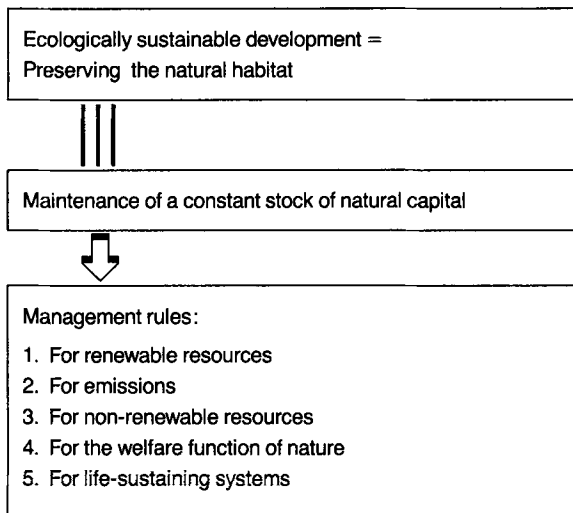
¹² R. Goodland and G. Ledec: *Neoclassical Economics and Principles of Sustainable Development*, in: *Ecological Modelling*, Vol. 38 (1987), pp. 36-37.

¹³ Quoted in: A. Kandiah: *Water Quality Management for Sustainable Agricultural Development*, in: *Natural Resources Forum*, Vol. 14 (1990), p. 22.

¹⁴ Cf. Club of Rome: *Die globale Revolution*, Spiegel-Spezial, No. 2, Hamburg 1991.

¹⁵ World Commission on Environment and Development, op. cit., pp. 49ff.

Figure 3
How Restrictions are Established



The following restrictions apply to the utilisation of natural resources:¹⁶

1. In the case of renewable resources, the rate of exploitation must not exceed the rate of natural regeneration.

2. In using the natural environment as an absorptive medium for the economic system's waste materials, the level of emissions must not exceed the assimilative capacities of the ecosystems affected.

Different rules apply to the utilisation of non-renewable resources, as any consumption of these necessarily reduces the stock which will be available to succeeding generations.

3. Whenever non-renewable resources are depleted, care must be taken to ensure that the reduction in stocks is compensated for by an equivalent increase in the stocks of renewable resources.

The ecologically sustainable development approach is based on the principle that a constant stock of natural capital must be upheld. That capital stock consists of a combination of non-renewable and renewable resources, and the assumption is made that such resources are to some extent mutually substitutable. Thus inter-temporal justice consists in maintaining the same availability of ecological systems' different functions for all generations. However, observing this principle means that the first restriction, on renewable resources, needs to be made rather tighter: i.e. the quantity consumed must be lower than the quantity regenerated to an extent which is adequate to compensate for the depletion of non-renewable resources. Another factor which needs to be

taken into account when determining the level of consumption of renewable and of non-renewable resources is that the assimilative capacities are also limited.

The third restriction above may be modified if the more optimistic assumption is made that the natural capital involved can be substituted for by reproducible or artificial capital. In this situation, consumption is justifiable if an equivalent stock in the form of reproducible capital can be made available to subsequent generations, sufficient to maintain the same living standards (per capita consumption).

4. Nature also contributes directly to human welfare (e.g. via the beauty of a landscape), and this must be taken into consideration before making decisions on utilising natural resources.

5. Nature's life-sustaining systems (such as the climate) must be preserved, not least because of the need to leave the options open for future generations.

In determining the restrictions it needs to be taken into account that interdependences occur between the different functions of nature. Apart from that, the principles can only be laid down on the basis of the limited knowledge currently available with regard to ecological inter-relationships.

Concluding Remarks

A number of general reservations have been voiced from various quarters regarding the sustainable development concept. Traditional economists have voiced the criticism that this is simply a revamped version of the debate on the absolute versus relative scarcity of resources. It is pointed out that the idea of limits to growth inherent in the sustainable development concept is based on an unduly pessimistic world-view. From an ecological perspective, critics point out the unclear delineation between development and growth, and say that we have clung on too long to traditional indicators of welfare.¹⁷

Extensive analysis is still necessary so as to define sustainable development unequivocally and to implement it in practical policy-making. So far, neither the necessary concepts nor the necessary institutions would appear to be available to transform the global economy from its current quantitative growth policy to a strategy of sustainable development. Yet the ecological problems all over the world demonstrate just how urgently a different development policy is needed.

¹⁶ G. Vornholz, op. cit.

¹⁷ T.S. Veeman: Sustainable Development: Its Economic Meaning and Policy Implications, in: Canadian Journal of Agricultural Economics, Vol. 37 (1989), pp. 875-886.