

THE FUTURE OF SUSTAINABLE DEVELOPMENT

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Summary

The concept of sustainable development has become the organizing framework for much economic, social and environmental policy because it meets a policy need. Specifically, it has the potential to address environmental issues in a way that is more consistent with economic and social aspirations than the emphasis on 'limits to growth', which was characteristic of much environmental thinking in the 1970s and 1980s.

The conditions for improvements in environmental quality to be attained simultaneously with continuing economic growth are now well understood, and comprise substitution between factor inputs, more efficient use of the same inputs and structural economic change. However, realizing what is required for economic growth to be consistent with environmental protection does not mean that it can be achieved in practice. Such achievement remains a major challenge for sustainable development.

Sustainable development seeks to combine two ideas: development and sustainability. The former idea has evolved substantially over the past four decades, and has changed from a preoccupation mainly with economic development, narrowly defined, to a concern more with building capability for the achievement of human potential and improving the quality of human life, broadly defined. It is this most recent formulation of the development concept that fits best with current interpretations of sustainable development.

The concern for sustainability mainly relates to environmental sustainability. This is defined as the maintenance of important environmental functions. Seven principles of environmental sustainability are set out, from which indicators of environmental sustainability are derived which can give a clear picture of movement towards, or away from, environmental sustainability across different environmental dimensions.

Combining ideas of human development with the principles and indicators of environmental sustainability results in a new paradigm of ‘sustainable human development’. The future of sustainable development will depend on the extent to which sustainable development policy is able to realize in practice the various characteristics of this new paradigm. The challenge is very great, because many of the trends to be reversed are both deep-rooted and powerfully motivated. But there appears to be no other paradigm available if improvements in the human condition are to last over the long term.

1. Introduction

Previous chapters have explored the idea of sustainable development from many angles and perspectives, and elaborated different aspects of it in some detail. The purpose of this chapter is to speculate on how the idea of sustainable development may itself develop and change over time.

The most important influence on how the idea of sustainable development is likely to evolve is whether it is perceived to be a success. Sustainable development did not get taken up by the policy community in practically all countries because of the intellectual power or rigor of the idea. It was adopted because it was felt that it met a policy need. In order to assess the possible future of the sustainable development idea, it is necessary to understand its genesis and the hopes that have been invested in it. Section 2 of this chapter therefore explores how sustainable development came to be an almost unanimous expression of different countries’ aspirations.

Undoubtedly one of the reasons why so many countries were able to sign up to the idea of sustainable development was that it can mean many different things and accommodate many different policy emphases within those meanings. The phrase is itself a linking of two concepts – sustainability and development – which themselves have layers of complexity. Section 3 of this chapter briefly explores different aspects of this complexity. It concludes that the ‘development’ component of sustainable development, as it has so far been interpreted, is broadly consistent with the ideas related to human development which have been formulated over the last decade by bodies such as the United Nations Development Programme (UNDP), which in turn evolved from such approaches to development as that taken in the 1980s by the Brandt Report. The ingredient that has been added to sustainable development is, as its name implies, the explicit aspiration that development should be sustainable and, in particular, be *environmentally* sustainable.

If the success or otherwise of the sustainable development idea depends on whether it manages to combine development with environmental sustainability, then, to assess that success, it is necessary both to have a clear definition of environmental sustainability, and to have indicators by which it, and progress towards it, can be measured. Section 4 sets out such a definition and describes how appropriate indicators may be derived.

The nature of the environmental challenge is so fundamental that it is unlikely that it will be successfully addressed, and environmental sustainability achieved, in an international context which seeks in other ways to proceed largely with business as

usual. Rather it is likely that policies and initiatives to promote environmental sustainability will need to be embedded in a context of international solidarity and cooperation which would also find expression in a new paradigm of development. Section 5 briefly recapitulates, on the basis of the previous discussion, the main characteristics of a paradigm of ‘sustainable human development’, and suggests that its future will depend on the extent that it can deliver real results in respect of these characteristics.

2. Limits to Growth and Sustainable Development

The twenty years between the 1972 UN Conference on the Environment in Stockholm and the 1992 Earth Summit, the UN Conference on Environment and Development (UNCED) in Rio de Janeiro witnessed a major change in approach to issues of environment and development. Today the key phrase is ‘sustainable development’. Then it was ‘limits to growth’.

The term ‘limits to growth’ itself was the title of a book by Donella and Dennis Meadows and a team from the Massachusetts Institute of Technology (MIT), which was the principal fuel for the subsequent debate. For the Meadows team the limits were ecological limits, and they applied to economic growth, understood as growth in production as measured by GNP, which they assumed implied a similar increase in the consumption of natural resources. They concluded: “The most probable result (of reaching the limits to growth) will be a rather sudden and uncontrollable decline in both population and industrial capacity.” (Meadows et al., 1974, p.23)

The Meadows’ model assumed that population and industrial capital would grow exponentially, leading to a similar growth in demand for food and non-renewable resources and in pollution. The supply of food and non-renewable resources were, however, taken to be absolutely finite. Not surprisingly, exponential growth within finite limits resulted in systematic breakdown; the expansive nature of compound growth also meant that the finite limits could be raised by a factor of four without significantly affecting the results.

While the ‘limits to growth’ thesis struck a chord with the general public, economists and other scientists were quick to seek to discredit it. Two of the most comprehensive rebuttals came from a team at Sussex University’s Science Policy Research Unit (Cole et al., 1973), and from William Nordhaus (1973). They criticized the relationships in Meadows’ model, the assumptions on which the model was based and the emphasis on purely physical parameters. Their re-runs of the model produced dramatically different results, with the introduction of technical change and substitutability having the greatest effect, either significantly postponing the model’s ‘overshoot and collapse’ trajectory or converting it into one of continually increasing consumption.

Lecomber (1975) admirably expresses the difference between resource optimists, such as Nordhaus and Cole et al., and pessimists such as the Meadows’ team. He identifies the three key effects that can reduce depletion or pollution: changes in composition of output, substitution between factor inputs, and technical progress (more efficient use of the same input). If these three effects add up to a shift away from the limiting resource

or pollutant equal to or greater than the rate of growth, then the limits to growth are put back indefinitely. But, Lecomber (1975, p. 42) warns: “[This] establishes the *logical* conceivability, not the certainty, probability or even the possibility in practice, of growth continuing indefinitely. Everything hinges on the rate of technical progress and possibilities of substitution. This is perhaps the main issue that separates resource optimists and resource pessimists. The optimist believes in the power of human inventiveness to solve whatever problems are thrown in its way, as apparently it has done in the past. The pessimist questions the success of these past technological solutions and fears that future problems may be more intractable.” Lecomber looks for evidence in an effort to judge between these two positions, but without success. “The central feature of technical advance is indeed its uncertainty” (Lecomber, 1975, p.45). This conclusion is of relevance to the contemporary situation with sustainable development, as will be seen.

Whatever the potential of technological change, there are certain physical constraints, defined by the laws of thermodynamics, that cannot be circumvented. The Second Law - that all activity and transformation of energy or materials leads to an increase of entropy - has been most extensively related to economics by Georgescu-Roegen (1971).

In this analysis it is the increase of entropy that is the ultimate limit to growth. Economic activity increases entropy by depleting resources and producing wastes. Entropy on earth can only be decreased by importing low entropy resources (solar energy) from outside it. This energy can renew resources and neutralize and recycle wastes. To the extent that the human economy is powered by solar energy, it is limited only by the flow of that energy. Growth in physical production and throughput that is not based on solar energy must increase entropy and make environmental problems worse, implying an eventual limit to such growth. Growth in physical production based on solar energy is limited by the quantity and concentration of that energy. GNP can free itself from these limits only to the extent that it ‘decouples’ itself from growth in physical production. Such decoupling has occurred to some extent, but the entropy law decrees that it can never be complete. Optimists believe that the decoupling can be substantial and continuous; pessimists are more skeptical.

The 1970s’ limits to growth critiques failed to dent the social consensus in favor of economic growth, so that by the time the Brundtland Commission produced its report, *Our Common Future* (WCED, 1987), on environment and development, the emphasis was placed on a perceived complementarity between growth and environment. In her introduction to the report, Mrs. Brundtland calls for “a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable” (WCED, 1987, p. xii).

This bullish attitude was justified by statistics which showed that over the period 1972-1986 the relationship between energy use and economic growth in industrial countries had undergone a significant change from the broadly proportional relation that had pertained before. In the US, energy intensity (the amount of energy used per unit of GDP) from 1973-1986 diminished by 25%. Over the OECD as a whole, it fell by 20% from 1973-85. In the same period for countries belonging to the International Energy Agency, GDP grew by nearly 32%, but energy use only by 5% (WRI, 1990, p. 146). A

‘decoupling’ of economic growth from energy consumption in rich countries was proclaimed. In poor countries, Beckerman, who had been a vigorous critic of the limits-to-growth thesis in the 1970s, argued that economic growth was essential for environmental improvement, at least in important areas such as access to drinking water, sanitation and air quality. He concludes: “In the longer run, the surest way to improve your environment is to become rich” (Beckerman, 1992, p.491).

However, Beckerman’s is not the only important voice from the 1970s debate to have restated its essential conclusions in the 1990s. A second report from Meadows et al. (1992, p.12) states: “[The possible paths into the future] do not include continuous growth. The choices are to bring the burden of human activities upon the earth down to a sustainable level through human choice, human technology and human organization, or to let nature force the reduction through lack of food, energy or materials, or an increasingly unsound environment”.

It was in response to the new Meadows book that Nordhaus (1993a) also produced an updated assessment of the issues and arguments around the limits-to-growth theme. His critique of Meadows’ new model run largely restates his earlier objections, with the extra calculation that introducing a rate of technical change of only 0.25% per annum (in the context of recent historical rates of 1-2%) is sufficient to keep consumption per head rising (Nordhaus 1993a, p.16). However, his key new conclusion is that “the debate about the future of economic growth is an empirical one” (ibid., p.16).

Nordhaus then goes on to estimate the “drag on economic growth” that depletion, pollution and defensive environmental expenditures may exert in the years up to 2050, concluding that the growth rate may be reduced by 0.3% per annum, or nearly 20% of the per capita 1.6% per annum growth that he projects (Nordhaus 1993a, p.38). Although this is still very far from ‘overshoot and collapse’, it is a non-negligible effect. If the projected per capita growth rate is over-optimistic, if the estimates of environmental damage are generally too low, or if there is some unforeseen environmental calamity, then the impacts on growth rates could start to look dramatic. Nordhaus’ (1993a, p.39) conclusion from these figures is justified: “It would take either a massive slowdown in productivity growth or a massive underestimate of the constraints to growth before the resource constraints would actually produce a decline in global living standards.” However, he rules out neither eventuality, ending with a sober assessment of both the necessity for and difficulties of sound policy making in this area: “The peril lies not in the stars but in ourselves.” (ibid., p.43)

A comparison between the attitudes of the 1970s and the 1990s shows that the resource pessimists’ conclusions are essentially unchanged, but there has been a significant shift in the mainstream resource optimists’ position since the 1970s. Then, environmental limits were largely perceived to be either non-existent or automatically self-delimiting. Now the broad conclusion of the mainstream optimists is that environmental problems are real and threatening and that to be reconciled with continuing economic expansion *active policy* will be required.

This conclusion received one of its most sophisticated restatements in the *World Development Report 1992* (World Bank, 1992). This report accepts the gravity of the

environmental situation. Further, it accepts that some environmental problems are “exacerbated by the *growth* of economic activity” (p.7, original emphasis). Its strategy to achieve both environmental conservation and economic growth advocates a twin focus. Most importantly, “Some problems are associated with the *lack* of economic development; inadequate sanitation and clean water, indoor air pollution from biomass burning, and many types of land degradation in developing countries have poverty as their root cause. Here the challenge is to accelerate equitable income growth...” (p. 7, original emphasis). The Report accepts that “these ‘win-win’ policies will not be enough” (p.5) and that, in other cases, “there may be trade-offs between income growth and environmental protection” (p.1). However, “The evidence indicates that the gains from protecting the environment are often high, and that the costs in foregone income are modest if appropriate policies are adopted” (p.1). The gains from ‘win-win’ opportunities on the one hand, and only modest costs on the other, could, on this analysis, result in both a 3.5-times rise in world output and “better environmental protection, cleaner air and water, and the virtual elimination of acute poverty” (p.2).

The greater acceptance now of environmental threat by policy makers and academics compared to the 1970s has resulted in the enormous expansion of analysis of and political interest in the idea of sustainable development. Although it was the Brundtland report that popularized the concept, it was in fact first used in the mid-1970s “to make the point that environmental protection and development are linked” (Holmberg & Sandbrook 1992 p.19).

Barbier (1987) has suggested that sustainable development should be viewed as an interaction between three systems, the biological, economic and social systems. “The general objective of sustainable economic development, then, is to maximize the goals across all these systems through an adaptive process of trade-offs” (Barbier 1987 p.104), although the difficulty of expressing these trade-offs in the same units suggests that the process is likely to be at best one of attempted optimization through the political process rather than strict maximization. The same multi-dimensionality is present in the concept of “primary environmental care” (PEC), which is clearly related to sustainable development and has become widely current among development organizations in their attempts to put sustainable development into practice. PEC is defined as “the umbrella term for development approaches in the interactive zone between economic, environmental and social systems” (Holmberg & Sandbrook 1992 p.31). Its “integral elements” are:

- meeting and satisfying of basic needs - the economic goal;
- protection and optimal utilization of the environment - the environmental goal;
- and empowering of groups and communities - the social goal.” (ibid. p.32)

The multi-dimensionality and multiplicity of objectives embraced by sustainable development has resulted in it coming to mean different things to different people. By 1989 Pearce et al. were able to cite a “gallery of definitions” (Pearce et al. 1989 pp.173-85), which has been much extended since. Such diversity of meaning clearly militates against clarity of discourse. Beckerman is roundly dismissive of the whole debate around sustainability: “The aggregative concept of global sustainability... seems to be either morally indefensible or devoid of operational value”, while the question “how do

we achieve sustainable development?” is “unanswerable and meaningless” (Beckerman, 1992, pp.491-492). One relatively early survey of the sustainable development scene was led to conclude (Lélé, 1991, p.613): “[Sustainable development] is a ‘metafix’ that will unite everybody from the profit-minded industrialist and risk-minimizing subsistence farmer to the equity-seeking social worker, the pollution-concerned or wildlife-loving First Worlder, the growth-maximizing policy-maker, the goal-oriented bureaucrat and, therefore, the vote-counting politician.”

Not surprisingly perhaps, Lélé (1991, p.613) finds that this all-inclusive formulation “suffers from significant weaknesses in:

- Its characterization of the problems of poverty and environmental degradation;
- Its conceptualization of the objectives of development, sustainability and participation; and
- The strategy it has adopted in the face of incomplete knowledge and uncertainty.”

The weaknesses in conceptualization have meant that the limits to growth debate has been left hanging in the air, with the resource optimists either dismissing it as *passé* or regarding it as somehow resolved by the mere incantation of ‘sustainable development’, and the resource pessimists sticking doggedly to their line of ‘indefinite growth is not possible in a finite world’. The introduction of the concept of sustainable development into this definitional imprecision has further muddied the waters. What is now needed is clarification of what kinds of growth and development it is desired to sustain and why this may prove problematic. These are the subjects of the following sections.

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Bibliography

Adriaanse, A. 1993 *Environmental Policy Performance Indicators*, SDU, The Hague

Barbier, E.B. 1987 ‘The Concept of Sustainable Economic Development’, *Environmental Conservation*, Vol.14 No.2, pp.101-110

Beckermann, W. 1992 ‘Economic Growth and the Environment: Whose Growth? Whose Environment?’, *World Development*, Vol.20 No.4, pp.481-496

Cole, H.S.D., Freeman, C., Jahoda, M. and Pavitt, K.L.R. Eds. 1973 *Thinking about the Future: a Critique of the Limits to Growth*, Chatto and Windus for Sussex University Press, London

Daly, H.E. 1992 ‘From Empty World to Full World Economics’ in Goodland, R., Daly, H.E. & Serafy, S. El Eds. 1992 *Population, Technology and Lifestyle: the Transition to Sustainability*, Island Press, Washington DC, pp.23-37

- De Groot, R.S., 1992 *Functions of Nature*, Wolters-Noordhoff, Groningen, Netherlands
- Ekins, P. 1997 'A New Paradigm of Development for the Next Century: an International Perspective' in Styger, P., Meyer, S. & Saayman, A. Eds. 1997 *Conflicting Challenges in Development*, Proceedings of the Biennial conference of the Development Society of Southern Africa (DSSA), DSSA, Pretoria, pp.1-40
- Ekins, P. & Simon, S. 1998 'Determining the Sustainability Gap: National Accounting for Environmental Sustainability' in Vaze, P. Ed. 1998 *UK Environmental Accounts: Theory, Data and Application*, Office for National Statistics, London, pp.147-167
- Ekins, P. & Simon, S. 2000 'Estimating Sustainability Gaps for the UK', New Directions Paper 1/00, Forum for the Future, London
- Georgescu-Roegen, N. 1971 *The Entropy Law and the Economic Process*, Harvard University Press, Cambridge MA
- Hardoy, J., Mitlin, D., & Satterthwaite, D. 1993 *Environmental Problems in Third World Cities*, Earthscan, London
- HMG (Her Majesty's Government) 1990 *This Common Inheritance: Britain's Environmental Strategy*, Cm1200, HMSO, London
- Holmberg, J., & Sandbrook, R. 1992 'Sustainable Development: What is to be Done?', Holmberg, J. Ed. 1992 *Policies for a Small Planet*, Earthscan, London
- Huetting, R. 1980 *New Scarcity and Economic Growth*, North Holland, Amsterdam (Dutch edition first published 1974)
- Jackson, T. & Marks, N. 1994 *Measuring Sustainable Economic Welfare - a Pilot Index: 1950-1990*, Stockholm Environment Institute, Stockholm
- Lecomber, R. 1975 *Economic Growth versus the Environment*, Macmillan, London
- Lélé, S. 1991 'Sustainable Development: a Critical Review', *World Development*, Vol.19 No.6, pp.607-621
- Meadows, D.H, Meadows, D.L, Randers, J. & Behrens, W. 1974 *The Limits to Growth*, Pan Books, London/Sydney
- Meadows, D.H, Meadows, D.L, Randers, J. 1992 *Beyond the Limits: Global Collapse or a Sustainable Future*, Earthscan, London
- Nordhaus, W.D. 1973 'World Dynamics: Measurement Without Data', *Economic Journal*, Vol.83 (December), pp.1156-1183
- Nordhaus, W.D. 1993 'Lethal Model 2: the Limits to Growth Revisited', Cowles Foundation Paper No.831, Yale University, New Haven
- Pearce, D., Barbier, E. & Markandya, A. 1990 *Sustainable Development: Economics and Environment in the Third World*, Edward Elgar, Aldershot
- Perrings, C., Turner, R.K & Folke, C. 1995 'Ecological Economics: the Study of Interdependent Economic and Ecological Systems', Beijer Discussion Paper Series No.55, Beijer International Institute of Ecological Economics, Stockholm
- Pezzey, J. 1992a 'Sustainability: an Interdisciplinary Guide', *Environmental Values*, Vol.1 No.4, pp.321-362
- Pezzey, J. 1992b *Sustainable Development Concepts: an Economic Analysis*, World Bank Environment Paper No.2, World Bank, Washington DC
- Turner, R.K. 1993 'Sustainability: Principles and Practice' in Turner, R.K. Ed. 1993 *Sustainable Environmental Economics and Management: Principles and Practice*, Belhaven Press, New York/London, pp.3-36
- UNDP (United Nations Development Programme) 1992 *Human Development Report 1992*, Oxford University Press, Oxford/New York

UNDP (United Nations Development Programme) 1996 *Human Development Report 1996*, Oxford University Press, Oxford/New York

Victor, P.A. 1991 'Indicators of Sustainable Development: Some Lessons from Capital Theory', *Ecological Economics*, Vol.4 (1991), pp.191-213

Victor, P., Hanna, E. & Kubursi, A. 1995 'How Strong is Weak Sustainability?', in Faucheux, S., O'Connor, M. and Van der Straaten, J. Eds. *Sustainable Development: Analysis and Public Policy*, Kluwer, Dordrecht, pp.195-210

WCED (World Commission on Environment and Development) 1987 *Our Common Future* (The Brundtland Report), Oxford University Press, Oxford/New York.

World Bank 1992 *World Development Report 1992*, Oxford University Press, Oxford/New York

WRI (World Resources Institute) (with UNDP and UNEP) 1990 *World Resources, 1990-91*, Oxford University Press, Oxford/New York

Biographical Sketch

Paul Ekins has a Ph.D. in economics from the University of London and is Head of the Environment Group at the Policy Studies Institute, and Professor of Sustainable Development at the University of Westminster. He is also a Member of the UK's Royal Commission on Environmental Pollution.