CHAPTER 16 Environmental Ethics and Worldviews

16.1 WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT

Towards Sustainable Development

In 1983 the United Nations secretary general, responding to a call by the UN General Assembly, established a World Commission on Environment and Development, which was charged with the task of producing a "global agenda for change." Gro Harlem Brundtland, currently Director-General of the World Health Organization, was chosen to organize and chair this commission. Brundtland, a former Norwegian prime minister and minister of environment, is the author of numerous articles on political, environmental, and developmental issues. She responded with vigor to the UN mandate, which called for proposals of long-term environmental strategies for achieving sustainable development by the year 2000 and beyond and for ways in which countries at different stages of economic development could cooperate in dealing with global environmental concerns.

After three years of intense work the commission produced the report *Our Common Future* (Oxford University Press, 1987). The report included a proposal to hold an international conference on environment and development as a follow-up to the 1972 UN Conference on the Human Environment. The UN Conference on Environment and Development was indeed held—in Rio de Janeiro in June 1992—and it resulted in several preliminary political agreements and an ambitious agenda that is presently guiding the

international effort to address global environmental issues while promoting equitable economic development.

"Sustainable development" has recently become something of a catchphrase that appears in most discussions of long-term environmental issues. However, it frequently conveys different meanings when used by industrial developers rather than by environmental advocates. The following selection is an excerpt from chapter 2 of *Our Common Future*. It provides an environmentally sound definition of a global sustainable development policy and some suggestions about what needs to be done to begin its implementation.

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Key Concept: sustainable development

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

Thus the goals of economic and social development must be defined in terms of sustainability in all countries-developed or developing, market-oriented or centrally planned. Interpretations will vary, but must share certain general features and must flow from a consensus on the basic concept of sustainable development and on a broad strategic framework for achieving it.

Development involves a progressive transformation of economy and society. A development path that is sustainable in a physical sense could theoretically be pursued even in a rigid social and political setting. But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation.

THE CONCEPT OF SUSTAINABLE DEVELOPMENT

The satisfaction of human needs and aspirations is the major objective of development. The essential needs of vast numbers of people in developing countries —for food, clothing, shelter, jobs—are not being met, and beyond their basic needs these people have legitimate aspirations for an improved quality of life. A world in which poverty and inequity are endemic will always be prone to ecological and other crises. Sustainable development requires meeting the basic

needs of all and extending to all the opportunity to satisfy their aspirations for a better life.

Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability. Yet many of us live beyond the world's ecological means, for instance in our patterns of energy use. Perceived needs are socially and culturally determined, and sustainable development requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire.

Meeting essential needs depends in part on achieving full growth potential, and sustainable development clearly requires economic growth in places where such needs are not being met. Elsewhere, it can be consistent with economic growth, provided the content of growth reflects the broad principles of sustainability and non-exploitation of others. But growth by itself is not enough. High levels of productive activity and widespread poverty can coexist, and can endanger the environment. Hence sustainable development requires that societies meet human needs both by increasing productive potential and by ensuring equitable opportunities for all.

An expansion in numbers can increase the pressure on resources and slow the rise in living standards in areas where deprivation is widespread. Though the issue is not merely one of population size but of the distribution of resources, sustainable development can only be pursued if demographic developments are in harmony with the changing productive potential of the ecosystem.

A society may in many ways compromise its ability to meet the essential needs of its people in the future—by overexploiting resources, for example. The direction of technological developments may solve some immediate problems but lead to even greater ones. Large sections of the population may be marginalized by ill-considered development.

Settled agriculture, the diversion of watercourses, the extraction of minerals, the emission of heat and noxious gases into the atmosphere, commercial forests, and genetic manipulation are all examples of human intervention in natural systems during the course of development. Until recently, such interventions were small in scale and their impact limited. Today's interventions are more drastic in scale and impact, and more threatening to life-support systems both locally and globally. This need not happen. At a minimum, sustainable development must not endanger the natural systems that support life on **Earth:** the atmosphere, the waters, the soils, and the living beings.

Growth has no set limits in terms of population or resource use beyond which lies ecological disaster. Different limits hold for the use of energy, materials, water, and land. Many of these will manifest themselves in the form of rising costs and diminishing returns, rather than in the form of any sudden loss of a resource base. The accumulation of knowledge and the development of technology can enhance the carrying capacity of the resource base. But ultimate limits there are, and sustainability requires that long before these are reached, the world must ensure equitable access to the constrained resource and reorient technological efforts to relieve the pressure.

Economic growth and development obviously involve changes in the physical ecosystem. Every ecosystem everywhere cannot be preserved intact.

A forest may be depleted in one part of a watershed and extended elsewhere, which is not a bad thing if the exploitation has been planned and the effects on soil erosion rates, water regimes, and genetic losses have been taken into account. In general, renewable resources like forests and fish stocks need not be depleted provided the rate of use is within the limits of regeneration and natural growth. But most renewable resources are part of a complex and interlinked ecosystem, and maximum sustainable yield must be defined after taking into account system-wide effects of exploitation.

As for non-renewable resources, like fossil fuels and minerals, their use reduces the stock available for future generations. But this does not mean that such resources should not be used. In general the rate of depletion should take into account the criticality of that resource, the availability of technologies for minimizing depletion, and the likelihood of substitutes being available. Thus land should not be degraded beyond reasonable recovery. With minerals and fossil fuels, the rate of depletion and the emphasis on recycling and economy of use should be calibrated to ensure that the resource does not run out before acceptable substitutes are available. Sustainable development requires that the rate of depletion of non-renewable resources should foreclose as few future options as possible.

Development tends to simplify ecosystems and to reduce their diversity of species. And species, once extinct, are not renewable. The loss of plant and animal species can greatly limit the options of future generations; so sustainable development requires the conservation of plant and animal species.

So-called free goods like air and water are also resources. The raw materials and energy of production processes are only partly converted to useful products. The rest comes out as wastes. Sustainable development requires that the adverse impacts on the quality of air, water, and other natural elements are minimized so as to sustain the ecosystem's overall integrity.

In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

EQUITY AND THE COMMON INTEREST

Sustainable development has been described here in general terms. How are individuals in the real world to be persuaded or made to act in the common interest? The answer lies partly in education, institutional development, and law enforcement. But many problems of resource depletion and environmental stress arise from disparities in economic and political power. An industry may get away with unacceptable levels of air and water pollution because the people who bear the brunt of it are poor and unable to complain effectively. A forest may be destroyed by excessive felling because the people living there have no alternatives or because timber contractors generally have more influence than forest dwellers.

Ecological interactions do not respect the boundaries of individual ownership and political jurisdiction. Thus:

- In a watershed, the ways in which a farmer up the slope uses land directly affect run-off on farms downstream.
- The irrigation practices, pesticides, and fertilizers used on one farm affect the productivity of neighbouring ones, especially among small farms.
- The efficiency of a factory boiler determines its rate of emission of soot and noxious chemicals and affects all who live and work around it.
- The hot water discharged by a thermal power plant into a river or a local sea affects the catch of all who fish locally.

Traditional social systems recognized some aspects of this interdependence and enforced community control over agricultural practices and traditional rights relating to water, forests, and land. This enforcement of the 'common interest' did not necessarily impede growth and expansion though it may have limited the acceptance and diffusion of technical innovations.

Local interdependence has, if anything, increased because of the technology used in modem agriculture and manufacturing. Yet with this surge of technical progress, the growing 'enclosure' of common lands, the erosion of common rights in forests and other resources, and the spread of commerce and production for the market, the responsibilities for decision making are being taken away from both groups and individuals. This shift is still under way in many developing countries.

It is not that there is one set of villains and another of victims. All would be better off if each person took into account the effect of his or her acts upon others. But each is unwilling to assume that others will behave in this socially desirable fashion, and hence all continue to pursue narrow self-interest. Communities or governments can compensate for this isolation through laws, education, taxes, subsidies, and other methods. Well-enforced laws and strict liability legislation can control harmful side effects. Most important, effective participation in decision-making processes by local communities can help them articulate and effectively enforce their common interest.

Interdependence is not simply a local phenomenon. Rapid growth in production has extended it to the international plane, with both physical and economic manifestations. There are growing global and regional pollution effects, such as in the more than 200 international river basins and the large number of shared seas.

The enforcement of common interest often suffers because areas of political jurisdictions and areas of impact do not coincide. Energy policies in one jurisdiction cause acid precipitation in another. The fishing policies of one state affect the fish catch of another. No supranational authority exists to resolve such issues, and the common interest can only be articulated through international cooperation.

In the same way, the ability of a government to control its national economy is reduced by growing international economic interactions. For example,

foreign trade in commodities makes issues of carrying capacities and resource scarcities an international concern. If economic power and the benefits of trade were more equally distributed, common interests would be generally recognized. But the gains from trade are unequally distributed, and patterns of trade in, say, sugar affect not merely a local sugar-producing sector, but the economies and ecologies of the many developing countries that depend heavily on this product.

The search for common interest would be less difficult if all development and environment problems had solutions that would leave everyone better off. This is seldom the case, and there are usually winners and losers. Many problems arise from inequalities in access to resources. An inequitable landownership structure can lead to overexploitation of resources in the smallest holdings, with harmful effects on both environment and development. Internationally, monopolistic control over resources can drive those who do not share in them to excessive exploitation of marginal resources. The differing capacities of exploiters to commandeer 'free' goods—locally, nationally, and internationally—is another manifestation of unequal access to resources. 'Losers' in environment/development conflicts include those who suffer more than their fair share of the health, property, and ecosystem damage costs of pollution.

As a system approaches ecological limits, inequalities sharpen. Thus when a watershed deteriorates, poor farmers suffer more because they cannot afford the same anti-erosion measures as richer farmers. When urban air quality deteriorates, the poor, in their more vulnerable areas, suffer more health damage than the rich, who usually live in more pristine neighbourhoods. When mineral resources become depleted, late-comers to the industrialization process lose the benefits of low-cost supplies. Globally, wealthier nations are better placed financially and technologically to cope with the effects of possible climatic change.

Hence, our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice within and amongst nations.

STRATEGIC IMPERATIVES.. .

Reorienting Technology and Managing Risk

The fulfilment of all these tasks will require the reorientation of technology—the key link between humans and nature. First, the capacity for technological innovation needs to be greatly enhanced in developing countries so that they can respond more effectively to the challenges of sustainable development. Second, the orientation of technology development must be changed to pay greater attention to environmental factors.

The technologies of industrial countries are not always suited or easily adaptable to the socio-economic and environmental conditions of developing countries. To compound the problem, the bulk of world research and development addresses few of the pressing issues facing these countries, such as

arid-land agriculture or the control of tropical diseases. Not enough is being done to adapt recent innovations in materials technology, energy conservation, information technology, and biotechnology to the needs of developing countries. These gaps must be covered by enhancing research, design, development, and extension capabilities in the Third World.

In all countries, the processes of generating alternative technologies, upgrading traditional ones, and selecting and adapting imported technologies should be informed by environmental resource concerns. Most technological research by commercial organizations is devoted to product and process innovations that have market value. Technologies are needed that produce 'social goods', such as improved air quality or increased product life, or that resolve problems normally outside the cost calculus of individual enterprises, such as the external costs of pollution or waste disposal.

The role of public policy is to ensure, through incentives and disincentives, that commercial organizations find it worthwhile to take fuller account of environmental factors in the technologies they develop. Publicly funded research institutions also need such direction, and the objectives of sustainable development and environmental protection must be built into the mandates of the institutions that work in environmentally sensitive areas.

The development of environmentally appropriate technologies is closely related to questions of risk management. Such systems as nuclear reactors, electric and other utility distribution networks, communication systems, and mass transportation are vulnerable if stressed beyond a certain point. The fact that they are connected through networks tends to make them immune to small disturbances but more vulnerable to unexpected disruptions that exceed a finite threshold. Applying sophisticated analyses of vulnerabilities and past failures to technology design, manufacturing standards, and contingency plans in operations can make the consequences of a failure or accident much less catastrophic.

The best vulnerability and risk analysis has not been applied consistently across technologies or systems. A major purpose of large system design should be to make the consequences of failure or sabotage less serious. There is thus a need for new techniques and technologies—as well as legal and institutional mechanisms—for safety design and control, accident prevention, contingency planning, damage mitigation, and provision of relief.

Environmental risks arising from technological and developmental decisions impinge on individuals and areas that have little or no influence on those decisions. Their interests must be taken into account. National and international institutional mechanisms are needed to assess potential impacts of new technologies before they are widely used, in order to ensure that their production, use, and disposal do not overstress environmental resources. Similar arrangements are required for major interventions in natural systems, such as river diversion or forest clearance. In addition, liability for damages from unintended consequences must be strengthened and enforced.

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The common theme throughout this strategy for sustainable development is the need to integrate economic and ecological considerations in decision making. They are, after all, integrated in the workings of the real world. This will require a change in attitudes and objectives and in institutional arrangements at every level.

Economic and ecological concerns are not necessarily in opposition. For example, policies that conserve the quality of agricultural land and protect forests improve the long-term prospects for agricultural development. An increase in the efficiency of energy and material use serves ecological purposes but can also reduce costs. But the compatibility of environmental and economic objectives is often lost in the pursuit of individual or group gains, with little regard for the impacts on others, with a blind faith in science's ability to find solutions, and in ignorance of the distant consequences of today's decisions. Institutional rigidities add to this myopia.

One important rigidity is the tendency to deal with one industry or sector in isolation, failing to recognize the importance of intersectoral linkages. Modern agriculture uses substantial amounts of commercially produced energy and large quantities of industrial products. At the same time, the more traditional connection—in which agriculture is a source of raw materials for industry—is being diluted by the widening use of synthetics. The energy–industry connection is also changing, with a strong tendency towards a decline in the energy intensity of industrial production in industrial countries. In the Third World, however, the gradual shift of the industrial base towards the basic material-producing sectors is leading to an increase in the energy intensity of industrial production.

These intersectoral connections create patterns of economic and ecological interdependence rarely reflected in the ways in which policy is made. Sectoral organizations tend to pursue sectoral objectives and to treat their impacts on other sectors as side effects, taken into account only if compelled to do so. Hence impacts on forests rarely worry those involved in guiding public policy or business activities in the fields of energy, industrial development, crop husbandry, or foreign trade. Many of the environment and development problems that confront us have their roots in this sectoral fragmentation of responsibility. Sustainable development requires that such fragmentation be overcome.

Sustainability requires the enforcement of wider responsibilities for the impacts of decisions. This requires changes in the legal and institutional frameworks that will enforce the common interest. Some necessary changes in the legal framework start from the proposition that an environment adequate for health and well-being is essential for all human beings—including future generations. Such a view places the right to use public and private resources in its proper social context and provides a goal for more specific measures.

The law alone cannot enforce the common interest. It principally needs community knowledge and support, which entails greater public participation in the decisions that affect the environment. This is best secured by decentraliz-

ing the management of resources upon which local communities depend, and giving these communities an effective say over the use of these resources. It will also require promoting citizens' initiatives, empowering people's organizations, and strengthening local democracy.

Some large-scale projects, however, require participation on a different basis. Public inquiries and hearings on the development and environment impacts can help greatly in drawing attention to different points of view. Free access to relevant information and the availability of alternative sources of technical expertise can provide an informed basis for public discussion. When the environmental impact of a proposed project is particularly high, public scrutiny of the case should be mandatory and, wherever feasible, the decision should be subject to prior public approval, perhaps by referendum.

Changes are also required in the attitudes and procedures of both public and private-sector enterprises, Moreover, environmental regulation must move beyond the usual menu of safety regulations, zoning laws, and pollution control enactments; environmental objectives must be built into taxation, prior approval procedures for investment and technology choice, foreign trade incentives, and all components of development policy.

The integration of economic and ecological factors into the law and into decision-making systems within countries has to be matched at the international level. The growth in fuel and material use dictates that direct physical linkages between ecosystems of different countries will increase. Economic interactions through trade, finance, investment, and travel will also grow and heighten economic and ecological interdependence. Hence in the future, even more so than now, sustainable development requires the unification of economics and ecology in international relations.

CONCLUSION

In its broadest sense, the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. In the specific context of the development and environment crises of the 1980s, which current national and international political and economic institutions have not and perhaps cannot overcome, the pursuit of sustainable development requires:

- a political system that secures effective citizen participation in decision making,
- an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis,
- a social system that provides for solutions for the tensions arising from disharmonious development,
- a production system that respects the obligation to preserve the ecological base for development,
- a technological system that can search continuously for new solutions,

- an international system that fosters sustainable patterns of trade and finance, and
- an administrative system that is flexible and has the capacity for self-correction.

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These requirements are more in the nature of goals that should underlie national and international action on development. What matters is the sincerity with which these goals are pursued and the effectiveness with which departures from them are corrected.