CHAPTER 1

REFLECTIONS ON SUSTAINABLE DEVELOPMENT

What do we mean by “sustainable development”? How did we get to the current situation? Why should we do things differently? Where, when, and what action is required? Who will be affected? Are the issues of developing countries fundamentally different from those of the industrialized world?

THE DEVELOPMENT FRAMEWORK

The traditional concerns expressed in Western concepts of development have been “who gets what” and “how is it distributed?” As a discipline, economics (and consequently the study of development) has been selective and incomplete in explaining why humans make the choices they do. Narrowly defined factors of production, land, labor, and capital ignore “externalities,” so-called free goods or external costs. Cost-benefit ratios, often used to determine the rate of return on investment, exclude ancillary effects and focus only on intended consequences. Equations, based on quantitative factors, are inadequate in determining how human values arise and how qualitative factors contribute to peoples’ choices.

Western understanding of how humanity relates to the natural world has been greatly influenced by historical traditions of subduing nature, taming the wilderness, and pacifying forces that oppose our will. Assumptions of human superiority have been encouraged by cultural and/or religious traditions that emphasize a confrontational approach, competition for resources, and satisfaction flowing from winning or defeating adversaries and from accumulation and consumption. There is abundant evidence that these approaches have succeeded in stimulating creativity and innovation, producing ample rewards for some. There is also substantial evidence that these gains, by a minority, are made at a cost that the natural environment and the majority of the global population can no longer afford to pay.

If “economic progress” leads to global warming, climate change, accelerated extinction of biological species, and degradation of soils, air, and water, we might need to rethink how we measure and account for such “progress.” What are some of the alternatives? Economics designed to maximize growth might give place to systems that optimize security, satisfy basic needs, and empower people with the means to contribute to the betterment of their lives (UNDP, 1990, 1991, and 1992). The value of growth might be seen in its ability to generate resources to finance those improvements rather than as an end in itself (World Bank 1990, 1991, and 1992). Social change that increases the options available to individuals and societies could become a basic objective of public policy. Economies and societies based on ecological harmony of humankind with the rest of nature would provide a firmer base for progress and development, and some optimism that future generations will have opportunities as great or greater than those we enjoy.

HOW DID WE GET HERE?

Each of us functions in a variety of different
relationships or spheres of influence. We have different relationships with our parents, our spouse, our children, with schools, with employers, with clients, with organizations, with religious affiliations, with figures of authority. There are feedback mechanisms present in all of these relationships: How we interact on one level has an impact on our other interactions.

The same concept of interactions and feedbacks is helpful in understanding the "spheres" in which we act in a larger context (Weiner, 1991) (see Figure 1.1). Gases and molten material began to cool and congeal some 4.5 billion years ago, becoming the foundation of our globe, the lithosphere. Vigorous volcanic activity early in Earth history contributed the gaseous emissions that formed the atmosphere; about one billion years later, the atmosphere had evolved to a chemical mixture similar to the present-day atmosphere, hospitable to life. The hydrosphere and cryosphere — the water in our oceans, lakes, and rivers, and the polar ice caps, respectively — followed; liquid water has been present on the Earth for at least the past 3.8 billion years. Life forms, the biosphere, began to emerge at least as early as 3.5 billion years ago. Some 65 million years ago, probably as a result of the impact of an immense asteroid colliding with the Earth in the Yucatan and the subsequent blockage of significant parts of the sun's rays, many life forms — including the dinosaurs — were destroyed, and the Age of Reptiles gave way to the Age of Mammals. The ancestors of modern humans, homo habilis (cognitive beings, inhabitants of a reasoning world, the noosphere), made their appearance about 2.5 million years ago, distinguishing themselves from the other animals, who inhabit the zoosphere. Modern humans, homo sapiens, did not appear until about 50,000 years ago. It was only 10,000 years ago that hunting and gathering gave way to cultivation as the chief means of livelihood, leading to the establishment of villages, towns, and later cities. Subsequently, pastoralism gave way to agriculture, to mercantilism, and eventually to the industrial revolution.

HUMAN IMPACTS AND THE LAWS OF NATURE

We often refer to the "laws of nature" to explain how this process occurred. Whatever was required to make the planet fit for life has been "provided by nature" for at least 3.5 billion years. During this immense span of time a dynamic system existed that maintained an equilibrium, so that basic relationships of heat and cold, light and darkness, respiration and photosynthesis were conducive to the emergence and evolution of millions of species. Amino acids and DNA chains combined to produce an unprecedented diversity of life, which is now estimated to contain some 10 million species.

Human beings are relatively late arrivals in this evolutionary chain (see Figure 1.2). Many other species emerged earlier and survived for long periods. Some became extinct before humans appeared. Many species that predated humans still thrive. Throughout Earth's history, all species have shared a relationship. They have contributed to, and are part of, a food chain and biogeochemical cycle that has sustained life on Earth. The various "spheres" of their existence have interacted and provided feedback to maintain a dynamic and adjustable system. Throughout this period, "nature" has managed the relationship and maintained an equilibrium.

Humans changed this relationship. They gathered seeds from the forests and began to plant and cultivate the soil, channelling water for their use, cooking and processing food, and using animal and plant material for textiles and utensils. They domesticated
Figure 1.1 — Schematic View of the Earth System

SCHEMATIC VIEW OF THE EARTH SYSTEM. Among the representative processes depicted clockwise from top: atmospheric chemistry; winds (large arrows); evaporation and precipitation, critical ingredients of the physical climate system; ocean circulation (small arrows) around polar ice cap; sea-floor spreading, reshaping Earth's surface and recycling elements through the interior (section); and photosynthesis by terrestrial vegetation, one of many contributors to the global carbon cycle.


plants and began to calculate animals in terms of their utility to humans rather than for their intrinsic worth as part of an interdependent relationship among species.

Initially, the impact of humanity on nature was relatively light. As towns and cities emerged, trading relationships developed, sea and land transportation improved, and linguistic and cultural diversity led to the formation of states and empires. Local despoliation occurred, but there were new frontiers that could be settled when local resources were depleted. Until the advent of the industrial revolution, human activities were lightly felt on the surface of the Earth, in the oceans, and in the air.
The Challenge of Sustainability

The Scientific and Industrial Revolutions

Western knowledge of the world around us, previously based on philosophical and theological concepts, became "scientific" through the discoveries and experimentations of Copernicus and Galileo, Columbus and Magellan, Newton and Faraday, Linnaeus and Darwin (Boorstin, 1985). The mysteries of the Earth did not reveal themselves easily; the search for knowledge and scientific certainty became increasingly specialized, narrow, and esoteric, often lacking connective tissue among disciplines. The idea of Earth as an integrated, mutually interdependent entity receded in Western consciousness. Partnership between the sexes gave way to stereotypes of male and female roles, with greater social and economic value placed on aggression, warfare, and male dominance. Work performed outside the home was considered economically productive, while what was done inside the home — mainly by women — was ignored in terms of economic or social productivity or worth.

The industrial revolution greatly expanded the scope and impact of human activity. Freed from the constraints of individual or collective muscle power and artisanship by the capture of energy and its mechanical transmission, humans were able to change materially many of the resources on which their lives depended. Coal, steam, and mechanical devices transformed minerals, metals, wood, and plants into new materials for new uses. The use of the Earth's resources increased. Wealth created from the exchange of goods placed a premium on productivity and competitiveness. Exploration led to the discovery of new riches and lands to be exploited. The division of populations into economic classes, always present, became more pronounced. Vested interests were more narrowly defined. Continuous exponential economic growth was seen as the means to greater progress.

The Western world continued to operate within the paradigm of the scientific and industrial revolutions until the middle of the 20th century. Those who questioned these orthodoxies, like Marx and Engels, or Ibsen and Steinbeck, or Mahatma Gandhi, or Nyerere, Mao, or Allende, or who espoused more collective or humanist values, were attacked — not because their analysis of society was incorrect, but because the course they advocated did not conform to the accepted view of the world.

The Uniqueness of Our World

One of the major factors that distinguishes Earth from Mars or Venus is respiration, that is, the ability to convert carbon dioxide into oxygen through photosynthesis. The Earth's lithosphere, the hydrosphere, and the cryosphere contribute to an environment in which life is possible (the biosphere) because the atmosphere contains the right mixture of oxygen and provides a protective ozone layer. The oxygen enables air-breathing species to survive, and the ozone layer shields the biosphere from harmful ultraviolet radiation. Mars and Venus do not have the precise atmospheric mixture that enables plants to grow and keeps oxygen accessible, nor do they have protection from those rays of the sun that are harmful to life. Consequently, as the Goldilocks problem would have it, Venus is far too hot and Mars is far too cold to sustain life. Earth is just right, unique — at least in our solar system — in having the conditions necessary to sustain life (Weiner, 1991).

The Gaia Hypothesis

We do not know why the Earth has these unique properties. James Lovelock, a British scientist of repute and a self-proclaimed
Myths and Realities

Human beings continue to ignore the evidence of the past 50 years and to behave in a way that is increasingly self-destructive. It may be helpful to look at some of our underlying assumptions about how the world works. Each of these assumptions helps to shore up our present way of doing things. Each of them is highly questionable and calls for us to adjust our thinking.

- Cause and effect are linear — there is a simple explanation.
- All growth is good — there are no effective limits.
- When we throw something “away,” it is gone.
- Better technology has the answers.
- The future is what happens to us; we don’t create it.
- If a problem can’t be measured, it doesn’t exist.
- If something can be justified economically, it is good.
- If something is "uneconomic," it has no value.
- Relationships are linear; feedback is accurate and timely; there are no critical thresholds; systems can be managed through cause-effect thinking.
- More security, better education, can be measured by money expended. More is better.
- Nations, people, economic sectors can develop separately and independently, some thriving while others suffer.
- Choices are either/or, never both/and.
- Possession of more things means greater happiness.
- You can’t buck the system — individuals can’t make any difference.
- People are bad, greedy, and not to be trusted — good people are rare exceptions.
- Rationality is superior to intuition or moral values.
- Present systems are okay — alternative systems would be worse.
- We know what we are doing.

(Modified from Meadows, 1991, pp. 4-5.)
eccentric, has put forward the Gaia Hypothesis, which "supposes the Earth to be alive and considers what evidence there is for and against the supposition" (1990, p. 8). We may find this hypothesis helpful as an aid to understanding the links among the spheres in which we operate, whether we accept it metaphorically or as a literal geo-

physical possibility (that all ecosystems are interconnected and therefore interdependent). Lovelock describes the biosphere as the envelope of living matter and takes all species and their physical environment together as a single interactive system. He postulates that all living matter both contributes to the health of and assists in the
demolition of the natural environment. To live “in harmony with Gaia” (Lovelock, 1990, p. 225) is the objective, in order to preserve the Earth’s life-sustaining properties.

The principle behind the Gaia hypothesis is not one of preplanning but one of reaction and adaptation, of global cooperation among species, of interdependent links that connect every species on Earth and affect the survival chances of every other one. As all living bacteria and organisms constantly interact, the Earth adjusts and compensates, altering habitats in response to changing conditions and stimulating, depleting, or extinguishing species as the conditions required for their survival change.

Gaia is not purposefully anti-human, but so long as we continue to change the global environment against her preferences, we encourage our replacement with a more environmentally seemly species. If we see the world as a living organism of which we are a part — not the owner, nor the tenant; not even a passenger — we could have a long time ahead of us and our species might survive for its “allotted span” (Lovelock, 1990, p. 236).

In the long run the biosphere survives but its species do not, just as the human body survives while losing and replacing individual cells (Weiner, 1991, p. 210).

Fossil evidence would lead us to conclude that species whose behavior was not conducive to harmony among the interactive spheres that support life found it increasingly difficult to survive. Whether humans can expect to be treated differently by Gaia may depend on our readiness to adjust our behavior and harmonize our activities with nature rather than attempt to set ourselves apart.

ADJUSTING THE PARADIGM

Prospects for New Approaches

Events of the last 50 years have begun to shake the complacency of the global community. First, atomic physics gave rise to the splitting of the atom and the consequent making of nuclear weapons. The Doomsday Clock was created to measure humanity’s march towards “mutually assured destruction.” Second, the electronic revolution, particularly the invention of the microchip and subsequent generations of computers, each more compact and powerful, gave a competitive advantage to those who could process and transmit information most quickly. While the industrial revolution enhanced the impact of human muscle power by factors of tens and hundreds, the electronic revolution enhanced brain power and the ability to communicate exponentially. Third, evidence is mounting that human activities are now destroying the equilibrium among the various spheres that support life at a pace that nature can no longer correct.

The “problem” may be the way in which humans view their relationship with the rest of the world. This relationship includes our interdependence with other people and other species, the impact that our activities have on the continuing ability of the biosphere to sustain life, and the way we measure or assign value to things and relationships. Perhaps if we recognize the anomalies in the way we view our current world and what is actually happening out there, our paradigm may change and we may be able to see more clearly a way to a desirable future.

What we are doing now may be meeting some short-term needs, but at a long-term cost that cannot be met. While our approach to development to date has had many successes in terms of per capita income gains, higher literacy, lower child mortality, greater
THE CHALLENGE OF SUSTAINABILITY

life expectancy, better access to education, etc., the cost of achieving these gains has been high financially and environmentally, and very uneven in the benefits obtained.

For the first time in history over 50 percent of the human race is literate.... Our ability to gather and communicate information has never been greater. The world as a whole still has more than enough resources to meet all human needs. Never before has the human population had such power, organization and riches with which to manage those resources wisely and to meet those human needs sustainably. Simultaneously, never before have so many resources been wasted and destroyed on such a large scale in so many parts of the planet or have so many people lived lives of deprivation and suffering (Meadows, 1991, p. 39).

During the decade of the 1980s, there was a marked decline in some of these indicators from what had been achieved in previous decades. Is it not time to ask whether there is a better way of doing things? The impact of sustained poverty, disease, and lack of opportunities to realize human potential affects all of us in developing and developed countries. We need to do new things and we need to do things differently.

The Challenges Are Real

The challenge facing world leaders, and all of us whom they represent, was summarized prior to the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992, as follows:

[World leaders] must initiate significant reform of the policies and institutions that are behind the steady depletion of our basic ecological capital, the accelerating degradation of the environment, and the growing threat to essential life-support systems. They must commence a process of basic change in the way we conduct domestic and international economic relations and in the way we make decisions in government, industry, and the home. They must begin to reshape our international institutions for an age of total interdependence (MacNeill et al., 1991, p. 109).

Is there such great urgency? Are we being stampeded into actions before we know their consequences? Is there enough evidence to justify fundamentally different approaches to those that have served (some of us) to date? Is there validity in the view that environmental risks now pose the greatest danger to human security and survival? “The next one hundred years will be one of the most dangerous periods since the origin of life....We are living at the start of a mass extinction, a mass dying, such as the planet has not experienced since the end of the Age of the Dinosaurs, some 65 million years ago” (Weiner, 1991, pp. 6, 188).

There is no doubt that changes are taking place in our soils, water, and atmosphere more quickly than ever because of the impact of human activity. Consistent increases over the past one hundred years in the level of carbon dioxide, methane, and other “greenhouse gases” have been well documented. Deforestation and desertification reduce the Earth’s natural capacity to absorb carbon dioxide and remit oxygen into the atmosphere. The impact of synthetic chemicals such as chlorofluorocarbons (CFCs) in depleting the protective ozone layer is no longer questioned. Population growth rates, while declining in percentage terms globally, are creating population densities that exceed the carrying capacities of many parts of the world. Approximately one-fifth of the world’s population that lives in the developed world is responsible for four-fifths of annual global
Is There Such Great Urgency?

The dynamics of "our system" are in disarray. The evidence speaks for itself.

Each day:

- 35,000 people die of starvation, 27,000 of them children;
- 220,000 people are born; and
- 1.4 billion people (25 percent of the global population) live in abject poverty with their most basic needs unmet; yet enough food is already produced to feed more than the current global population of 5.4 billion people.

Each day:

- 57 million tons (52 tonnes) of topsoil are lost to erosion;
- 70 square miles (181 square kilometers) become desert; and
- 80 square miles (207 square kilometers) of tropical forest are destroyed; yet hundreds of thousands of farmers know and practice agricultural technologies that preserve the soil, promote long-term yields, and minimize the use of harmful chemicals; desertification reduces the amount of land that can support human livelihood; forest losses result in soil erosion, flooding and drought, siltation of water reservoirs, extinction of species, and enhancement of the greenhouse effect.

Each day:

- $2 billion is spent on armaments; and
- between 10 and 100 species become extinct because their habitats have been destroyed by human activity.

Each minute:

- 60 million barrels of oil — which is non-renewable — are burned and contribute significantly to the release of carbon dioxide into the atmosphere at rates that threaten a global climate change, yet all the goods and services the world now consumes could be produced with one-fourth of the energy it now uses, just by using it more efficiently.

(Modified from Meadows, 1991, pp. 37-38.)
THE CHALLENGE OF SUSTAINABILITY

resource use. If similar levels of consumption were “enjoyed” in the rest of the world, the rates of soil degradation, and water and atmospheric pollution would increase by 400 percent. Global warming and consequent climate change threaten to flood coastal areas, increase the violence and frequency of tropical storms, and disrupt agricultural production. The extinction of hundreds of species — many unknown and undocumented — along with their role and potential benefits lost depletes the biological diversity of the planet, the gene pool that permits adaptation to change.

We do not understand fully the synergistic feedbacks that these changes are producing in the Earth’s natural dynamic systems. They could be slow and insidious, or sudden, sporadic, and unpredictable. There are warning signs that human activity has exceeded the design tolerances of Spaceship Earth (Fuller, 1969 and 1970). Having taken over the management of the planet from nature — or Gaia — by the intensity of our activities, “we have to take on the never-ceasing responsibility of keeping the Earth a fit place for life, a service now (hitherto) provided for free” (Lovelock, 1990, p. 202).

NEW ASSUMPTIONS AS A PRELUDE TO ACTION

A Fundamental Proposition

If we look at the meshing of the world’s economy with the Earth’s ecology only in terms of our relationships with developing countries, we are missing some fundamental points: The actions we take in any part of the world affect all parts; we cannot segregate human activities from the activities of other species, nor within the artificial boundaries of nation states; global interaction quickly and inevitably transforms local actions into global results. This understanding should serve both to caution us about activities that are detrimental and encourage us to act in ways that are increasingly beneficial to global ecology.

How do we take on the responsibility of planetary management? If we accept that we are approaching, and indeed may have passed, a number of critical thresholds, we can set out some assumptions for responsible management of planetary resources (MacNeill et al., 1991, pp. 30-49).

- Current consumption levels in industrialized countries cannot be sustained, let alone emulated by the nearly 80 percent of the global population living in developing countries.
- Population growth and density should be related to the carrying capacity of the locality where the population lives.
- Emissions of ozone-depleting synthetic chemicals must be curtailed; even if cutbacks are achieved, the concentrations of chemicals already in the stratosphere will continue to deplete the ozone layer for many years to come.
- Global warming is a reality that must be anticipated; while its full implications are unclear, it will have diverse impacts in different parts of the world.
- Economic growth is a means to human betterment, not an end in itself, and must be fully costed through procedures that take account of the value of standing resources and the impact on the environment.
- Environmental issues are no longer an afterthought, but rather an integral part of public and private decision making.
Change is needed in the way governments intervene in the market through taxes, incentives, subsidies, and disincentives.

Accounting systems must incorporate value for standing assets and revise what is included in estimates of Gross National Product (GNP).

We must re-examine the manner in which public and private sector actors are held accountable for the ecological as well as the economic consequences of their actions.

**What Needs To Be Done?**

Environmental changes that threaten peace and security will likely be recognized and responded to more rapidly than those that do not appear to have a strategic impact. Examples might include control over energy and scarce resources, ozone depletion as health care costs mount, or migration if loss of livelihood due to deforestation or desertification results in mass movements of people (MacNeill et al., 1991).

In terms of North-South relations there will be a need to find common cause and repair the apparent polarization that emerged in Rio. In its Human Development Report 1991, the United Nations Development Program (UNDP) called for a new understanding of what constitutes national security in terms, not of military might, but of the ability to meet the needs of inhabitants. The report emphasized the sometimes forgotten truth that development is supposed to provide people with a greater range of choices and greater control over decisions that affect them. In subsequent reports, the UNDP also called for substantial reform of international development institutions, to ensure that environmental and developmental needs are taken together in public sector investment plans (1990, 1991, and 1992).

Public policy should reflect a new understanding of the relationships of trade, debt, investment, and access to technology and aid with environmental concerns. This is critical if developing countries are to recognize that they share both a short- and long-term interest with the developed countries in reaching new international agreements to respond to environmental needs. Global bargains can be struck, as seen in the United Nations Convention on the Law of the Sea (Montego Bay, 1982), and in the Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987), as well as in the agreements reached at the United Nations Conference on Environment and Development (UNCED) (Benedick, 1991). Much more remains to be done through international conventions, but there is no utopia to be found in some new form of world government, particularly given the strong reluctance of governments worldwide to cede elements of national sovereignty.

**Where Do We Start?**

"The most critical need...will be to activate and accelerate the entire presently available machinery for international action at all levels" (Sand, 1990). This could involve making existing machinery more efficient and effective, such as ensuring that the new UNCED is given adequate resources, and broadening the mandate of the International Court of Justice in the Hague to arbitrate disputes and conduct fact-finding judicial enquiries of environmental issues. It will be equally important that the World Bank, regional development banks, and other multilateral, as well as bilateral, development institutions strengthen their environmental capacity and conduct environmental impact assessments as a standard part of program
THE CHALLENGE OF SUSTAINABILITY

and project planning. This approach reflects the need for broad, internationally recognized standards, but acknowledges that the implementation of international agreements is only as good as the actions that take place regionally, nationally, and locally.

Bridges will need to be built among government, business, developmental non-governmental organizations, and environmental groups to reduce antagonism and benefit from diverse points of view. Environmental diplomacy, multilateral and bilateral, requires that political leaders, foreign ministries, and development organizations be scientifically informed, so that their actions will be appropriate and based on accurate information. Policy formulation will increasingly require the involvement of non-governmental and private sector organizations and environmental groups, both as sources of information and input and as actors in carrying out work to implement the agreements reached.

Are We Making Progress?

How can we determine whether we are moving in the right direction? We must examine the allocation and use of resources. Do governments encourage ecologically responsible, long-term behavior, or do they respond to short-term political or economic priorities? Is the private sector encouraged by tax and other incentives to invest in conservation, reclamation, and resource use in a sustainable way? Are we using nonrenewable resources as efficiently as possible? Are we employing renewable resources in ways that will provide sustainable yields? Do accounting systems increasingly use real costs, incorporating values for existing natural capital in the form of forests, fisheries, soil quality, and for work performed in the “informal sector”?

We must monitor the development of alternative technologies that will make far fewer demands on scarce resources than current approaches. Will these technologies be globally available? Under what arrangements? How appropriate will they be to the diverse circumstances of different countries and regions?

We must look for evidence that attitudes towards economic growth and investment have changed. Has there been a shift away from investments in short-term, one-time, high-payoff endeavors, in favor of investments in sustainable yield enterprises? Can we move beyond the carefully nuanced report of the World Commission on Environment and Development (WCED) that called for a five- to tenfold increase in global economic activity (WCED, 1987), and stipulate that less of that growth must take place in the over-consuming North and much more in response to the growing needs of the South?

We must seek confirmation that environmental issues have become fully incorporated into decision-making processes at all levels. Is there evidence of greater understanding by governments and the public of the fundamental importance of environmental issues? Is this reflected in our educational institutions, in multilateral organizations, and bilateral aid agencies, as well as in the decisions of the private sector?

PRIORITIES

In order to promote sustainable development, we need to ensure that mandates, philosophies, values, attitudes, behaviors, goals, objectives, strategies, programs, projects, and activities encourage the functioning of systems that support development with a long-term perspective. Development priorities must include the following.

- Poverty alleviation: in rural and urban areas, including improved access to health, family planning, education,
employment, and decision making.

- **Structural adjustment**: helping economies cope with debt and reduced export earnings and improve economic management (while being sensitive to the social and economic effects of this adjustment).

- **Increased participation of women**: programs and projects to promote generalized economic growth and social change, as well as programs aimed specifically at women.

- **Environmentally sound development**: ecologically sustainable development, environmental impact assessment of all capital projects, and support for environmental strategies.

- **Food security**: agricultural research, production, extension, post-harvest technology, transportation, and marketing.

- **Energy availability**: development of existing resources, and research and development of sustainable alternatives (CIDA, 1987, p. 25).

**Dialogue**

Primary responsibility for development rests with developing countries themselves, and is shared by governments, business, labor, nongovernmental organizations and institutions, and individuals. To participate effectively and have a sense of ownership, all of these stakeholders must have a voice in determining approaches and making decisions. Discussion of national and regional priorities, policy options, constraints, and the terms on which external assistance may be forthcoming helps to ensure that the importance of global concerns is recognized, while national actions are taken that are appropriate to local circumstances and capacity. Local knowledge, skills, and experience can be complemented by outside financing, technology, and organizational and managerial skills. Given global interdependence, we are all stakeholders in sustainable development.

It is clear that economic growth does need to be accelerated in developing countries. It is undeniable, however, that the South cannot attain current consumption levels of industrialized countries without placing unsupportable demands on the recuperative powers of land, air, and water. At the same time, industrialized countries need to develop more efficient and ecologically sound means of production, implement effective conservation measures, and accept lower levels of consumption as the norm in the future.

**Defining Sustainable Development**

"Sustainable development" is difficult to define. While there is increasing consensus on the need for sustainable development, there is not yet sufficient understanding of the elements that contribute to it or their interrelationships. Prior to UNCED, the former Secretary for the Environment for Brazil called for an approach that would "put our species back in harmony with the rest of creation." The report issued by WCED says: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). The report also provides a more precise definition of sustainable development: "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" (WCED, 1987, p. 46).

Our current understanding of the concept of sustainable development has the following five elements.

1. **Physical or environmental sustainability**: deals with the capacity of the biosphere to sustain life and preserve species, and with humanity's stewardship and responsibility for efficiency in using and conserving nonrenewable resources and using renewables in a sustainable manner to reduce carbon emissions, remove ozone-destroying chemicals from production, reduce deforestation and land, air, and water degradation.

2. **Social sustainability**: relates to the infrastructure of society and its capacity to cope with, measure, and evaluate the changes that accompany actions affecting poverty, demographic change, access to basic health, shelter, education, jobs, income, and gender equity.

3. **Cultural sustainability**: relates to the congruency of personal ethnic, religious, philosophical, and other values and behavior with the changes that accompany development, involving a sense of ownership of the development process and of cultural integrity.

4. **Economic sustainability**: refers to the continuing financial, organizational, and managerial capacity to maintain the process of adjustment through adoption and implementation of appropriate macroeconomic policies.

5. **Political sustainability**: involves the responsiveness of the political system to human rights and gender equity, individual participation in decisions, a system of representation and freedom to express views, political pluralism, the consent of the governed, the transparency of decision making, the ethical basis on which power is exercised, and good governance (CIDA, 1991).

**PRINCIPLES INTO PRACTICE**

Policy frameworks for sustainable development should start with an understanding of how the finely balanced, integrated Earth system works. The Earth is basically a complex, closed system. The materials and resources provided when the Earth was formed are limited, and — except for the constant input of solar energy — they are all we have. Policies should reflect the need to use nonrenewable resources as efficiently as possible, and to ensure that renewable resources are replaced in a way that makes their continued use sustainable.

To be environmentally responsible, sustainable development programs should pay particular attention to the dynamics of the global system: the importance of watersheds as microclimates and natural ecosystems; the capacity of natural vegetation, including forests, for maintaining system equilibrium; the importance of soil quality and agriculture in ensuring basic human security; the role of human settlements and urbanization in providing basic needs; the fundamental significance of the atmosphere and climate in preserving the ability of the biosphere to maintain life; the role of oceans and coastal zones in the provision of basic elements of the food chain; and the need to husband Earth's materials, provide energy efficiently, and reduce waste.

If we are to survive and thrive as a global community, we must challenge the traditional mentality that equates intense resource utilization with higher
standards of living. To meet the needs of a growing population, we must produce more, using far less energy and fewer materials, and with much lighter environmental impact. Our political, social, economic, and technological efforts worldwide must be fully committed to this goal. We must concern ourselves with the satisfaction of basic human needs, a more equitable distribution of the Earth's material resources and the rejection of excessive consumerism as a way of life. We must acknowledge — and pay — the true costs of resource utilization (Kumar and Murck, 1992, p. 190).

Equally important is to ensure that decisions are made by those who will be affected. Environmental considerations should be incorporated at the beginning of economic decision making; local experience should be fully used in designing and implementing programs; and the governance and stewardship of the planet should be shared among global institutions, governments, business, labor, private groups, and individuals. In the end, the realization of sustainable development will depend on "a political system that ensures effective participation in decision making (in other words, human rights and democracy), an economic system able to generate surpluses on a sustainable basis, and an administrative system that is flexible, with a built-in capacity for self-correction" (MacNeill et al., 1991, p. 20).
Questions for Review

1. How have our definitions of economic progress and Western attitudes towards nature influenced and shaped current approaches to development?

2. What are some alternative ways of defining or envisioning economic growth and development? Are economic growth and development necessarily incompatible with care for the environment and ecological harmony?

3. What is the “Gaia Hypothesis”? In what ways have human impacts upset the natural balances maintained by Gaia throughout Earth history?

4. How can we monitor and assess our progress towards sustainable development?

Questions for Discussion and Research

1. What is “wrong” with each of the assumptions listed on page 21?

2. Do you think it will be possible for the human species to regain a dynamic and balanced relationship with Gaia?

3. Which of the “problems” listed on page 25 would you identify as being of highest priority?

4. With respect to the priorities listed on pages 28–29, do these parallel your own objectives? Is anything missing?

5. Why is “sustainable development” such a difficult concept to define? How would you define it? Do you think the five elements given in this paper constitute a reasonably comprehensive definition of sustainable development?

6. What should be the substance and goals of a North-South dialogue? Is there a basis on which to begin such a dialogue?

7. How can we successfully balance the roles of government, business, developmental and non-governmental organizations, and environmental groups, with respect to the formulation and implementation of policy for sustainable development?
REFERENCES


