

SUSTAINABLE DEVELOPMENT - CONCEPT AND PRACTICE*

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The term "sustainable development" was first used in the mid-1970s to make the point that environmental protection and development are linked. The notion of sustainability is about society's obligation to the future, a moral one people are supposed to have for future generations. However, it is important to realize that someone can not be morally beholden to achieve something that is not feasible.

"Sustainable development" sadly is often interchanged with "sustainable growth", which is dangerously simplistic. The conflicts between ecological equilibrium and economic development in the long run are still enigmatic. Non the less, the basic implication of the concept of sustainable development is that we should leave to the next generation a stock of **quality of life assets** no less than those we have inherited. It is a **political goal**.

False assumptions

Our belief in technology has allowed us to continue to avoid making a distinction between growth (quantitative change) and development (qualitative change) and has allowed us to assume that there are no limits. Yet, "sustainable growth" is an oxymoron. Growth cannot, by definition, continue in a closed system. For example, **sustained growth** in the human body is cancer. Thus it is unpleasant and unwanted. On the other hand, economic growth has been revered. It has been sought after as a solution to many societal illnesses without considering its consequences, especially for nature as a source and a receptacle for our wastes.

Despite strong evidence to the contrary, we have assumed and continue to assume that growth will lead to equity and justice within and among countries, regardless of the political or economic-system. The expected "trickle-down" effect or process has been of

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limited success. Economic growth may be necessary for a period of time to raise the living standards of the poor. But it will have to be a different kind of growth, targeted to the needs of the people, and sensitive to the needs of the environment.-

We have also maintained our faith in the market system's ability to deal with issues of the public good, including ecological sustainability and justice. Yet in its failure to value **nature's capital** as well as human health, the market system fails to deal adequately with that which we seek to protect and create.

At this point we need better definitions for our conceptual scheme.

Sustainable growth and sustainable development

Economic growth means that real GNP per capita is increasing over time. However, observation or realization of such a trend does not mean that growth is 'sustainable'.

Sustainable economic growth means that real GNP per capita is increasing over time and the increase is not threatened by "feedback" either from biophysical impacts (pollution, resource problems) or from social impacts (poverty, social disruption).

Sustainable development means either that per capita utility or well-being is increasing over time with free exchange or substitution between natural and man-made capital or that per capita utility or well-being is increasing over time subject to non-declining natural wealth.

There are several reasons why the second and more narrow focus is justified, including:

- Non-substitutability between environmental assets;
(i.e. the ozone layer cannot be recreated);
- Uncertainty (our limited understanding of the life-supporting functions of many environmental assets dictates that they be preserved for the future);
- Irreversibility (once lost, no species can be recreated);
- and, equity (the poor are usually more affected by bad environments than the rich).

The Systemic Approach

One can identify three systems as basic to any process of development: The biological or ecological resource system, the economic system and the social system. Human society applies a set of goals to each system, each with its own hierarchy of sub-goals and targets. The objective of sustainable development will then be to maximize goal achievement across these systems at one and the same time through an adaptive process. It will not be possible to maximize all goals all the time. Moreover, there may be

conflict among intra-system goals. Choices must therefore be made as to which goals should receive greater priority. Different development strategies will assign different priorities.

System goals may include the following:

Biological system goals

- + Genetic diversity
- + Resilience
- + Biological productivity

Economic system goals

- + Increasing production of goods and services
- + Satisfying basic needs or reducing poverty
- + Improving equity

Social system goals

- + Cultural diversity
- + Social justice
- + Gender equality
- + Participation

The list of this information is that future prosperity depends on preserving "natural capital" (air, water, soil and other ecological treasures) and that doing so will require balancing human activity with nature's ability to renew itself. It also recognizes that growth is necessary to eliminate poverty, which leads to the plunder of resources. Sustainable development, in one sense, is environmental protection. But in general it is "the cutting edge" of social and economic reform.

The implications indeed call for revolutionary changes: Industrial nations would have to shift from resource-intensive production systems and lifestyles to ones that consume vastly fewer resources and dramatically cut pollution. Developing nations would have to practice less destructive agriculture, industrialize with unprecedented care, cut birth rates, and improve women's rights. But, could they do it alone? Hardly so. Affluent nations have to contribute billions in aid, while their industries shared the latest technology. The total impact of this over-all aid would be comparable to the industrial revolution.

Bridging the gulf between the rich and poor nations has become gospel of sustainable development. In the destitution of developing countries and the overconsumption of industrial countries lie the seeds of all environmental problems. The richest 20% of the world's people have 150 times the income of the poorest 20%. Industrial nations, with 25% of global population, consume 70% of all resources and emit most of the pollution. Just seven (including the U.S. and Japan) produce 45% of greenhouse gasses.

There is more to the inequality between the nations of the earth: Limited access to global markets costs developing nations \$500 billion in revenue annually. As growth struggles to catch up with population in these countries, more people push onto fragile lands. In tropical regions, nearly 400 million people. A number expected to double within 50 years live by clearing land for farming that will be worn out in just a few years. Millions more will flood already over-populated and polluted cities.

Crushing debt further exacerbates existing problems. As of 1989, developing nations owed \$1.2 trillion, 44% of their collective GNP. To pay off these borrowings, they have exported about \$50 billion in resources annually since 1983. This "transaction" has proven to be devastating for the environment, since farming, fishing, forestry, and mining account for more than two-thirds of employment and 50% of export earnings of these nations. Of 33 countries that export tropical timber, some 23 are likely to run out within a decade or even earlier. Yet in the same time frame, developing countries will need to create at least one million new jobs. If they industrialize without **clean technology**, as China, Brazil, and India are doing, they will greatly increase global pollution and resources destruction. Given these trends, technology becomes the chief engine of sustainability. Eco-efficiencies (reducing the resource used and pollution emitted per unit of output) is the way for industrial countries to curtail environmental damage. Developing countries may follow suit. With the proper infrastructure, industrial countries could recycle more than 50% of their paper, glass, plastics and metals.

New technologies also could head off the 75% increase in global energy demand the worldwide energy conference projects by 2020. Conservation, new tilling practices, crop rotation, and more efficient irrigation are checking erosion, water waste, and agricultural pollution. Biotechnology promises to create non-polluting pesticides, crops that need less water, and pollution-fighting microbes. Less wasteful, less energy-intensive biological processes could increasingly replace chemical-based system. Already, bacteria are used to produce 30% of U.S. copper. They release the metal from minerals and avoid the sulphur dioxide emissions of smelting. Yet in other places, newly created marshlands, through their plants and organisms absorb heavy metal and pollutants in the wastewater emitted by metal factories and sewers.

Along with more suitable technology, less developed nations need a **new model for growth**. In the past, growth was associated with new dam and road projects, factories, commodity agriculture (sometimes on state owned farms) and mining. Many of these projects destroyed ecosystems and did little to help the poor. The emphasis needs to shift to creating smaller but efficient businesses and sustainable farming, forestry, and wildlife management. It must be remembered though that human development objectives cannot be limited to quantifiable targets. Many important aspects of human development escape quantification and cannot be analysed in quantitative terms. For example, people's education, a vital input of human development, depends on both years of schooling and the type of knowledge imparted.

Today's Problems are Yesterday's Solutions

All new technologies are introduced in terms of their utopian possibilities. Their cost-benefit analysis came years later after much damage was incurred. The new paradigm is "sustainability". What are the characteristics of a **sustainable society**?

A sustainable society is one that can persist over generations, one that is far-sighted enough, flexible enough, and wise enough not to undermine either physical or its social systems of support. Put in other words, a sustainable society is one that meets the needs of the present without compromising the ability of the future generations to meet their own needs.

From a systems point of view a sustainable society is one that has in place informational, social, and institutional mechanisms to keep in check the positive feedback loops that cause exponential population and capital growth. That means that birth rates roughly equal death rates, and investment rates roughly equal depreciation rates unless and until technical changes and social decisions justify a considered and controlled change in the levels of population or capital.

In order to be socially sustainable the combination of population, capital, and technology in the society could have to be configured so that the material living standard is adequate and secure for everyone.

In order to be physically sustainable the society's material and energy throughputs would have to meet the following conditions:

- + Its rates of use of renewable resources do not exceed their rates of regeneration.
- + Its rates of the nonrenewable resources do not exceed the rate at which sustainable renewable substitutes are developed.
- + Its rates of pollution emission do not exceed the assimilative capacity of the environment.

A sustainable society would be interested in qualitative development, not physical expansion. It would use material growth as a considered tool, not as perpetual mandate. It would be neither for nor against growth, rather it would begin to discriminate kinds of growth and purposes for growth. Before a society would decide on any specific growth proposal. It would ask what growth is for, and who would benefit, and what it would cost, and how long it would last, and whether it could be accommodated by the sources and sinks of the earth.

A sustainable society would apply its values and its best knowledge of the earth's limits to choose only those kinds of growth that would actually serve social goals and enhance sustainability.

A sustainable society would not freeze into permanence the current inequitable patterns of distribution. It would certainly not permit the persistence of poverty. To do so would not be sustainable for two reasons. First, the poor would not (may be should not) stand for it. Second, keeping any part of the population in poverty would not be possible for long, except under harsh coercive measures. Allow the population to stabilize. For both moral and practical reasons any sustainable society must provide material sufficiency and security for all.

A sustainable society would not bear the marks of despondency and stagnancy, high unemployment and bankruptcy that current market systems experience when their

growth is interrupted. The difference between a sustainable society and a present-day economic recession is like the difference between stopping an automobile purposely with the brakes and stopping it by crashing into a concrete wall.

There is no reason why a sustainable society need be technically or culturally primitive. Freed from both material anxiety and material greed, human society would have enormous possibilities for the expansion of human creativity in constructive ways. Without the high costs of growth for both human society and the environment, both technology and culture could bloom.

One may think that a sustainable society would have to stop using nonrenewable resources, since their use is by definition unsustainable. That idea is an overly rigid interpretation of what it means to be sustainable. There is no reason not to use them, as long as renewable substitutes should be developed, so that no future society finds itself built around the use of a resource that is suddenly no longer available or affordable.

There is no reason for a sustainable society to be uniform. Diversity is both a cause of and a result of sustainability in nature, and it would be in human society as well. Many people envision a sustainable world/society as decentralized. With boundary conditions keeping each locality from threatening the viability of another or of the earth as a whole. Cultural variety and local autonomy could be greater, not less, in such a world.

There is no reason for a sustainable society to be undemocratic, or boring, or unchallenging. Some games that attract people today, such as arms races and accumulation of unlimited volumes of wealth, would no longer be played. But there still would be games, challenges, problems to solve, ways for people to prove themselves, to serve each other, to realize their abilities, and to live good lives, perhaps more satisfying lives than any that are possible today.

Cultivation, humanization, co-operation, symbiosis are the watchwords of the new world order and its culture in the making. Every vestige of life will record this change and adapt to it in time. The procedures of science, organization of industrial enterprises, the planning of cities, the development of regions and their integration into the societal whole, the patterns of interchange of national and global resources will all change. This is no less than a **revolution**.

Sustainability: The Next Revolution

The sustainability revolution, will be organic and evolutionary. It will arise from the visions, insights, experiments, and actions of billions of people. No identifiable person or group will get the credit. Everyone will (have to) contribute (in order to survive and) change the foundations of production, consumption, education, foundation of human self-definitions, institutions and cultures. Otherwise the end result of human evolution and engineered change could lead to collapse rather than a revolution.

Goals of the sustainability revolution:**Economic goals**

- Employment creation
- Equitable income distribution within countries and redistribution among countries
- The establishment of an equilibrium between the economy and other human and non-human system
- Economic self-reliance at the community and national level
- Promoting development through trade, in particular through an open and equitable multilateral trading system and improving access to markets for exports of developing countries
- Making environment and trade mutually supportive by encouraging international productivity and competitiveness and clarifying the role of GATT, UNCTAD and other international organizations in dealing with trade and environment related issues, including dispute settlement
- Providing adequate financial resources to developing countries, possibly through reduction of external debt and an increase in official development assistance from developed countries to 0.7 of gross domestic product
- Encouraging macroeconomic policies conducive to sustaining environment and development, such as stabilizing interest rates, stimulating savings and reducing fiscal deficits
- Alleviation of poverty by enabling the poor to achieve sustainable livelihoods through development programmes that focus on income generation, increased local control of resources, local capacity building and greater involvement of NGOs and local governments
- Focusing on investment in human capital, with special policies and programmes directed at rural areas, the urban poor, women and children
- Promoting patterns of consumption and production that reduce environmental stress and will meet the basic needs of humanity. Developed countries should take the lead in achieving sustainable consumption patterns and lifestyles. Developing countries, in order to develop, will need technological and other assistance from industrialized countries, **without replicating those wasteful and inefficient consumption patterns**

Social and cultural goals

- Equity and justice, emphasizing needs over wants, especially in developed countries

- Full status for all citizens regardless of race, gender, ethnicity, or class
- Maintenance of cultural diversity, including respect and support for indigenous peoples
- Strengthened communities through the participation of individuals and social groups in the conduct of their own affairs
- Revitalization of sustainable rural communities through the development of environmentally sensitive and economically productive agriculture, family farming, and appropriate value-added environmentally sound industrial development

- Revitalization of communities within urban settings

Political Goals

- Cultivating political security, by calling on the participation of communities in defining the problems of the polity and developing solutions, so as to protect from non-democratic internal threats and to meet the needs of the inhabitants
- Building up strategic security, so that communities are able to defend themselves against external threats, coercion or invasion whether economic or political
- Developing environmental security, under which a viable balance is struck between a community's population and the demands made on it relative to its economic endowment (including its natural capital and its levels of technology) and performance, and which allows it to protect itself from environmental assaults from outside the community
- Contributing to the making of a world that is largely demilitarized
- Providing effective legal and regulatory framework for the integration of environment and development policies

Ecological Goals

- Planning for ecological stability that will fit with increased general self-reliance and rely much more on renewable and recyclable supplies of resources
- Environmental protection through greater concentration on resource and waste repository constraints, which may require resource planning and target setting to minimize the use of resources and the production of wastes
- Technology assessment, management, and regulation, with particular attention to unintended consequences in the medium to long term
- Focusing first on waste reduction and then on waste management
- Reducing toxins as much as possible

- Balancing ecological debt within and among countries
- Considering sufficiency rather than simple efficiency, since high levels of consumption are generally incompatible with the conservation and preservation of the world's resources
- Maintaining bio-diversity
- Stabilizing population
- Formulating integrated national policies for population, environment and development
- Implementing integrated population, environment and development programmes at the local level through such measures as universal access to family planning services and safe contraceptives; and direct education programmes aimed at both men and women
- Providing adequate shelter for all and improving settlement management, especially urban management
- Promoting sustainable land use through environmentally-sound physical planning to ensure access to land
- Ensuring provision of environmental infrastructure: water, sanitation, drainage and waste management in all settlements by the year 2000.
- Promoting sustainable energy and transport systems
- Promoting sustainable construction industry activities
- Promoting human resource development by enhancing personal and institutional capacity, particularly of indigenous people and women
- Establishing systems for integrating environmental and economic accounting and creating prices which reflect the costs of natural resources

Health Goals

- Meeting basic health needs, such as safe food, balanced nutrition, clean drinking water and adequate sanitation
- Controlling communicable diseases by eliminating some of them by other methods while improving access to vaccines and other health care methods
- Protecting vulnerable groups such as infants, youth, women and indigenous peoples
- Meeting the urban health challenge by improving health indicators, such as infant mortality and diarrhoeal diseases by year 2000

- Reducing health risks from environmental pollution and hazards.

A new outlook

Significant structural and systemic change must take place in the way we manage our nation's and the world's affairs if we are to reach the goal of sustainability. We must struggle locally, but think globally. **"What is our tolerance for ignorance and ambiguity while trying to avoid harm"** must be our norm. Since economics has become the language of politics, we need to reshape how we define the economy. A problem-oriented **ecological economics** is needed, synthesizing ecological and economic knowledge in a new paradigm for a sustained world. No longer can we tolerate a science based on purely mathematics. **"Nature's capital"** must be recognized and accounted for.