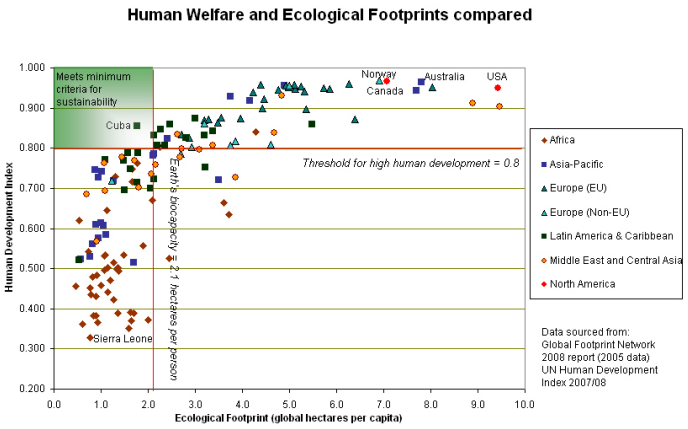
Sustainable development

Sustainable development is an organising principle for human life on a finite planet. It posits a desirable future state for human societies in which living conditions and resource-use meet human needs without undermining the sustainability of natural systems and the environment, so that future generations may also meet their needs.

Solar power towers utilize the natural resource of the Sun, and are a renewable energy source. From left: PS10 and PS20 solar towers in Spain.

Sustainable development ties together concern for the carrying capacity of natural systems with the social and economic challenges faced by humanity. As early as the 1970s, 'sustainability' was employed to describe an economy "in equilibrium with basic ecological support systems."[1] Scientists in many fields have pointed to *The Limits to Growth*,[2] and economists have presented alternatives, for example a 'steady state economy',[3] to address concerns over the impacts of expanding human development on the planet.



Ecological footprint for different nations compared to their Human Development Index (HDI)

The term 'sustainable development' rose to significance after it was used by the Brundtland Commission in its 1987 report Our Common Future. In the report, the commission coined what has become the most often-quoted definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[4]

The concept of sustainable development has in the past most often been broken out into three constituent domains: environmental sustainability, economic sustainability and social sustainability. However, many other possible ways to delineate the concept have been suggested. For example, distinguishing the four domains of economic, ecological, political and cultural sustainability.[5] Other important sources refer to the fourth domain as 'institutional' [6] or as 'good governance.' [7]

Definitions

In 1987, the United Nations World Commission on Environment and Development released the report *Our Common Future*, now commonly named the 'Brundtland Report' after the commission's chairperson, the then Prime Minister of Norway Gro Harlem Brundtland. The report included what is now one of the most widely recognised definitions: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The Brundtland Report goes on to say that sustainable development also 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
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

The United Nations 2005 World Summit Outcome Document refers to the "interdependent and mutually reinforcing pillars" of sustainable development as economic development, social development, and environmental protection.[8] Based on this 'triple bottom line', numerous sustainability standards and certification systems have been established in recent years, in particular in the food industry.[9][10] Well-known standards include organic, Rainforest Alliance, fair trade, UTZ Certified, Bird Friendly, and The Common Code for the Coffee Community.

Indigenous people have argued, through various international forums such as the United Nations Permanent Forum on Indigenous Issues and the Convention on Biological Diversity, that there are *four* pillars of sustainable development, the fourth being cultural. *The Universal Declaration on Cultural Diversity* (UNESCO, 2001) further elaborates the concept by stating that "... cultural diversity is as necessary for humankind as biodiversity is for nature"; it becomes "one of the roots of development understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence". In this vision, cultural diversity is the fourth policy area of sustainable development.

The natural resource of wind powers these 5MW wind turbines on this wind farm 28 km off the coast of Belgium.

A useful articulation of the values and principles of sustainability can be found in the Earth Charter [11]. It offers an integrated vision and definition of strong sustainability. The document, an ethical framework for a sustainable world, was developed over several years after the Rio Earth Summit in 1992 and launched officially in 2000. The Charter derives its legitimacy from the participatory process in which it was drafted, which included contributions from hundreds of organizations and thousands of individuals, and from its use since 2000 by thousands of organizations and individuals that have been using the Earth Charter as an educational instrument and a policy tool [12].

Economic Sustainability: Agenda 21 clearly identified information, integration, and participation as key building blocks to help countries achieve development that recognises these interdependent pillars. It emphasises that in sustainable development everyone is a user and provider of information. It stresses the need to change from old sector-centered ways of doing business to new approaches that involve cross-sectoral co-ordination and the integration of environmental and social concerns into all development processes. Furthermore, Agenda 21 emphasises that broad public participation in decision making is a fundamental prerequisite for achieving sustainable development.[13]

According to Hasna Vancock, sustainability is a process which tells of a development of all aspects of human life affecting sustenance. It means resolving the conflict between the various competing goals, and involves the simultaneous pursuit of economic prosperity, environmental quality and social equity famously known as three dimensions (triple bottom line) with the resultant vector being technology, hence it is a continually evolving process; the 'journey' (the process of achieving sustainability) is of course vitally important, but only as a means of getting to the destination (the desired future state). However, the 'destination' of sustainability is not a fixed place in the normal sense that we understand destination. Instead, it is a set of wishful characteristics of a future system.

Important related concepts are 'strong' and 'weak' sustainability, deep ecology, and just sustainability. "Just sustainability" offers a socially just conception of sustainability. Just sustainability effectively addresses what has been called the 'equity deficit' of *environmental* sustainability (Agyeman, 2005:44).[14] It is “the egalitarian conception of sustainable development" (Jacobs, 1999:32).[15] It generates a more nuanced definition of sustainable development: “the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems” (Agyeman, et al., 2003:5).[16] This conception of sustainable development focuses equally on four conditions: improving our quality of life and well-being; on meeting the needs of both present and future generations (*intra-* and *inter*generational equity); on justice and equity in terms of recognition (Schlosberg, 1999),[17] process, procedure and outcome and on the need for us to live within ecosystem limits (also called *one planet living*) (Agyeman, 2005:92).[18] Open-source appropriate technology has been proposed as an approach for reaching just sustainable development.[19][20]

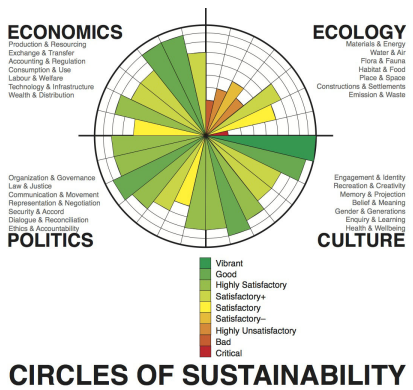
Green development is generally differentiated from sustainable development in that Green development prioritizes what its proponents consider to be environmental sustainability over economic and cultural considerations. Proponents of Sustainable Development argue that it provides a context in which to improve overall sustainability where cutting edge Green Development is unattainable. For example, a cutting edge treatment plant with extremely high maintenance costs may not be sustainable in regions of the world with fewer financial resources. An environmentally ideal plant that is shut down due to bankruptcy is obviously less sustainable than one that is maintainable by the community, even if it is somewhat less effective from an environmental standpoint. However, this view depends on whether one determines that it is the development (the plant) which needs to be sustainable, or whether it is the human-nature ecology (the environmental conditions) in which the plant exists which should be sustainable. It follows, then, that an operational but heavily polluting plant may be judged as actually 'less sustainable' than having no plant at all.

Sustainability educator Michael Thomas Needham referred to 'Sustainable Development' "as the ability to meet the needs of the present while contributing to the future generations’ needs."[21] There is an additional focus on the present generations' responsibility to improve the future generations' life by restoring the previous ecosystem damage and resisting to contribute to further ecosystem damage.

Domains

Economics

The domain of 'economics' is fundamental to considerations of sustainable development, however there has been considerable criticism of the tendency to use the three-domain model of the triple bottom line: economics, environment and social. This approach is challenged to the extent that it treats the economy as the master domain, or as a domain that exists outside of the social; it treats the environment as a world of natural metrics; and it treats the social as a miscellaneous collection of extra things that do not fit into the economic or environmental domains (see the section on Economic sustainability below). In the alternative Circles of Sustainability approach, the economic domain is defined as the practices and meanings associated with the production, use, and management of resources, where the concept of ‘resources’ is used in the broadest sense of that word.



Circles of Sustainability image (assessment - Melbourne 2011)

Ecology

The domain of 'ecology' has been difficult to resolve because it too has a social dimension. Some research activities start from the definition of green development to argue that the environment is a combination of nature and culture. However, this has the effect of making the domain model unwieldy if culture is to be considered a domain in its own right (see below). Others write of ecology as being more broadly at the intersection of the social and the environmental - hence, ecology. This move allows culture to be used as a domain alongside economics and ecology.[22]

The sustainability of human settlements is implicit in the focus of study into the relationship between humans and their natural, social and built environments. Also termed human ecology, this broadens the focus of sustainable development to include the domain of human health. Fundamental human needs such as the availability and quality of air, water, food and shelter are also the ecological foundations for sustainable development; addressing public health risk through investments in ecosystem services can be a powerful and transformative force for sustainable development which, in this sense, extends to all species.[23]

Culture

Working with a different emphasis, some researchers and institutions have pointed out that a fourth dimension should be added to the dimensions of sustainable development, since the triple-bottom-line dimensions of economic, environmental and social do not seem to be enough to reflect the complexity of contemporary society. In this context, the Agenda 21 for culture and the United Cities and Local Governments (UCLG) Executive Bureau lead the preparation of the policy statement “Culture: Fourth Pillar of Sustainable Development”, passed on 17 November 2010, in the framework of the World Summit of Local and Regional Leaders – 3rd World Congress of UCLG, held in Mexico City. This document inaugurates a new perspective and points to the relation between culture and sustainable development through a dual approach: developing a solid cultural policy and advocating a cultural dimension in all public policies. The Network of Excellence "Sustainable Development in a Diverse World", sponsored by the European Union, integrates multidisciplinary capacities and interprets cultural diversity as a key element of a new strategy for sustainable development. The Circles of Sustainability approach defines the cultural domain as practices, discourses, and material expressions, which, over time, express continuities and discontinuities of social meaning. However, culture falls within the social/sociopolitical dimension of sustainability, and therefore the proposal for adding a fourth "cultural" dimension has not been widely accepted.

Politics

The United Nations Global Compact Cities Programme has defined sustainable political development is a way that broadens the usual definition beyond states and governance. The political is defined as the domain of practices and meanings associated with basic issues of social power as they pertain to the organisation, authorisation, legitimation and regulation of a social life held in common. This definition is in accord with the view that political change is important for responding to economic, ecological and cultural challenges. It also means that the politics of economic change can be addressed. This is particularly true in relation to the controversial concept of 'sustainable enterprise' that frames global needs and risks as 'opportunities' for private enterprise to provide profitable entrepreneurial solutions. This concept is now being taught at many business schools including the Center for Sustainable Global Enterprise at Cornell University and the Erb Institute for Global Sustainable Enterprise at the University of Michigan.

Sustainable development is an eclectic concept and a wide array of political views fall under its umbrella. The concept has included notions of weak sustainability, strong sustainability and deep ecology. Different conceptions also reveal a strong tension between ecocentrism and anthropocentrism. Many definitions and images (Visualizing Sustainability) [24] of sustainable development coexist. Broadly defined, the sustainable development mantra enjoins current generations to take a systems approach to growth and development and to manage natural, produced, and

social capital for the welfare of their own and future generations.

During the last ten years, different organizations have tried to measure and monitor the proximity to what they consider sustainability by implementing what has been called sustainability metrics and indices. This has engendered considerable political debate about what is being measured. Sustainable development is said to set limits on the developing world. While current first world countries polluted significantly during their development, the same countries encourage third world countries to reduce pollution, which sometimes impedes growth. Some consider that the implementation of sustainable development would mean a reversion to pre-modern lifestyles.[25]

Others have criticized the overuse of the term:

> "[The] word sustainable has been used in too many situations today, and ecological sustainability is one of those terms that confuse a lot of people. You hear about sustainable development, sustainable growth, sustainable economies, sustainable societies, sustainable agriculture. Everything is sustainable (Temple, 1992)."

History of the concept

The concept of sustainable development was originally synonymous with that of sustainability and is often still used in that way. Both terms derive from the older forestry term "sustained yield", which in turn is a translation of the German term "nachhaltiger Ertrag" dating from 1713.[26][27] According to different sources, the concept of sustainability in the sense of a balance between resource consumption and reproduction was however applied to forestry already in the 12th to 16th century.[28]

> 'Sustainability' is a semantic modification, extension and transfer of the term 'sustained yield'. This had been the doctrine and, indeed, the 'holy grail' of foresters all over the world for more or less two centuries. The essence of 'sustained yield forestry' was described for example by William A. Duerr, a leading American expert on forestry: "To fulfill our obligations to our descendents and to stabilize our communities, each generation should sustain its resources at a high level and hand them along undiminished. The sustained yield of timber is an aspect of man's most fundamental need: to sustain life itself." A fine anticipation of the Brundtland-formula.

Not just the concept of sustainable development, but also its current interpretations have its roots in forest management. *Strong* sustainability stipulates living solely off the interest of natural capital, whereas adherents of *weak* sustainability are content to keep constant the sum of natural and human capital.[29]

The history of the concept of sustainability is however much older. Already in 400 BCE, Aristotle referred to a similar Greek concept in talking about household economics. This Greek household concept differed from modern ones in that the household had to be self-sustaining at least to a certain extent and could not just be consumption oriented.

The first use of the term "sustainable" in the modern sense was by the Club of Rome in March 1972 in its epoch-making report on the "Limits to Growth", written by a group of scientists led by Dennis and Donella Meadows of the Massachusetts Institute of Technology. Describing the desirable "state of global equilibrium", the authors used the word "sustainable": "*We are searching for a model output that represents a world system that is: 1. sustainable without sudden and uncontrolled collapse; and 2. capable of satisfying the basic material requirements of all of its people*."

Sustainable development in Cuba

According to data it presents to the United Nations, Cuba was the only nation in the world in 2006 that met the World Wide Fund for Nature's definition of sustainable development, with an ecological footprint of less than 1.8 hectares per capita, 1.5 hectares, and a Human Development Index of over 0.8, 0.855.[30]

Environmental sustainability

Environmental sustainability is the process of making sure current processes of interaction with the environment are pursued with the idea of keeping the environment as pristine as naturally possible based on ideal-seeking behavior. Thus, environmental sustainability demands that society designs activities to meet human needs while indefinitely preserving the life support systems of the planet. This, for example, entails using water sustainably, only utilizing renewable energy, and sustainable material supplies (e.g. harvesting wood from forests at a rate that maintains the biomass and biodiversity).

Water is an important natural resource that covers 71% of the Earth's surface. Image is the Earth photographed from Apollo 17.

An "unsustainable situation" occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished. Sustainability requires that human activity only uses nature's resources at a rate at which they can be replenished naturally. Inherently the concept of sustainable development is intertwined with the concept of carrying capacity. Theoretically, the long-term result of environmental degradation is the inability to sustain human life. Such degradation on a global scale should imply extinction for humanity.

Consumption of renewable resources	State of environment	Sustainability
More than nature's ability to replenish	Environmental degradation	Not sustainable
Equal to nature's ability to replenish	Environmental equilibrium	Steady state economy
Less than nature's ability to replenish	Environmental renewal	Environmentally sustainable

Economic sustainability

Template:Pillars of sustainabilty The Venn diagram of sustainable development has many versions,[31] but was first used by economist Edward Barbier (1987). However, Pearce, Barbier and Markandya (1989) criticized the Venn approach due to the intractability of operationalizing separate indices of economic, environmental, and social sustainability and somehow combining them. They also noted that the Venn approach was inconsistent with the Brundtland Commission Report, which emphasized the interlinkages between economic development, environmental degradation, and population pressure instead of three objectives. Economists have since focused on viewing the economy and the environment as a single interlinked system with a unified valuation methodology (Hamilton 1999, Dasgupta 2007). Intergenerational equity can be incorporated into this approach, as has become common in economic valuations of climate change economics (Heal 2009). Ruling out discrimination against future generations and allowing for the possibility of renewable alternatives to petro-chemicals and other non-renewable resources, efficient policies are compatible with increasing human welfare, eventually reaching a golden-rule steady state (Ayong le Kama 2001 and Endress *et al.* 2005). Thus the three pillars of sustainable development are

interlinkages, intergenerational equity, and dynamic efficiency (Stavins et al. 2003).

Arrow et al. (2004) and other economists (e.g. Asheim,1999 and Pezzey, 1989 and 1997) have advocated a form of the weak criterion for sustainable development – the requirement than the wealth of a society, including human capital, knowledge capital and natural capital (as well as produced capital) not decline over time. Others, including Barbier 2007,[32] continue to contend that strong sustainability – non-depletion of essential forms of natural capital – may be appropriate.

Economic development has traditionally required a growth in the gross domestic product. This model of unlimited personal and GDP growth may be over. Sustainable development may involve improvements in the quality of life for many but, particularly for the affluent, may necessitate a decrease in resource consumption.

Types of capital

Deforestation of native rain forest in Rio de Janeiro City for extraction of clay for civil engineering (2009 picture).

The sustainable development debate is based on the assumption that societies need to manage three types of capital (economic, social, and natural), which may be non-substitutable and whose consumption might be irreversible.[33] Daly (1991),[34] for example, points to the fact that natural capital can not necessarily be substituted by economic capital. While it is possible that we can find ways to replace some natural resources, it is much more unlikely that they will ever be able to replace eco-system services, such as the protection provided by the ozone layer, or the climate stabilizing function of the Amazonian forest. In fact natural capital, social capital and economic capital are often complementarities. A further obstacle to substitutability lies also in the multi-functionality of many natural resources. Forests, for example, not only provide the raw material for paper (which can be substituted quite easily), but they also maintain biodiversity, regulate water flow, and absorb CO2.

Another problem of natural and social capital deterioration lies in their partial irreversibility. The loss in biodiversity, for example, is often definite. The same can be true for cultural diversity. For example with globalisation advancing quickly the number of indigenous languages is dropping at alarming rates. Moreover, the depletion of natural and social capital may have non-linear consequences. Consumption of natural and social capital may have no observable impact until a certain threshold is reached. A lake can, for example, absorb nutrients for a long time while actually increasing its productivity. However, once a certain level of algae is reached lack of oxygen causes the lake's ecosystem to break down suddenly.

Market failure

Before flue-gas desulfurization was installed, the air-polluting emissions from this power plant in New Mexico contained excessive amounts of sulfur dioxide.

If the degradation of natural and social capital has such important consequence the question arises why action is not taken more systematically to alleviate it. Cohen and Winn (2007)[35] point to four types of market failure as possible explanations: First, while the benefits of natural or social capital depletion can usually be privatized the costs are often externalized (i.e. they are borne not by the party responsible but by society in general). Second, natural capital is often undervalued by society since we are not fully aware of the real cost of the depletion of natural capital. Information asymmetry is a third reason—often the link between cause and effect is obscured, making it difficult for actors to make informed choices. Cohen and Winn close with the realization that contrary to economic theory many firms are not perfect optimizers. They postulate that firms often do not optimize resource allocation because they are caught in a "business as usual" mentality.

Business case

The most broadly accepted criterion for corporate sustainability constitutes a firm's efficient use of natural capital. This eco-efficiency is usually calculated as the economic value added by a firm in relation to its aggregated ecological impact.[36] This idea has been popularised by the World Business Council for Sustainable Development (WBCSD) under the following definition: "Eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the earth's carrying capacity." (DeSimone and Popoff, 1997: 47)[37]

Similar to the eco-efficiency concept but so far less explored is the second criterion for corporate sustainability. Socio-efficiency[38] describes the relation between a firm's value added and its social impact. Whereas, it can be assumed that most corporate impacts on the environment are negative (apart from rare exceptions such as the planting of trees) this is not true for social impacts. These can be either positive (e.g. corporate giving, creation of employment) or negative (e.g. work accidents, mobbing of employees, human rights abuses). Depending on the type of impact socio-efficiency thus either tries to minimize negative social impacts (i.e. accidents per value added) or maximise positive social impacts (i.e. donations per value added) in relation to the value added.

Both eco-efficiency and socio-efficiency are concerned primarily with increasing economic sustainability. In this process they instrumentalize both natural and social capital aiming to benefit from win-win situations. However, as Dyllick and Hockerts point out the business case alone will not be sufficient to realise sustainable development. They point towards eco-effectiveness, socio-effectiveness, sufficiency, and eco-equity as four criteria that need to be met if sustainable development is to be reached.

Sustainable agriculture

Sustainable agriculture may be defined as consisting of environmentally friendly methods of farming that allow the production of crops or livestock without damage to human or natural systems. More specifically, it might be said to include preventing adverse effects to soil, water, biodiversity, surrounding or downstream resources—as well as to those working or living on the farm or in neighboring areas. Furthermore, the concept of sustainable agriculture extends intergenerationally, relating to passing on a conserved or improved natural resource, biotic, and economic

base instead of one which has been depleted or polluted.

Elements

- **Agroforestry**

According to the World Agroforestry Centre, agroforestry is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence. There are normally both ecological and economic interactions between woody and non-woody components in agroforestry.

- **Mixed Farming**

Many farmers in tropical & temperate countries survive by managing a mix of different crops or animals. The best known form of mixing occurs probably where crop residues are used to feed the animals and the excreta from animals are used as nutrients for the crop. Other forms of mixing takes place where grazing under fruit trees keeps the grass short or where manure from pigs is used to feed the fish. Mixed farming exists in many forms depending on external and internal factors. External factors are: Weather Patterns, Market Prices, Political Stability and Technological Development. Internal factors relate to Local Soil Characteristics, Composition of family and Farmer's Ingenuity. Mixed Farming provides farmers with a) an opportunity to diversify risk from single-crop production; (b) to use labour more efficiently; (c) to have a source of cash for purchasing farm inputs; (d) to add value to crop or crop by-product; (e) combining crops and livestocks.

- **Multiple Cropping**

The process of growing two or more crops in the same piece of land, during the same season is called Multiple Cropping. It can be rightly called a form of polyculture. It can be – (a) Double Cropping (the practice where the second crop is planted after the first has been harvested); (b) Relay Cropping (the practice where a second crop is started along with the first one, before it is harvested).

- **Crop Rotation**

The process of growing two or more dissimilar or unrelated crops in the same piece of land in different seasons is known as Crop Rotation. This process could be adopted as it comes with a series of benefits like – (a) avoid the build up of pests that often occurs when one species is continuously cropped; (b) the traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops; (c) Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants; (d) it is a component of polyculture.

Criticisms

The concept of "Sustainable Development" raises several critiques at different levels.

Deforestation and increased road-building in the Amazon Rainforest are a significant concern because of increased human encroachment upon wilderness areas, increased resource extraction and further threats to biodiversity.

Consequences

John Baden[39] views the notion of sustainable development as dangerous because the consequences have unknown effects. He writes: "In economy like in ecology, the interdependence rule applies. Isolated actions are impossible. A policy which is not carefully enough thought will carry along various perverse and adverse effects for the ecology as much as for the economy. Many suggestions to save our environment and to promote a model of 'sustainable development' risk indeed leading to reverse effects."[40] Moreover, he evokes the bounds of public action which are underlined by the public choice theory: the quest by politicians of their own interests, lobby pressure, partial disclosure etc. He develops his critique by noting the vagueness of the expression, which can cover anything It is a gateway to interventionist proceedings which can be against the principle of freedom and without proven efficacy. Against this notion, he is a proponent of private property to impel the producers and the consumers to save the natural resources. According to Baden, “the improvement of environment quality depends on the market economy and the existence of legitimate and protected property rights.” They enable the effective practice of personal responsibility and the development of mechanisms to protect the environment. The State can in this context “create conditions which encourage the people to save the environment.”[41]

Vagueness of the term

Some criticize the term "sustainable development", stating that the term is too vague. For example, both Jean-Marc Jancovici and the philosopher Luc Ferry[42] express this view. The latter writes about sustainable development: "I know that this term is obligatory, but I find it also absurd, or rather so vague that it says nothing." Luc Ferry adds that the term is trivial by a proof of contradiction: "who would like to be a proponent of an “untenable development! Of course no one! [..] The term is more charming than meaningful. [..] Everything must be done so that it does not turn into Russian-type administrative planning with ill effects." sustainable development has become obscured by conflicting world views, the expansionist and the ecological, and risks being co-opted by individuals and institutions that perpetuate many aspects of the expansionist model.[43]

A sewage treatment plant that uses environmentally friendly solar energy, located at Santuari de Lluc monastery.

Basis

Sylvie Brunel, French geographer and specialist of the Third World, develops in *A qui profite le développement durable* (Who benefits from sustainable development?) (2008) a critique of the basis of sustainable development, with its binary vision of the world, can be compared to the Christian vision of Good and Evil, an idealized nature where the human being is an animal like the others or even an alien. Nature – as Rousseau thought – is better than the human being. It is a parasite, harmful for the nature. But the human is the one who protects the biodiversity, where normally only the strong survive.[44]

Moreover, she thinks that the core ideas of sustainable development are a hidden form of protectionism by developed countries impeding the development of the other countries.[how?] For Sylvie Brunel, sustainable development serves as a pretext for protectionism and "I have the feeling that sustainable development is perfectly helping out capitalism".

"De-growth"

The proponents of the de-growth reckon that the term of sustainable development is an oxymoron. According to them, on a planet where 20% of the population consumes 80% of the natural resources, a sustainable development cannot be possible for this 20%: "According to the origin of the concept of sustainable development, a development which meets the needs of the present without compromising the ability of future generations to meet their own needs, the right term for the developed countries should be a sustainable de-growth".[45]

For several decades, theorists of steady state economy and ecological economy have been positing that reduction in population growth or even negative population growth is required for the human community not to destroy its planetary support systems, i.e., to date, increases in efficiency of production and consumption have not been sufficient, when applied to existing trends in population and resource depletion and waste by-production, to allow for projections of future sustainability.

Measurability

In 2007 a report for the U.S. Environmental Protection Agency stated: "While much discussion and effort has gone into sustainability indicators, none of the resulting systems clearly tells us whether our society is sustainable. At best, they can tell us that we are heading in the wrong direction, or that our current activities are not sustainable. More often, they simply draw our attention to the existence of problems, doing little to tell us the origin of those problems and nothing to tell us how to solve them."[46] Nevertheless a majority of authors assume that a set of well defined and harmonised indicators is the only way to make sustainability tangible. Those indicators are expected to be identified and adjusted through empirical observations (trial and error).[47] (See also ecological footprint.)

The most common critiques are related to issues like data quality, comparability, objective function and the necessary resources. However a more general criticism is coming from the project management community: How can a sustainable development be achieved at global level if we cannot monitor it in any single project?

The Cuban-born researcher and entrepreneur Sonia Bueno suggests an alternative approach that is based upon the integral, long-term cost-benefit relationship as a measure and monitoring tool for the sustainability of every project, activity or enterprise. Furthermore this concept aims to be a practical guideline towards sustainable development following the principle of conservation and increment of value rather than restricting the consumption of resources.

Reasonable qualifications of sustainability are seen U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED). This design incorporates some ecological, economic, and social elements. The goals presented by LEED design goals are sustainable sites, water efficiency, energy and atmospheric emission reduction, material and resources efficiency, and indoor environmental quality. Although amount of structures for sustainability development is many, these qualification has become a standard for sustainable building.

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