

GEO-A-SEC-B-4-04-TH – Sustainable Development (Part-I)

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Sustainable development

Concept and definition

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

For humans, sustainability is the long-term maintenance of well being, which has environmental, economic, and social dimensions, and encompasses the concept of stewardship and responsible resource management.

Sustainable development is a concept that appeared for the first time in 1987 with the publication of the *Brundtland Report*, warning of the negative environmental consequences of economic growth and globalization, which tried to find possible solutions to the problems caused by industrialization and population growth.

Although many definitions abound, the most often used definition of sustainable development is that proposed by the Brundtland Commission (Cerin, 2006; Dernbach J. C., 1998; Dernbach J. C., 2003; Stoddart, 2011). This broad definition, which will be used in this dissertation, does not limit the scope of sustainability. The explanation does, however, touch on the importance of intergenerational equity. This concept of conserving resources for future generations is one of the major features that distinguish sustainable development policy from traditional environmental policy, which also seeks to internalize the externalities of environmental degradation. The overall goal of sustainable development (SD) is the long-term stability of the economy and environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making process.

In the application of this definition of sustainable development, one issue concerns the substitutability of capital. There are several types of capital: social, natural, and man-made. The definition of weak sustainable development explains that only the aggregate level of capital matters: man-made, or manufactured, capital is an adequate alternative to natural capital. Strong sustainability, on the other hand, recognizes the unique features of natural resources that cannot be replaced by manufactured capital. Most ecologists and environmentalists are proponents of the strong sustainability definition (Stoddart, 2011).

In addition to substitutability, this definition of sustainability is also founded on several other important principles. Contained within the common definition of sustainable development, intergenerational equity recognizes the long-term scale of sustainability in order to address the needs of future generations (Dernbach J. C., 1998; Stoddart, 2011). Also, the polluter pays principle states that "governments should require polluting entities to bear the costs of their pollution rather than impose those costs on others or on the environment" (Dernbach J.

C., 1998, p. 58). Thus, government policy should ensure that environmental costs are internalized wherever possible; this also serves to minimize externalities.

Table 1 shows some definitions of sustainable development. It can be seen that all these definitions involve common and different imperatives. Most definitions integrate many buildings under development: expansion, growth, progress, development and satisfaction. So, all conceptualizations show a directly proportional relationship between economical growth and population satisfaction.

Table 1. Definitions of sustainable development

Authors	Definition
WCED (1987), United States of America	"Sustainable development is meeting the needs of present without compromising the ability of future generations to meet their needs." (WCED, 1987).
Pearce, D., Markandya, A. and Barbier, E. (1989), United Kingdom	"Sustainable development involves devising a social and economic system, which ensures that these goals are sustained, i.e. that real incomes rise, that educational standards increase that the health of the nation improves, and that the general quality of life is advanced."(Pearce et al., 1989).
Harwood, R.R. (1990), United States of America	"Sustainable development is a system that can evolve indefinitely toward greater human utility, greater efficiency of resource use and a balance with the environment which is favourable to humans and most other species."(Harwood, 1990).
Meadows, D. H. (1998), United States of America	"Sustainable development is a social construct, referring to the longterm evolution of a hugely complex system – the human population and economy embedded within the eco-systems and biogeochemical flow of the planet."(Meadows, 1998).
Van der Merwe, I. and Van der Marwe, J. (1999), South Africa	"Sustainable development is a program for changing the process of economic development so that it ensures a basic quality of life for all people and at the same time protects the ecosystems and community systems that make life possible and worthwhile."(Van der Merwe & Van der Marwe, 1999).
Viorel, H.J. (2002), Romania	"Sustainable development is a form of economic growth which satisfies welfare needs of society in terms of short, medium and long term, it must meet the needs of the present without, however, compromising the of future generations."(Viorel, 2002).
Stefanescu, F. (2003), Romania	"Sustainable development must be understood as a type of economic development that ensures meeting the needs of present generations without compromising the ability of future generations to meet their own requirements and applicable measures aimed at long intervals and long-term effects." (Stefanescu, 2003).
Beck, U. and Wilms, J. (2004), United Kingdom	"Sustainable development is currently a powerful global counter- narrative to contemporary western lifestyles and forms of governing societies." (Beck & Wilms, 2004).
Hopwood, B., Mellor, M. and O'Brien, G. (2005), United Kingdom	"Sustainable development represents a shift in understanding of humanity's place on the planet, but it is open to interpretation of being anything from almost meaningless to of extreme importance to humanity." (Hopwood et al., 2005).
Vare, P. and Scott, W.	"Sustainable development is a process of change, where resources are being gathered, an investment direction is chosen, the development technologies directed

- (2007), United Kingdom and various institutions have convergent actions, increasing the potential for human needs and desires.” (Vare & Scott, 2007).
- Marin, C., Dorobanțu, R., Codreanu D. and Mihaela R. (2012), Romania ”Sustainability development refers to the ability of a society, ecosystem, or any such existing system to operate continuously in an undefined future without reaching key resource depletion.” (Marin et al., 2012).
- Ivascu L. (2013), Romania ”Sustainable development can be defined as maintaining system stability by developing a balance of responsibilities: economic, social, environmental and technological support technique without compromising the needs of future generations.” (Ivascu, 2013).

Principles

The precautionary principle establishes that “where there are threats of serious or irreversible damage; lack of full scientific certainty shall not be used as a reason for postponing cost-effective measure to prevent environmental degradation” (United Nations Conference on the Human Environment, 1992). Therefore, the proponent of an activity bears the burden of proving that this action will not cause significant harm. Explicitly stated in the Rio Declaration, the notion of common but differentiated responsibilities recognizes that each nation must play their part on the issue of sustainable development. This principle also acknowledges the different contributions to environmental degradation by developed and developing nations, while appreciating the future development needs of these less developed countries (Brodhag & Taliere, 2006; Dernbach J. C., 1998; United Nations Conference on the Human Environment, 1992). Developed nations, therefore, bear greater responsibility in light of the resources they require and the pressures they exert on the environment.

The *key principle* of sustainable development underlying all others is the integration of environmental, social, and economic concerns into all aspects of decision making. All other principles in the SD framework have integrated decision making at their core (Dernbach J. C., 2003; Stoddart, 2011). It is this deeply fixed concept of integration that distinguishes sustainability from other forms of policy.

Institutionally, government organizations are typically organized into sectoral ministries and departments. This works fairly well until the system encounters something very comprehensive and highly integrated in nature, such as sustainable development. In practice, sustainable development requires the integration of economic, environmental, and social objectives across sectors, territories, and generations. Therefore, sustainable development requires the elimination of fragmentation; that is, environmental, social, and economic concerns must be integrated throughout decision making processes in order to move towards development that is truly sustainable.

Goals

The Sustainable Development Goals (SDGs) are a global agenda, adopted by countries in 2015, with a **vision of ending poverty, protecting the planet and ensuring that all people enjoy**

peace and prosperity. The sustainable development goals (SDGs) are a new, universal set of goals, targets and indicators that UN member states will be expected to use to frame their agendas and political policies over the next 15 years.

The millennium development goals (MDGs) –reduce poverty and hunger; achieve universal education; promote gender equality; reduce child and maternal deaths; combat HIV, malaria and other diseases; ensure environmental sustainability; develop global partnerships – failed to consider the root causes of poverty and overlooked gender inequality as well as the holistic nature of development.

The goals made no mention of human rights and did not specifically address economic development. While the MDGs, in theory, applied to all countries, in reality they were considered targets for poor countries to achieve, with finance from wealthy states. Conversely, every country will be expected to work towards achieving the SDGs.

Proposed 17 Goals:

- 1) End poverty in all its forms everywhere
- 2) End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
- 3) Ensure healthy lives and promote wellbeing for all at all ages
- 4) Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- 5) Achieve gender equality and empower all women and girls
- 6) Ensure availability and sustainable management of water and sanitation for all
- 7) Ensure access to affordable, reliable, sustainable and modern energy for all
- 8) Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
- 9) Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation
- 10) Reduce inequality within and among countries
- 1) Make cities and human settlements inclusive, safe, resilient and sustainable
- 12) Ensure sustainable consumption and production patterns
- 13) Take urgent action to combat climate change and its impacts (taking note of agreements made by the UNFCCC forum)
- 14) Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- 15) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation, and halt biodiversity loss
- 16) Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- 17) Strengthen the means of implementation and revitalise the global partnership for sustainable development

Within the goals are 169 targets, to put a bit of meat on the bones. Targets under goal one, for example, includes reducing by at least half the number of people living in poverty by 2030, and eradicating extreme poverty (people living on less than \$1.25 a day). Under goal five, there's a target on eliminating violence against women, while goal 16 has a target to promote the rule of law and equal access to justice.

Historical background

The **history of sustainability** traces human-dominated ecological systems from the earliest civilizations to the present. This history is characterized by the increased regional success of a particular society, followed by crises that were either resolved, producing sustainability, or not, leading to decline. In early human history, the use of fire and desire for specific foods may have altered the natural composition of plant and animal communities. Between 8,000 and 10,000 years ago, agrarian communities emerged which depended largely on their environment and the creation of a "structure of permanence".

The Western industrial revolution of the 18th to 19th centuries tapped into the vast growth potential of the energy in fossil fuels. Coal was used to power ever more efficient engines and later to generate electricity. In the mid-20th century, a gathering environmental movement pointed out that there were environmental costs associated with the many material benefits that were now being enjoyed. In the late 20th century, environmental problems became global in scale. The 1973 and 1979 energy crises demonstrated the extent to which the global community had become dependent on non-renewable energy resources.

In the 21st century, there is increasing global awareness of the threat posed by the human-induced enhanced greenhouse effect, produced largely by forest clearing and the burning of fossil fuels.

Sustainability is divided into two main branches: *sustainability science* and *sustainability governance*. Each of these branches is divided into a number of subfields:

Sustainability science

- Environmental impact assessment
- Environmental psychology
- Environmental philosophy
- Environmental law
- Sustainability measurement

Sustainability governance

- Economic sector
 - Sustainable art
 - Sustainable advertising
 - Sustainable architecture
 - New Classical Architecture
 - Sustainable business
 - Sustainable fashion
 - Sustainable industries
 - Hannover Principles
 - Sustainable landscape architecture
 - Sustainable packaging
 - Sustainable procurement
 - Sustainable tourism
 - Sustainable transport
- Political
- Organization

- Fisheries management
- Sustainable forest management
- Sustainable city
 - New Urbanism
 - Eco-cities
 - Sustainable urban infrastructure
 - Sustainable urban drainage systems
- Sustainable community
 - Sustainable Communities Plan
- Sustainability reporting
- Activity
 - Sustainable design
 - Sustainable living
 - Sustainable yield

Politics of sustainability

- Rio Declaration on Environment and Development
- International reports and agreements
 - United Nations Conference on the Human Environment (Stockholm 1972)
 - Brundtland Commission Report, 1983
 - *Our Common Future*, 1987
 - Earth Summit (1992)
 - Agenda 21 (1992)
 - Convention on Biological Diversity (1992)
 - ICPD Programme of Action (1994)
 - Earth Charter
 - Millennium Declaration (2000)
 - Millennium Ecosystem Assessment (2005)
- Politics of global warming
 - Climate change policy of the United States
 - Climate change in China

Population control

- Birth control
- Family planning
- Human overpopulation
- Unintended pregnancy
- Zero population growth

Environmental technology

- Renewable energy
 - Bio fuel
 - Biomass
 - Geothermal power
 - Hydroelectricity
 - Solar energy
 - Tidal power
 - Wave power
 - Wind power

Energy conservation

- Carbon footprint
- Emissions trading
- Energy descent

- Peak oil
- Renewable energy

Over consumption

- Anti-consumerism
- Ecological footprint
- Ethical consumerism
- Tragedy of the commons

Food

- Food security
- Local food
- Permaculture
- Sustainable agriculture
- Sustainable fisheries
- Urban horticulture

Water

- Water footprint
- Water crisis
- Water efficiency
- Water conservation

Materials

- Industrial ecology
- Recycling
- Waste
- Zero waste

Sustainability organizations

- Association of Environmental Professionals
- International Society of Sustainability Professionals
- Sustainability Management Association

Components of sustainable development

The sustainable development of society refers to three major components of human existence: **economical, ecological and human**. The first component is essential, in the sense that the aim of social and economical activity is to satisfy human needs or desires, resulting for the three dimensions of human existence: biological (present in the interactions with the physical, natural environment), social/collective/collective (as a member of some social groups), rational/psychological/spiritual (induced by internal traits, particular to one human being). The relation between economical growth and the protection of the environment is an essential problem in the approaching sustainable development because the approach of economical growth not only by GDP, without trying a quantification of medium and long term advantages, resulting from environmental protection is only a basic form, unacceptable in sustainable development analysis. The human component in sustainable development has a major role, because the concept of equity incorporates several forms of manifestation in regards of sustainable evolution of human society.

1. Economic component

Economic development desired to produce a maximum flow of income in terms of rational use, resource efficiency, particularly scarce resources. As a manifestation of macroeconomic dynamics, economic development requires a set of quantitative transformations, structure and quality, both in economic and in scientific research and manufacturing technologies in organizational structures and mechanisms of economic functioning in thinking and people's behavior (Becker, 2001). In this approach, the main concern is related to how countries develop their economies. It is shown that rapid economic growth with obtaining maximum benefits, especially for developing countries, creates a heavy burden on the ability of the planet to support. From the perspective of sustainable development, economic growth should be such that negative environmental impact is limited. The concept of sustainable development represents a paradigm shift in this area - sustainability is not just about pivita environmental protection but is discussed in the context of connection with other areas, especially those involving economic activity (Krajnc & Glavic, 2005). Therefore, **development must be conceived as a process multidimensional, involving major changes in social structures, attitudes popular and national institutions, aiming at accelerating economic growth, reducing inequality and poverty eradication.** On the one hand, the economic dimension aims to ensure a balanced and sustainable economic environment by producing goods and services continuously to maintain manageable levels of government and external debt and avoid extreme sectoral imbalances affecting agriculture and production industrial, and in order to achieve needed training a competitive industry, diversification of industrial production and attracting investment. On the other hand, the economic dimension of the strategy is strangled by other countries that fail to recover from the economic crisis, putting its future difficulty. Moreover, the common objectives, they must reach a certain level joint and above this impediment can change the results (Stefanescu et al., 2009). These issues need to be resolved in a manner that inspires even if the problems are difficult, however, to have full exhalation solutions. Instruments that lead to economic purpose is achieved education, scientific and intellectual potential that is available, the target technology and natural resources, thereby triggering role in economic activity, which in turn helps in achieving the ultimate goal of the strategy.

2. Ecological component

Environment development can be defined as the ability to hold whiles the three basic functions of the environment: the power function of resources, waste receptor function and the direct utility (Wardle & Giller, 1996). By its complexity, ecological component of sustainable development captures not only the actual economic development in relation to the environment, but the entire development. **Ecological development is closely correlated growth and interrelation with environmental laws, the ecological balance.** Wheeler (2004) says that currently witnessing a transition from an economic perspective toward an environmental perspective. This dimension is oriented towards satisfying specific practical requirements, and long, proposing harmony and complexity, excluding unilateral orientation to a branch or another of the industry. In other words, in an area environmental development is the capacity to grow and to bring the environment and its peculiarities, while ensuring the protection and renewal of natural resources and environmental heritage. **Environmental**

protection is considering physical and biological system stability, developing their capacity to adapt to change and less conservation status considered ideal (Bran, 1991). Assuming a complex structure, diversified term eco-development is characterized by greater capacity according to the requirements of a stage and some major goals. It requires caution in ecologically; stimulates the development of knowledge based on consumption, but subordinate planning opportunities; expected a harmonious development, cautious, in full agreement with the possibilities at a time and in a particular place. Thus, economic growth should not affect the environment in order to talk about sustainable development. International organizations have proposed environmental policy, but there are a lot of people who do not like the actions targeting the environment, on the issue as a political commonplace. As said above ecological development is an objective of developing countries that stretches over a long period.

3. Human component

Assuming that viable alternatives have been identified to maintain ecological balance, and authorities everywhere so converting raw materials purchasing in material goods to be made in accordance with the requirements for efficiency and optimality, quality of life and labor standards is the prerequisite fulfillment and satisfaction professional, social or otherwise. Human sustainability has regard to social interactions, relationships, behavioral patterns and values of humanity (Dempsey et al., 2011). Human component aimed at socio-cultural stability, achieve fairness both at the same time a generation is concerned maintaining cultural diversity "world village", as the prevention or cure of "social ills" of contemporaneity: loneliness or alienation, lack of job satisfaction (continue under a narrowing of specialization on the basis of "knowing more and more about less and less" that difficult for the worker to perceive the finished product and understand the usefulness of his work), the relativism of values, the end of history, uncertainties about the nearer future or more distant "disease" postmodern age specific. Realizing the need for further social development (without harming the environment) is imperative to protect and improve the state of the environment represents the only possibility to create and maintain the welfare of both the present generation and those to come, this balance was the factor that can and should ensure development company whole. Minica and France (2008) synthesize the human aspect of sustainable development worldwide involves the following objectives:

- Promotion of education, training and public support for the environment.
- Protecting and promoting human health (focused on access to medical facilities, especially in rural areas, control of infectious diseases, risks pollution and ecological risk).
- Fight against poverty (through access of the poor to sustainable livelihoods, promoting human development and integrated policy investment in human capital).
- Demographic threatening sustainable development (focusing on population growth, especially in developing countries).

Limitations of sustainable development

Sustainable development has been defined by political and corporate leaders as the combination of environmental protection and economic growth. As a result, the concept of eco-efficiency has been promoted as the primary tool for achieving industrial sustainability.

However, **there are at least four reasons why technological improvements in eco-efficiency alone will be insufficient to bring about a transition to sustainability.**

First, considering that the very foundations of western industrial societies are based on the exploitation of non-renewable minerals and fuels, it will be extremely difficult to switch to an industrial and economic system based solely on renewable resources. Clearly, the continuing use of non-renewables is inherently unsustainable because of finite material supplies and the fact that 100% recycling is impossible.

Second, given the limited supply of non-renewable fuels, long-term sustainability can only be guaranteed if all energy is derived directly or indirectly from the sun. However, if the current U.S. energy demand would have to be supplied solely from solar sources, a wide range of serious and unavoidable negative environmental impacts are likely to result.

Third, even the best of human ingenuity and the greatest technological optimism are bounded by the second law of thermodynamics, which dictates that all industrial and economic activities have unavoidable negative environmental consequences.

Finally, improvements in eco-efficiency alone will not guarantee a reduction in the total environmental impact if economic growth is allowed to continue. Unless growth in both population and consumption is restrained, these technological improvements only delay the onset of negative consequences that, as a result, will have increased in severity, thereby reducing our freedom to choose satisfying solutions.

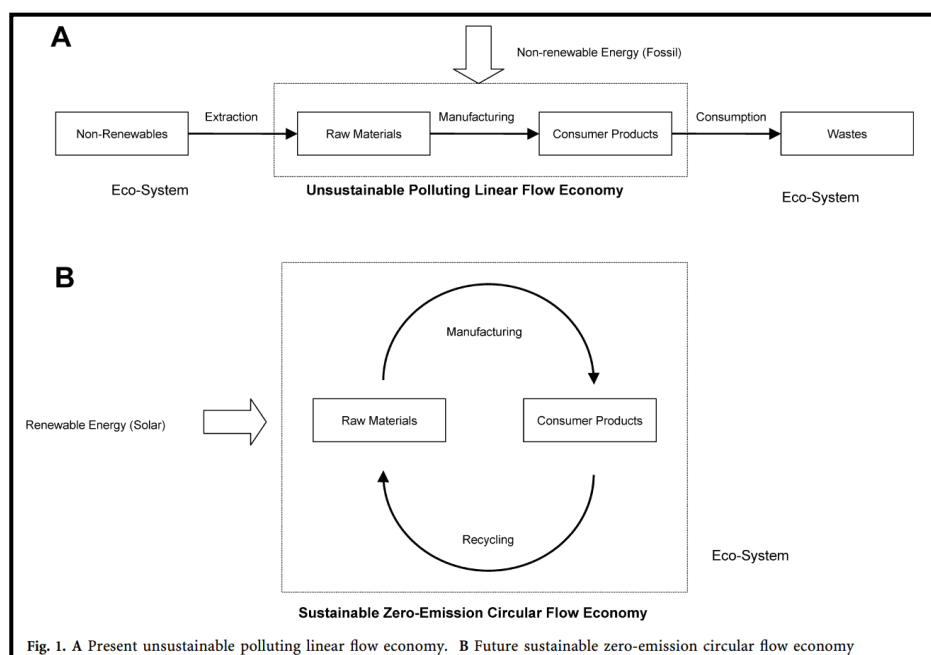


Fig. 1. A Present unsustainable polluting linear flow economy. B Future sustainable zero-emission circular flow economy