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Sustainable development of economy

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Abstract

Sustainable development is an organising principle that aims to meet human development goals while also enabling natural systems to provide necessary natural resources and ecosystem services to humans. The term sustainable development comes from the word sustainable, which refers to the state of being sustainable. The end goal is to create a society in which living circumstances and resources can satisfactorily fulfil human needs without jeopardising the integrity of the natural system or its capacity for stability on the planet. The Brundtland Report, which was published in 1987, provided the definition of sustainable development as follows: development that satisfies the demands of the current generation without compromising the capacity of future generations to satisfy their own needs. In today's world, the idea of sustainable development places an emphasis not only on economic growth and social development but also on the conservation of the environment for future generations. The Rio Process, which was the first formal attempt to institutionalise sustainable development, was launched during the Earth Summit that was held in Rio de Janeiro in 1992. The United Nations General Assembly (UNGA) established the Sustainable Development Objectives (2015 to 2030) in 2015 and outlined how the goals are linked and indivisible to achieve sustainable development on a global basis. These goals were set to run from 2015 to 2030. The United Nations General Assembly has set a number of objectives to address global issues such as poverty, inequality, climate change, the destruction of the environment, as well as justice and peace.

Keywords: Sustainability, economic growth, resource efficiency, circular economy, green economy, renewable energy

Introduction

The normative idea of sustainability is intricately connected to the process of sustainable development. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) made the following distinction between the two ideas: Sustainability is often thought of as a long-term goal (i.e. a more sustainable world), while sustainable development refers to the many processes and pathways to achieve it. There are many different angles from which one might attack the idea of sustainable development. Others are dissatisfied with the level of progress that has been made up to this point, which is seen as contradictory by some (Or as an oxymoron by others), who believe that development is necessarily incompatible with sustainability. The term development does not have a single, agreed-upon definition, which contributes to the difficulty.

Definition

In 1987, the United Nations World Commission on Environment and Development released the report *Our Common Future*, commonly called the Brundtland Report. “The report included a definition of sustainable development which is now widely used:

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

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- The notion of needs, in particular, the vital requirements of the world's poor, which should be given top priority; and the concept of the restrictions imposed by the level of technology and social structure on the environment's capacity to satisfy existing and future needs.

Sustainability

The capacity of humans to live together in peace and harmony on Earth for an extended period of time is related to the concept of sustainability, which is a goal of society. It is difficult to come to a consensus on a certain meaning of this phrase, which also changes depending on the literature, the setting, and the period of time. Environmental, economic, and social sustainability are the three facets, or pillars, that are often discussed in relation to the concept of sustainability. According to a great number of publications, the environmental aspect is the one that matters the most. As a result of this, the concept of sustainability in day-to-day usage is often centred on the fight against significant environmental issues such as climate change, the loss of biodiversity, the loss of ecosystem services, land degradation, as well as air and water pollution. The idea of sustainability may serve as a compass to direct decision-making on all scales, including the global, the national, and the individual levels (e.g. sustainable living).

Development of the concept

The concepts of sustainable forest management were created in Europe in the 17th and 18th centuries, and they are the ideals that serve as the foundation for sustainable development. In his essay titled *Sylva*, written in 1662, John Evelyn argued that sowing and planting of trees had to be regarded as a national duty of every landowner in order to stop the destructive over-exploitation of natural resources. This was in response to the growing awareness of the depletion of timber resources in England. In the year 1713, Hans Carl von Carlowitz, a senior mining administrator working for Elector Frederick Augustus I of Saxony, produced *Sylvicultura economica*, a study on forestry that was four hundred pages long. Von Carlowitz is credited with developing the notion of managing trees for continuous output. This theory was built upon the work of Evelyn and the French statesman Jean-Baptiste Colbert. Others, such as Alexander von Humboldt and Georg Ludwig Hartig, were affected by his work, which ultimately led to the establishment of the science of forestry. Gifford Pinchot, the first head of the United States Forest Service, whose approach to forest management was driven by the idea of wise use of resources, and Aldo Leopold, whose land ethic was influential in the development of the environmental movement in the 1960s, were both influenced as a result of this. Pinchot was the first head of the US Forest Service, and Leopold was influential in the development of the environmental movement.

The book *Silent Spring*, written by Rachel Carson and first released in 1962, was largely responsible for bringing awareness to the emerging environmental movement, which focused on the connection between economic development and environmental deterioration. Kenneth E. Boulding, in his seminal essay titled *The Economics of the Coming*

Spaceship Earth, published in 1966, identified the need for the economic system to fit itself into the ecological system with its limited pools of resources". Boulding's essay had a significant impact on the field of economics. Another important step forward was taken when, in 1968, Garrett Hardin published an essay that popularised the phrase tragedy of the commons. In 1972, the Club of Rome published its seminal report on the Limits to Growth, which was written by a group of scientists led by Dennis and Donella Meadows of the Massachusetts Institute of Technology. This report is considered to be one of the first instances in which the term sustainable was used in the contemporary sense. "The authors wrote the following when attempting to describe the ideal state of global equilibrium: We are searching for a model output that represents a world system that is sustainable without sudden and uncontrolled collapse and capable of satisfying the basic material requirements of all of its people. Additionally, in that same year, the seminal book *A Blueprint for Survival* was made available to the public.

In 1975, a study group at MIT prepared ten days of hearings on Growth and Its Implication for the Future for the United States Congress. These hearings were the very first hearings ever conducted on the topic of sustainable development.

In 1980, the International Union for the Conservation of Nature produced a world conservation plan that used the phrase sustainable development and featured one of the first references to sustainable development as a worldwide priority. This reference was included in the strategy. Two years later, in 1993, the United Nations adopted the World Charter for Nature, which outlined five conservation principles that should be used to govern and evaluate human actions that have an impact on the natural world.

Since the publication of the Brundtland Report, the idea of sustainable development has evolved to the point that it no longer focuses primarily on an intergenerational framework but rather on the overarching objective of socially inclusive and ecologically sustainable economic growth. The United Nations Conference on Environment and Development released the Earth Charter in 1992. This document defines the steps that need to be taken in order to create a global society that is equitable, sustainable, and peaceful in the 21st century. To assist nations in achieving development that acknowledges these interconnected pillars, the action plan Agenda 21 for sustainable development recognised information, integration, and participation as important building blocks that may help countries achieve sustainable development. In addition, the concept of widespread public involvement in decision-making is emphasised throughout Agenda 21 as an essential component that must exist before sustainable development can be achieved. The world finally came to an agreement on a path toward sustainability as a result of the Rio Protocol, which was a significant step forward. In point of fact, ignoring specific objectives and practical particulars was what made reaching a worldwide agreement possible. In contrast to the outcomes of the Rio Process, the Sustainable Development Goals (SDGs) do not include any mechanisms for the implementation of penalties, despite the fact that they now include specific goals.

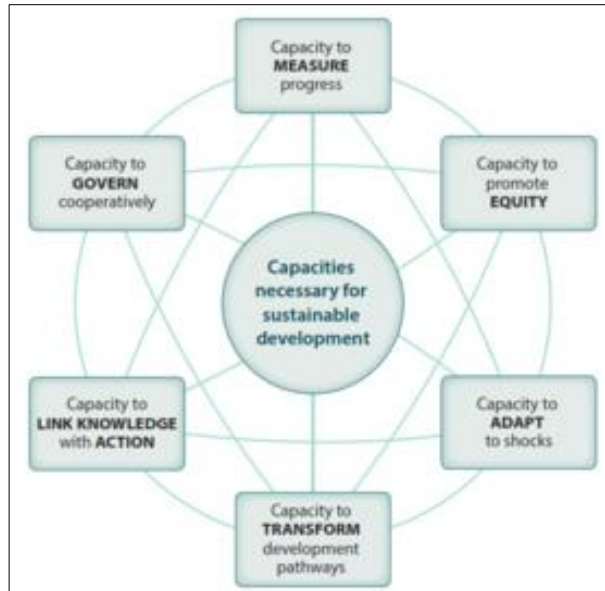


Fig 1: Sustainable development requires six central capacities

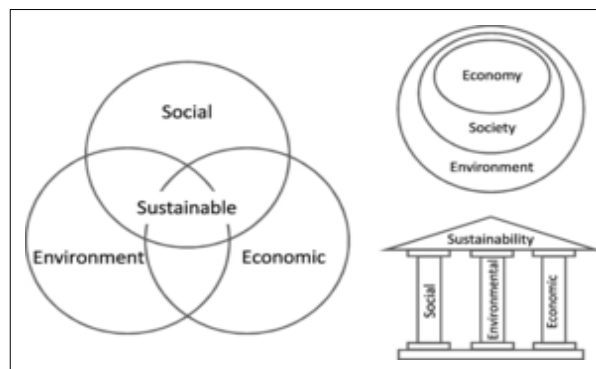


Fig 2: Several visual representations of sustainability and its three dimensions: the left image shows sustainability as three intersecting circles. In the top right it is a nested approach. In the bottom right it is three pillars. The schematic with the nested ellipses emphasizes a hierarchy of the dimensions, putting environment as the foundation for the other two”.

Environmental characteristics of sustainable cities

A sustainable city is an urban centre that reduces the negative effects it has on the surrounding natural environment via the use of urban planning and management. Imagine a city that has more parks and green areas, buildings that are powered by solar energy, rooftop gardens, and people who walk and ride bicycles rather than drive automobiles. This is the concept of an eco-city. This is not a

fantasy about the distant future. Cities that use artificial intelligence are making concerted efforts to create greener urban ecosystems and improve their environmental management.

Further information: Human impact on the environment and Ecological footprint



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

The concept of environmental sustainability refers to the natural environment and the ways in which it survives while also maintaining its diversity and capacity for production. Because natural resources are obtained from the surrounding environment, the quality of the air, water, and climate are issues that need special attention. “The only way for society to achieve environmental sustainability is to devise activities that are able to satisfy human needs while also protecting the life-supporting systems of the planet. For instance, this involves the sustainable use of water, as well as the use of renewable energy and sustainable material suppliers (e.g. harvesting wood from forests at a rate that maintains the biomass and biodiversity).

When natural capital—the sum of the earth's resources—is depleted at a rate greater than it can be renewed, the result is a state that cannot be maintained indefinitely.

In order for human activities to be considered sustainable, the pace at which natural resources are depleted must never exceed the rate at which they can be naturally restored. The idea of a population's carrying capacity is intricately connected to the notion of sustainable development. In the long run, the deterioration of the environment should lead to conditions that are inhospitable to human existence, according to the theory.

Herman Daly published three important operational principles of sustainable development in the year 1990: renewable resources should provide a sustainable yield (the rate of harvest should not exceed the rate of regeneration); for non-renewable resources, there should be equivalent development of renewable substitutes; and the amount of waste generated should not exceed the capacity of the environment to assimilate it.

Table 1: Summary of different levels of consumption of natural resources.

Consumption of natural resources	State of the environment	State of 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

Land use changes, agriculture and food

Further information: Environmental impact of agriculture

Approaches such as sustainable agriculture, organic farming, and business methods that are more environmentally friendly are currently being used in order to combat the environmental issues that are caused by industrial agriculture and agribusiness. Afforestation, sustainable forest management, and a reduction in deforestation are some of the climate change mitigation strategies that are most likely to be cost-effective. At the local level, there are a variety of movements aiming towards

sustainable food systems. Some of these initiatives include reducing the amount of meat that is consumed, increasing the production of food locally, slow food, sustainable gardening, and organic gardening. The impacts on the ecosystem of various dietary patterns are dependent on a wide variety of variables, one of which is the ratio of plant-based to animal-based meals ingested in addition to the mode of food production.

Materials and waste

Further information: Cradle-to-cradle.

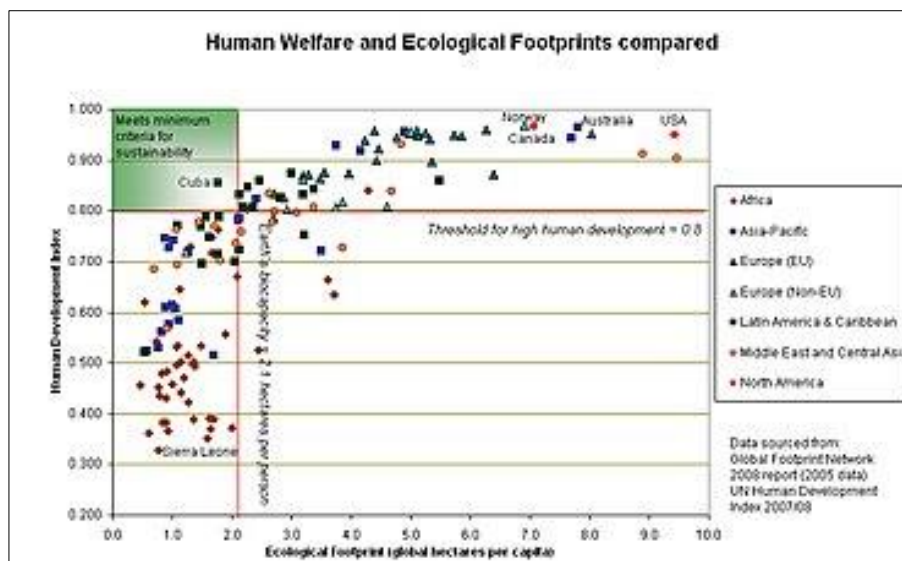


Fig 3: Relationship between ecological footprint and Human Development Index (HDI)



Fig 4: Before flue-gas desulfurization was installed, the air-polluting emissions from this power plant in New Mexico contained excessive amounts of sulfur dioxide.

As both the population and the standard of living of people throughout the world has risen, so too has the need for a wide variety of materials in terms of volume, variety, and distance conveyed. Raw materials, minerals, synthetic compounds (including dangerous substances), manufactured items, food, live beings, and garbage are all considered to fall under this category. Unless the pace of economic development is decoupled from the rate of natural resource consumption, mankind may use an estimated 140 billion tonnes of minerals, ores, fossil fuels, and biomass per year by the year 2050". This would be three times the amount consumed annually at the present time. The population of developed nations use up an annual average of 16 tonnes of these four essential resources per capita, with some developed countries using up 40 tonnes or more per person, which is much above the amount of resource consumption that is likely to be sustainable. To put it in perspective, the consumption level of an average individual in India now is four tonnes per year.

The concept of dematerialization, which aims to convert the traditional linear flow of materials (extraction, use, and disposal in landfills) into a circular flow of materials that reuses materials as much as possible, is at the heart of the sustainable use of materials. This concept is analogous to

the recycling and reuse of waste that occurs in nature. The concepts of industrial ecology, eco design, and ecolabelling are helping to spread awareness about the benefits of dematerialization. This way of thinking is expressed in the concept of circular economy, which utilises reuse, sharing, repair, refurbishment, remanufacturing, and recycling to create a closed-loop system, thereby minimising the use of resource inputs as well as the creation of waste, pollution, and carbon emissions. "In other words, it reduces the amount of resource inputs needed while simultaneously reducing the amount of waste, pollution, and carbon emissions. Building electric cars has become one of the most popular methods to contribute to sustainable development. This is due to the fact that there is a possibility for utilising reusable energy and minimising trash, both of which give a viewpoint on sustainable development. In the year 2020, the European Commission has proposed an ambitious plan for the circular economy that intends to make environmentally friendly goods the standard across the European Union.

Biodiversity and ecosystem services

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services released in 2019 a summary of the broadest and most thorough research done to date on biodiversity and ecosystem services geared for policymakers. This study was conducted in 2018. It was advised that human society would need to undergo a radical transition in order to survive, and this shift should include sustainable agriculture, reductions in consumption and waste, fishing limits, and collaborative water management. The Intergovernmental Panel on Climate Change (IPCC) report for 2022 places an emphasis on the many studies that have been conducted on the loss of biodiversity and proposes new solutions to slow the pace at which our biodiversity is disappearing. The destruction of natural ecosystems, properly managing fire and soil, and limiting the amount of competition for land may have a good effect on our planet's overall health and help to the process of sustainable development.



Fig 5: A sewage treatment plant that uses solar energy, located at Santuaride Lluç monastery, Majorca.

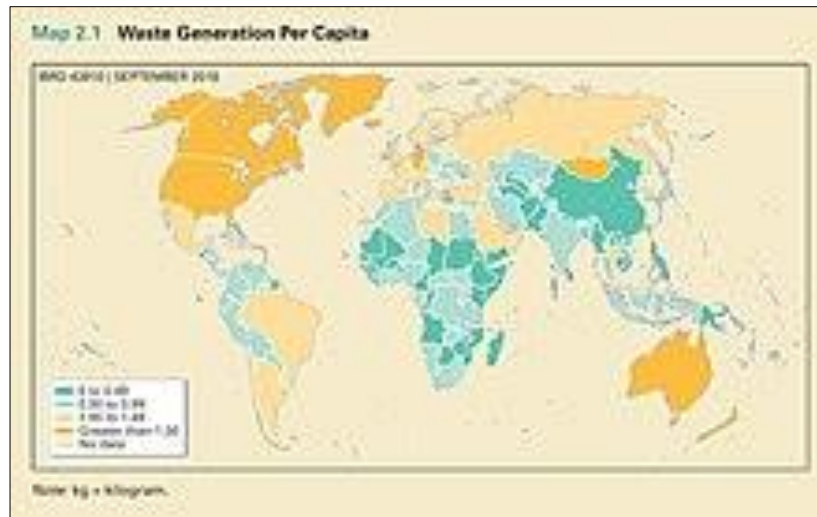


Fig 6: Waste generation, measured in kilograms per person per day

Management of human consumption and impacts

Further information: Consumption (economics), Overconsumption, and Micro-sustainability. The environmental impact of a community or of humankind as a whole is dependent not only on population but also on impact per person. This, in turn, is dependent in a complex manner on the resources that are being used, whether or not those resources are renewable, and the scale of the human activity in comparison to the carrying capacity of the ecosystems that are being impacted. At many different sizes, including economic sectors such as agriculture, manufacturing, and industry, as well as work organisations, the consumption patterns of families and people, and the resource needs of specific products and services, careful resource management may be employed.

Consumption by humans is the primary factor that contributes to direct environmental consequences caused by humans. This effect may be lessened not just by cutting down on consumption, but also by making the whole manufacturing, usage, and disposal process more environmentally friendly. Consumption of goods and services can be analysed and managed at all scales through the chain of consumption, beginning with the effects of individual lifestyle choices and spending patterns and progressing all the way up to the resource demands of particular goods and services, the impacts of economic sectors, national economies, and the global economy. This chain of consumption starts at the individual level and works its way up. Food, energy, raw materials, and water are some of the most important types of resources that relate to human requirements.

Improving on economic and social aspects

Further information: Corporate sustainability and Sustainable business

It has been proposed that because of rural poverty and overexploitation, natural resources should be regarded as significant economic assets and given the name natural capital. Historically speaking, expansion of the gross domestic product has been a prerequisite for economic progress. It's possible that this concept of endless personal and economic prosperity is coming to an end. The quality of life for many people may increase as a result of sustainable development, but this may be contingent on a reduction in the amount of resources that are used. In most cases, the

direct influence that the environment may have on social welfare is disregarded when referring to growth, while development takes this into consideration.

A sustainable economy is one that is in balance with fundamental natural support systems, and the term sustainability was first used to characterise such an economy in the 1970s".

Scientists working in a wide variety of disciplines have brought attention to *The Limits to Growth*, and economists have proposed various solutions, such as a steady-state economy, in order to address concerns over the effects that rising human progress may have on the planet. Edward Barbier, an American economist, acknowledged in his study titled. "The Concept of Sustainable Economic Development, which was published in 1987, that the goals of environmental preservation and economic development do not compete with one another and can actually be mutually supportive of one another.

Based on the theory of genuine savings, which is defined as traditional net savings less the value of resource depletion and environmental degradation plus the value of investment in human capital, a study that was conducted by the World Bank in 1999 came to the conclusion that policymakers have many possible interventions at their disposal to increase sustainability, whether in the realm of macroeconomics or purely environmental concerns.

According to the findings of a number of studies, effective policies on pollution and renewable sources of energy are compatible with rising levels of human wellbeing and will ultimately arrive at a golden-rule steady state.

In 2002, an examination of environmental and economic values was the subject of a meta-review, and the researchers concluded that there was a lack of specific knowledge of what sustainability policies may imply in reality.

According to the findings of a research that was completed in 2007, the loss of natural capital in many regions of the globe has not been compensated for by increases in knowledge, manufacturing, or human capital (such as health and education).

It has been proposed that intergenerational fairness may be included into both the process of decision making and the creation of sustainable practises, similar to how economic values of climate economics have become commonplace.

The ambitious climate change mitigation strategies that have caused severe social and economic repercussions when they

are not matched with the aims of sustainable development were examined in the IPCC Sixth Assessment Report that was published in 2022. As a consequence of this, the process of shifting toward mitigation policies for sustainable development has slowed down. As a result, the inclusiveness and considerations of justice of these policies may either weaken or support improvements on certain regions. This is because there are other limiting factors such as poverty, food insecurity, and water scarcity that may impede the application of policies by governments that aim to build a low carbon future. These policies aim to build a future in which there is less carbon dioxide in the atmosphere.

Vision 2050 was a that was issued in 2021 by the World Business Council for Sustainable Development with the purpose of demonstrating How business can lead the transitions the world needs. In the vision, it is said that we envisage a future in which 9 billion people or more may live well, within the constraints of the earth, by the year 2050. This study was recognised by The Guardian as the greatest coordinated corporate sustainability action plan to date. The strategy addresses issues such as restoring the harm done to ecosystems, tackling growing greenhouse gas emissions, and ensuring societies progress toward sustainable agriculture.

Gender and Leadership in sustainable development

The relationship between gender and sustainable development has been investigated, with a particular emphasis placed on the leadership potential of women and the obstacles in their way. Patriarchal systems and views continue to prevent women from rising to positions of power, despite the fact that leadership roles in sustainable development have grown less gendered over time and more gender-neutral. Women's lack of self-confidence is one of the underlying concerns that impedes their access to leadership posts; yet, males have the capacity to play a role as advocates for women in leadership roles.

Conclusion

The end objective of sustainable development is to fulfil the needs of human progress while also protecting the natural environment. The normative notion of sustainability is intricately intertwined with the practice of sustainable development, which may be defined as growth that satisfies the requirements of the current generation without sacrificing the potential of future generations to fulfil their own requirements. The goal of sustainable development is to combat significant environmental issues such as climate change, the loss of biodiversity, the loss of ecosystem services, land degradation, and air and water pollution. Sustainable development also focuses on restoring and protecting ecosystems. The intergenerational framework that served as the foundation for sustainable development is no longer the primary emphasis of the idea of sustainable development, which has shifted its attention to the objective of socially inclusive and ecologically sustainable economic growth. The idea of carrying capacity is intricately connected to the notion of sustainability, which mandates that human activities only consume the resources provided by nature at a pace that is compatible with their inherent potential for regeneration.

Less use of meat, more production of food locally, slower food, sustainable gardening, and organic gardening are all components of sustainable food systems. In order to

generate a closed-loop system and cut down on the amount of resources that are put into it, the practises of industrial ecology, eco design, and Eco labelling are advocated". The Intergovernmental Panel on Climate Change (IPCC) report for 2022 says that minimising competition for land, managing fire and soil, and protecting natural ecosystems may all have a beneficial influence on our environment and help contribute to sustainable development. The idea of Sustainable Economic Growth, which was proposed by Edward Barbier, implies that the aims of environmental protection and economic development may be able to mutually reinforce one another. The relationship between gender and leadership in sustainable development has been investigated, with a particular emphasis placed on the leadership potential of women and the obstacles that stand in their way.

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