

SUSTAINIBILITY

- ❖ Sustainability is ability to maintain or support a process over time or it is a social goal for people to co-exist on Earth over a long time.
- ❖ Sustainability is often broken into three core concepts: economic, environmental, and social.
 - **Environmental sustainability** occurs when humanity's rate of consumption does not exceed nature's rate of replenishment and when humanity's rate of generating pollution and emitting greenhouse gases does not exceed nature's rate of restoration.
 - **Social sustainability** is the ability of a society to uphold universal human rights and meet people's basic needs, such as healthcare, education, and transportation. Healthy communities ensure personal, labour, and cultural rights are respected and all people are protected from discrimination.
 - **Economical sustainability** is the ability of human communities around the world to maintain their independence and have access to the resources required to meet their needs, meaning that secure sources of livelihood are available to everyone.
- ❖ **UNESCO** distinguishes the two like this: "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.

RISING OF THE CONCEPT SUSTAINIBILITY

The 1983 UN Commission on Environment and Development (Brundtland Commission) had a big influence on how we use the term sustainability today. The commission's report, *Our Common Future*, defines it as "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The report helped bring sustainability into the mainstream of policy discussions. It also popularized the concept of sustainable development.

BRUNDTLAND COMMISSION REPORT

- The Brundtland Commission, formerly the World Commission on Environment and Development (WCED), was a sub-organization of the United Nations (UN) that aimed to unite countries in pursuit of sustainable development.
- It was founded in 1983
- Publication released in 1987 by the World Commission on Environment and Development (WCED)
- Sponsored by the United Nations (UN)
- Chaired by Norwegian Prime Minister Gro Harlem Brundtland.

The Brundtland Commission's mandate was to:

"[1] re-examine the critical issues of environment and development and to formulate innovative, concrete, and realistic action proposals to deal with them;

[2] strengthen international cooperation on environment and development and assess and propose new forms of cooperation that can break out of existing patterns and influence policies and events in the direction of needed change;

[3] raise the level of understanding and commitment to action on the part of individuals, voluntary organizations, businesses, institutes, and governments"

The Brundtland Report

- The Brundtland Report included chapters covering, among other topics within sustainable development, the role of the international economy, population and human resources, food security, species and ecosystems, energy, industry, and proposed legal principles for environmental protection.
- The Brundtland Report also highlighted global population growth that could not continue indefinitely. It predicted that in the 21st century the world population would stabilize somewhere between 7.7 billion and 14.2 billion people and that more people would live in cities than in rural areas.
- The report noted also that declining birth rates of the industrialized world would translate into a greater burden on the younger generations to support an aging population. For the developing world improved health and education, especially among women, were presented as solutions to the resource and demographic challenges posed by high birth rates.

Rio declaration- Agenda 21

The Rio Declaration on environment and development was approved by the United Nations during the Conference on Environment and Development held in Rio de Janeiro on June 1992. It was aimed at reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on June 1972. It was signed by over 175 countries.

The Declaration adopted a set of principles to guide the future development. These principles define the right of people to development, and their responsibilities to safeguard the common environment.

The 21 agendas are :

~~(WILL BE PROVIDED)~~

- 1) Protection of atmosphere.
- 2) Postpone deforestation.
- 3) Conservation of Bio-diversity.
- 4) Take protection step to protect health.
- 5) Take some step to develop inhabitation.
- 6) Poverty eradication.
- 7) To help developing countries internally or domestically for the purpose of Sustainable development.
- 8) Planning of land resource management.
- 9) Use of bio-technology without destroying environmental balance.
- 10) To protect democracy.
- 11) Development in hilly region.
- 12) Agricultural development through rural development.
- 13) Protection of ocean & marine resources.
- 14) Development of water resource.
- 15) Change the method of human consumption.
- 16) Developing Environmental balance.
- 17) To release toxic waste without making any kind of environmental pollution.
- 18) Stop international migration of chemical waste.
- 19) Safe maintenance of atomic waste.
- 20) Take proper steps to increase draining system.
- 21) Population related Sustainable development.

Sustainable Development Goal

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

In short, the 17 SDGs are:

Goal 1: No Poverty: End poverty in all its forms everywhere.

Goal 2: Zero Hunger: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3: Good Health and Well-being: Ensure healthy lives and promote well-being for all at all ages.

Goal 4: Quality Education: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5: Gender Equality: Achieve gender equality and empower all women and girls.

Goal 6: Clean Water and Sanitation: Ensure availability and sustainable management of water and sanitation for all.

Goal 7: Affordable and Clean Energy: Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 8: Decent Work and Economic Growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Goal 9: Industry, Innovation, and Infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

Goal 10: Reduced Inequality: Reduce inequality within and among countries.

Goal 11: Sustainable Cities and Communities: Make cities and human settlements inclusive, safe, resilient, and sustainable.

Goal 12: Responsible Consumption and Production: Ensure sustainable consumption and production patterns.

Goal 13: Climate Action: Take urgent action to combat climate change and its impacts.

Goal 14: Life Below Water: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Goal 15: Life on Land: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Goal 16: Peace, Justice, and Strong Institutions: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.

Goal 17: Partnerships to Achieve the Goal: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

SUSTAINABLE DEVELOPMENT INDEX

The Sustainable Development Index (SDI) measures the ecological efficiency of human development, recognizing that development must be achieved within planetary boundaries. It was created to update the Human Development Index (HDI) for the ecological realities of the Anthropocene.

The SDI starts with each nation's human development score (life expectancy, education and income) and divides it by their ecological overshoot: the extent to which consumption-based CO₂ emissions and material footprint exceed fair shares of planetary boundaries. Countries that achieve relatively high human development while remaining within or near planetary boundaries rise to the top.

First three countries are, Finland, Sweden, Denmark (2023) and India in 112th position.

Sustainable Energy

Energy is sustainable if it "meets the needs of the present without compromising the ability of future generations to meet their own needs." Most definitions of sustainable energy include considerations of environmental aspects such as greenhouse gas emissions and social and economic aspects such as energy poverty. Renewable energy sources such as wind, hydroelectric power, solar, and geothermal energy are generally far more sustainable than fossil fuel sources. However, some renewable energy projects, such as the clearing of forests to produce biofuels, can cause severe environmental damage.

The role of non-renewable energy sources in sustainable energy has been controversial. Nuclear power is a low-carbon source whose historic mortality rates are comparable to those of wind and solar, but its sustainability has been debated because of concerns about radioactive waste, nuclear proliferation, and accidents. Switching from coal to natural gas has environmental benefits, including a lower climate impact, but may lead to a delay in switching to more sustainable options. Carbon capture and storage can be built into power plants to remove their carbon dioxide (CO₂) emissions, but this technology is expensive and has rarely been implemented.

Fossil fuels provide 85% of the world's energy consumption, and the energy system is responsible for 76% of global greenhouse gas emissions. Reducing greenhouse gas emissions to levels consistent with the 2015 Paris Agreement will require a system-wide transformation of the way energy is produced, distributed, stored, and consumed. The burning of fossil fuels and biomass is a major contributor to air pollution, which causes an estimated 7 million deaths each year. Therefore, the transition to a low-carbon energy system would have strong co-benefits for human health. Pathways exist to provide universal access to electricity and clean cooking in ways that are compatible with climate goals while bringing major health and economic benefits to developing countries.

Climate change mitigation pathways have been proposed to limit global warming to 2 °C (3.6 °F). These pathways include phasing out coal-fired power plants, producing more electricity from clean sources such as wind and solar, and shifting towards using electricity instead of fossil fuels in sectors such as transport and heating buildings. To accommodate larger shares of variable renewable energy, electrical grids require flexibility through infrastructure such as energy storage. To make deep reductions in emissions, infrastructure and technologies that use energy, such as buildings and transport systems, would need to be changed to use clean forms of energy and also conserve energy. Some critical technologies for eliminating energy-related greenhouse gas emissions are not yet mature.

Sustainable Agriculture

Sustainable agriculture is farming in sustainable ways meeting society's present food and textile needs, without compromising the ability for current or future generations to meet their needs. It can be based on an understanding of ecosystem services. There are many methods to increase the sustainability of agriculture. When developing agriculture within sustainable food systems, it is important to develop flexible business process and farming practices. Agriculture has an enormous environmental footprint, playing a significant role in causing climate change (food systems are responsible for one third of the anthropogenic greenhouse gas emissions), water scarcity, water pollution, land degradation, deforestation and other processes; it is simultaneously causing environmental changes and being impacted by these changes. Sustainable agriculture consists of environment friendly methods of farming that allow the production of crops or livestock without damage to human or natural systems. It involves preventing adverse effects to soil, water, biodiversity, surrounding or downstream resources—as well as to those working or living on the farm or in neighbouring areas. Elements of sustainable agriculture can include permaculture, agroforestry, mixed farming, multiple cropping, and crop rotation.

The term "sustainable agriculture" was defined in 1977 by the USDA (The United States Department of Agriculture) as an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fibre needs
- enhance environmental quality and the natural resource base upon which the agriculture economy depends
- make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- sustain the economic viability of farm operations
- enhance the quality of life for farmers and society as a whole.

Key principles

There are several key principles associated with sustainability in agriculture:

- The incorporation of biological and ecological processes such as nutrient cycling, soil regeneration, and nitrogen fixation into agricultural and food production practices.
- Using decreased amounts of non-renewable and unsustainable inputs, particularly environmentally harmful ones.
- Using the expertise of farmers to both productively work the land as well as to promote the self-reliance and self-sufficiency of farmers.
- Solving agricultural and natural resource problems through the cooperation and collaboration of people with different skills. The problems tackled include pest management and irrigation.