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CE-12101 ENVIRONMENT AND CLIMATE CHANGE

Sustainable Management

INTRODUCTION

Development: the act or process of developing; growth; progress.
Sustainable: Capacity for Continuance/ remain in existence/Endure
Sustainable Development --- the process; **sustainability**--- the goal
Sustainable Development: A new process for human progress
Sustainable Development is a process whereby over time we achieve sustainability.

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

--World Commission on Environment & Development

In 1983, 'United Nations' General assembly established the '**World Commission on Environment and Development (WCED)'**. A team of Scientists from all walks of life, from all over the world were pressed into action to study all aspects of '**Environmental Degradation'** and '**Economic Development'**. The Commission submitted its report in 1987 which was entitled **"Our Common future".** It was in this report that emphasis was laid on **"Sustainable Development"**. The Commission emphasized that it is the pattern of development which humanity has been following, '**The greedy ways of our society'**, are responsible for causing massive degeneration of natural resources and pollution of environment which threaten to destroy the vital life support system on our planet.

The idea of sustainable development is sometimes also viewed as a synthesis of mutually contrasting concepts because development inevitably depletes and degrades the environment. Consequently, some definitions either avoid the word development and use the term sustainability exclusively, or emphasize the environmental component, as in "Environmentally Sustainable Development".

Sustainable development is about integration: developing in a way that benefits the widest possible range of sectors, across borders and even between generations. In other words, our decisions should take into consideration potential impact on **society, the environment and the economy**, while keeping in mind that: our actions will have impacts elsewhere and our actions will have an impact on the future.

"Governments face the complex challenge of finding the right balance between the competing demands on natural and social resources, without sacrificing economic progress."

The Concept of 'Sustainable Development'

1. Concept is new and controversial. Policies are needed to put it into practice.
2. It is a process which enables all people to realize their potential and improve their quality of life in ways that simultaneously protect and enhance the earth's life support systems.
3. Don't cheat on your children
4. No country is yet pursuing a Policy of Sustainable Development [SD].
5. Road to sustainable development varies with each country. Sustainable development for an **Industrialised country**, a **rapidly industrialising country** and a **developing country** are not the same. While some steps are appropriate for all countries, others are more appropriate for countries at specific stages of development.

The concept of sustainable development (SD) can be defined as "Maintenance and sustainable utilization of the functions (goods and services) provided by natural ecosystems and biospheric processes." Conversely, in a situation of unsustainability, where the limits of the biosphere's carrying capacity (CC) are exceeded, not all of the environmental functions can be fully fulfilled anymore. Let us recall some of the concepts and definitions of SD which integrate ecological and economic regimentations.

In ecological terms, the carrying capacity of an ecosystem is the size of the population or community that can be supported indefinitely upon the available resources and services of that ecosystem. Living within the limits of an ecosystem depends on three factors:

- The amount of resources available in the ecosystem;
- The size of the population or community; and
- The amount of resources each individual within the community is consuming.

A community that allows its children to be poorly educated, undernourished, and poorly housed is eroding its **human capital**.

A community that allows the quality of its social interactions to decline through lack of trust, respect, and tolerance is eroding its **social capital**.

A community that allows its **buildings, roads, parks, power facilities, water facilities, and waste processing capability** to decay is eroding its **built capital**. Additionally, a community that is creating built capital without considering the future maintenance of that capital is setting itself up for eventual decay.

Principles of Sustainable Development:
The Rio Declaration on Environment and Development (Rio de Janeiro from 3 to 14 June 1992) fleshes out the definition by listing 18 principles of sustainability:

1. People are entitled to a **healthy and productive life** in **harmony with nature**.
2. Development today must not undermine the development and environment needs of **present and future generations**.
3. Nations have the sovereign right to **exploit their own resources** but without causing environmental damage **beyond their borders**.
4. Nations shall develop **international laws** to provide **compensation** for damage that activities under their control cause to areas **beyond their borders.**
5. Nations shall use the **precautionary approach** to protect the environment. Where there are **threats of serious or irreversible damage**, scientific uncertainty shall not be used to postpone cost-effective measures to prevent environmental degradation.
6. In order to achieve sustainable development, **Environmental protection** shall constitute an integral part of the development process and cannot be considered in isolation from it.
7. **Eradicating poverty and reducing disparities** in living standards in different parts of the world are essential to achieve sustainable development and to meet the needs of the majority of people.
8. Nations shall cooperate to **conserve, protect and restore the health** and integrity of the Earth's ecosystem. The developed countries acknowledge the responsibility of sustainable development.
9. Nations should **reduce and eliminate unsustainable patterns of production and consumption** and promote appropriate demographic policies.
10. Environmental issues are best handled with the participation of all concerned citizens. Nations shall facilitate and encourage **public awareness and participation** by making environmental information widely available.
11. Nations shall enact effective **environmental laws and develop national law** regarding liability for the victims of **pollution and other environmental damages**. Where they have authority, nations shall assess the **environmental impact of proposed activities** that are likely to have a significant adverse impact.
12. Nations should cooperate to promote an open international economic system that will lead to economic growth and sustainable development in all countries. Environmental policies should not be used as an unjustifiable means of restricting international trade.
13. The **polluter should, in principle, bear the cost of pollution**.
14. Nations shall warn one another of **natural disasters or activities** that may have harmful trans boundary impacts.
15. Sustainable development requires better scientific understanding of the problems. Nations should **share knowledge and innovative technologies** to achieve the goal of sustainability.
16. The **full participation of women** is essential to achieve sustainable development. The creativity, ideals and courage of youth and the knowledge of indigenous people are needed too. Nations should recognize and support the identity, culture and interests of indigenous people.

17. Warfare is inherently destructive of sustainable development**. Nations shall respect international laws protecting the environment in times of armed conflict** and shall cooperate in their further establishment.
18. **Peace, development and environmental protection** are interdependent and indivisible.

Parameters of Sustainable Development:
The goal of sustainable development is an outcome achieved through joint effort among several inter-related parameters and requiring coordination at both vertical and horizontal levels. There exists dynamic triangular relationship among three keys viz., **Environmental, Economic and Social parameters**. The people centred at social parameter forms the broad base of triangle as **active public participation** holds an instrumental role. The interrelationship between population, environment and development is complex. Besides key factors, efficient manpower capacity building, institutional strengthening, including strong political will and effective implementation/monitoring mechanism play equally important role for successful outcome of sustainable development.

Following parameters may be considered:

1. Environmental Sustainability:
Environmental sustainability relates with maintenance of carrying capacity of natural resource base and life support systems. This emphasizes on area of **conservation of biodiversity** hot spots, **increase in forest cover**, **watershed protection** and **adoption of holistic approach**. Equally important are reduction of **environmental threats**, **environmental pollution** and using environment **friendly clean and green technologies** to mitigate local to global level environmental problems such as **biodiversity loss, climate change** from an inter-generational equity perspective.

2. Economic Sustainability:
Economic sustainability provides important energy source like a battery to secure environmental and social sustainability. This emphasizes on promotion of economic self-sustenance of development projects through measures like **adequate budgeting**, **budget transparency** and **financial incentive**. The focus area includes; **alleviation of poverty**, **increase in per capita income**, **promotion of income generating activities** including off farm **employment** and green microenterprises, establishment of mechanism of **fair sharing of benefit** and natural resource accounting.

3. Social sustainability:
Focuses on upgrading human environmental quality of life with fulfilment of basic needs and transforming man from most dangerous animal to most important creative resource. It emphasizes local communities to be well informed on sustainable ways of **Resource Utilization**. It ensures active **public participation** at various level of development activity, **Collaborative efforts** in conservation and development activities, **Improvement in public health**, **education** and **basic need**, reduction of **conflict among stakeholders on resource use**. This will be derived through

upgrading public environmental awareness, enhanced **gender equity** and **self-confidence among local community** with an emphasis on economically disadvantaged/marginalized groups,

4. Institutional Sustainability:
Plans and programmes without action represent futile exercise. **Strict implementation** and **monitoring of relevant environmental policies**, **plans, laws, regulations and standards** is indispensable to attain the goal of sustainable development. There should be **adequate skilled and motivated manpower and strong institutional capacity** to address environmental and social sustainability.

Focus area lies to achieve environmental quality of life such as reduced air, water, soil, noise pollution to accepted level of international standard and public confidence to get involved in environmental conservation activities. Institutional strengthening of project management should be efficient to deal with environmental problems having local, national, regional to global level significance and including legally binding world conventions and treaties.

Need of Sustainable Development for Improving Quality of Life for the Present and Future:
Today the whole world, particularly the developing countries, faces a near-crisis situation, both economic and environmental. Policy-makers find it difficult to formulate programmes that would work under the present situation of escalating population on the one hand diminishing resources on the other.

The environmental decadence inevitably weakens economy, which, in turn leads to social disintegration. Human history is replete with such instances and the remains of past civilizations in the archaeological sites of the world bear testimony to this.

These civilizations were not able to cope with the pressures of the degraded environments. Kautilya, the wise minister in the court of Chandragupta Maurya, said that "stability on an empire depended on the stability of its environment". The link between environmental and socio-economic degradation cannot be over-looked particularly because, in the past, what took hundreds of years is now getting telescoped into a few decades. Today, very few have the comprehension and the capability to break this vicious circle successfully. In our own country, in the post-independence period, our attitude was dominated by developmental growth and we did not have a culture of pollution control.

Goals for Sustainable Development

Goal-1: No Poverty

- As of 2015, about 736 million people still lived on less than US$1.90 a day; many lack food, clean drinking water and sanitation.

- Rapid growth in countries such as China and India has lifted millions out of poverty, but progress has been uneven.
- Women are more likely to be poor than men because they have less paid work, education, and own less property.
- Half of all people living in poverty are under 18.

Goal 2: Zero Hunger

- The number of undernourished people reached 821 million in 2017.
- More than 1 in 8 adults is obese.

GOAL 3: GOOD HEALTH AND WELL-BEING

- At least 400 million people have no basic healthcare, and 40 percent lack social protection.
- Every 2 seconds someone aged 30 to 70 years dies prematurely from noncommunicable diseases - cardiovascular disease, chronic respiratory disease, diabetes or cancer.
- More than one of every three women have experienced either physical or sexual violence at some point in their life resulting in both short- and long-term consequences for their physical, mental, and sexual and reproductive health.
- 7 million people die every year from exposure to fine particles in polluted air.

GOAL 4: QUALITY EDUCATION

- Enrollment in primary education in developing countries has reached 91 percent.
- Still, 57 million primary-aged children remain out of school, more than half of them in sub-Saharan Africa.
- In developing countries, one in four girls is not in school.

GOAL 5: GENDER EQUALITY

- Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world.
- 35 percent of women have experienced physical and/or sexual violence.
- Women represent just 13 percent of agricultural landholders.
- Almost 750 million women and girls alive today were married before their 18th birthday.
- Women earn only 77 cents for every dollar that men get for the same work.

GOAL 6: CLEAN WATER AND SANITATION

Clean, accessible water for all is an essential part of the world we want to live in.

- 71 percent of the global population, 5.2 billion people, had safely-managed drinking water in 2015, but 844 million people still lacked even basic drinking water.

- 80 percent of wastewater goes into waterways without adequate treatment.
- 80 percent of countries have laid the foundations for integrated water resources management.

GOAL 7: AFFORDABLE AND CLEAN ENERGY
Energy is central to nearly every major challenge and opportunity.
One in 7 people still lacks electricity, and most of them live in rural areas of the developing world.
Energy is the main contributor to climate change, it produces around 60 percent of greenhouse gases.
More than 40 percent of the world's population—3 billion—rely on polluting and unhealthy fuels for cooking.
As of 2015, more than 20 percent of power was generated through renewable sources.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH
Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.

- An estimated 172 million people worldwide were without work in 2018 - an unemployment rate of 5 percent.
- Some 700 million workers lived in extreme or moderate poverty in 2018, with less than US$3.20 per day.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE
Investments in infrastructure are crucial to achieving sustainable development.
2.6 billion people in developing countries do not have access to constant electricity.
More than 4 billion people still do not have access to the Internet; 90 percent of them are in the developing world.
In developing countries, barely 30 percent of agricultural products undergo industrial processing, compared to 98 percent high-income countries.

GOAL 10: REDUCED INEQUALITIES
To reduce inequalities, policies should be universal in principle, paying attention to the needs of disadvantaged and marginalized populations.

- In 2016, 22 percent of global income was received by the top 1 percent compared with 10 percent of income for the bottom 50 percent.
- In 1980, the top one percent had 16 percent of global income. The bottom 50 percent had 8 percent of income.
- Under "business as usual", the top 1 percent global wealth will reach 39 percent by 2050.
- Since 1980, very large transfers of public to private wealth occurred in nearly all countries. The global wealth share of the top 1 percent was 33 percent in 2016.

GOAL 11: SUSTAINABLE CITIES AND COMMUNITIES

There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more.

- In 2018, 4.2 billion people, 55 percent of the world's population, lived in cities. By 2050, the urban population is expected to reach 6.5 billion.
- Cities occupy just 3 percent of the Earth's land but account for 60 to 80 percent of energy consumption and at least 70 percent of carbon emissions.
- 828 million people are estimated to live in slums, and the number is rising.
- The economic role of cities is significant. They generate about 80 percent of the global GDP.

GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION
Responsible Production and Consumption

- 1.3 billion tonnes of food is wasted every year, while almost 2 billion people go hungry or undernourished.
- The food sector accounts for around 22 percent of total greenhouse gas emissions, largely from the conversion of forests into farmland.
- Globally, 2 billion people are overweight or obese.
- Only 3 percent of the world's water is fresh (drinkable), and humans are using it faster than nature can replenish it.
- If people everywhere switched to energy efficient lightbulbs, the world would save US$120 billion annually.
- One-fifth of the world's final energy consumption in 2013 was from renewable sources.

GOAL 13: CLIMATE ACTION
Climate change is a global challenge that affects everyone, everywhere.

- As of 2017 humans are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels.
- Sea levels have risen by about 20 cm (8 inches) since 1880 and are projected to rise another 30–122 cm (1 to 4 feet) by 2100.
- To limit warming to 1.5C, global net CO2 emissions must drop by 45% between 2010 and 2030, and reach net zero around 2050.
- The energy sector alone will create around 18 million more jobs by 2030, focused specifically on sustainable energy.

GOAL 14: LIFE BELOW WATER
Careful management of this essential global resource is a key feature of a sustainable future.

- The ocean covers three quarters of the Earth's surface and represents 99 percent of the living space on the planet by volume.
- The ocean contains nearly 200,000 identified species, but actual numbers may lie in the millions.

- As much as 40 percent of the ocean is heavily affected by pollution, depleted fisheries, loss of coastal habitats and other human activities.
- The ocean absorbs about 30 percent of carbon dioxide produced by humans, buffering the impacts of global warming.
- More than 3 billion people depend on marine and coastal biodiversity for their livelihoods.

GOAL 15: LIFE ON LAND
Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
Around 1.6 billion people depend on forests for their livelihoods.
Forests are home to more than 80 percent of all terrestrial species of animals, plants and insects.
Nature-based climate solutions can contribute about a third of CO_2 reductions by 2030.
Mountain regions provide 60-80 percent of the Earth's fresh water.

GOAL 16: PEACE, JUSTICE AND STRONG INSTITUTIONS
- Access to justice for all, and building effective, accountable institutions at all levels.
- By the end of 2017, 68.5 million people had been forcibly displaced as a result of persecution, conflict, violence or human rights violations.
- There are at least 10 million stateless people who have been denied nationality and its related rights.
- Corruption, bribery, theft and tax evasion cost developing countries US$1.26 trillion per year.
- 49 countries lack laws protecting women from domestic violence.
- 1 billion people are legally ‘invisible’ because they cannot prove who they are. This includes an estimated 625 million children under 14 whose births were never registered.

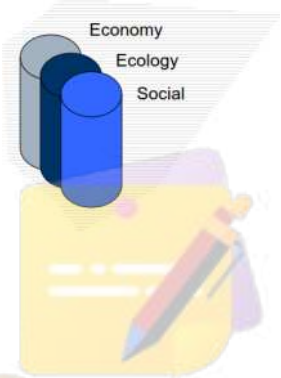
GOAL 17: PARTNERSHIPS
Revitalize the global partnership for sustainable development.

Objective: To attain sustainability

How it should be attained……?

- Social progress which recognizes the need of every one
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment

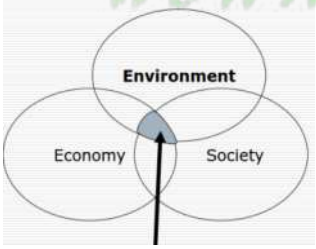
Sustainable Development – the three pillar approach



3-Dimensional

- Environment
- Society
- Economy

Venn Diagram and the triple bottom line



Techno-Environmental Dimension

- Shifting to cleaner & efficient technologies
- Curtailing use of fossil fuels
- Preserving traditional technologies
- Rapidly adopting improved technologies
- Improved government regulation & enforcement
- Efficient use of arable lands and water supplies.
- Improving agricultural practices and technologies
- Avoiding overuse of chemical fertilizers/pesticides.
- Conserving water
- Improving water quality

- Conserving biodiversity
- Preventing destabilization of climate
- Protecting natural resources needed for food
- Using irrigation carefully
- Avoiding expansion on hillsides or marginal lands.
- Slowing or halting destruction

Economic Dimensions

- Reduced Energy consumption.
- Changing consumption patterns
- Providing leadership
- Reduce Import Barriers
- Less resource intensive Technologies
- Equal access to Resources
- Reduce Disparity of incomes
- Money to development needs
- Improvement in Living Standards
- Alleviating Poverty
- Better access to Land, Education, Social Services
- Efficient manufacturing sector

Societal Dimension

- Stabilizing population.
- Rural development.
- minimize environmental consequences of urbanization.
- Improving standards for literacy.
- Primary health care more accessible.
- Improving social well-being
- protecting cultural diversity
- Investing in human capital.
- Investing in health and education of women.
- Participation in decision making.

SUSTAINABLE DEVELOPMENT PRIORITY AREAS

SOCIO-CULTURAL	ENVIRONMENTAL	ECONOMIC
Human rights	Natural resources:	Poverty reduction
Peace and human security	- water	Corporate responsibility and accountability
Justice	- energy	Market economy
Gender equality	- agriculture	Energy efficiency and conservation,
Cultural diversity and intercultural understanding	- biodiversity	Consumption and waste management
Community and culture	- habitat conservation	Economic performance
Health	- fish	Agricultural viability
HIV/AIDS	- forests	Resource – Mining, Forestry, Hydro, Fisheries
Governance	- air	Employment
Demographics	Climate change	Education
Equity and rights	Rural transformation	
	Sustainable urbanization	
	Disaster prevention and mitigation	

Sustainable Development Principles (What?)

- Economic sustainability: sustainable livelihoods and improved well-being through growth and poverty reduction
- Environmental sustainability: Target agricultural land, forests, water resources, protected areas, and biodiversity, so that opportunities and options of future generations are not degraded
- Fiscal and institutional sustainability: must be realistic about cost and institutional requirements of instruments May require tradeoffs

Sustainable Development Principles (How?)

- Correct the over-exploitation or inappropriate use of resources by ensuring that all environmental services are correctly valued (internalize the externalities)
- Establish projects and policies on appropriate levels --community, watershed, national, regional, global –generally with corresponding implementation/ financing mechanisms
- Incorporate institutional development and new technologies
- Reduce risks and vulnerabilities of farming communities
    - Diversify cropping systems for economic and environmental resilience
    - Weather forecasting to aid planting date and management decisions.
    - Weather and price crop insurance.

THINGS YOU CAN DO FROM YOUR COUCH

- Save electricity by plugging appliances into a power strip and turning them off completely when not in use, including your computer.
- Stop paper bank statements and pay your bills online or via mobile.
- Share, don't just like. If you see an interesting social media post about women's rights or climate change, share it so folks in your network see it too.
- Speak up! Ask your local and national authorities to engage in initiatives that don't harm people or the planet.
- Turn off the lights. Your TV or computer screen provides a cosy glow, so turn off other lights if you don't need them.
- Report online bullies. If you notice harassment on a message board or in a chat room, flag that person.

THINGS YOU CAN DO AT HOME

- Air dry. Let your hair and clothes dry naturally instead of running a machine. If you do wash your clothes, make sure the load is full.
- Take short showers. Bathtubs require gallons more water than a 5-10 minute shower.
- Eat less meat, poultry, and fish. More resources are used to provide meat than plants
- Freeze fresh produce and leftovers if you don't have the chance to eat them before they go bad. You can also do this with take-away or delivered food, if you know you will not feel like eating it the next day. You will save food and money.
- Compost—composting food scraps can reduce climate impact while also recycling nutrients.
- Recycling paper, plastic, glass & aluminium keeps landfills from growing.
- Buy minimally packaged goods.
- Avoid pre-heating the oven. Unless you need a precise baking temperature, start heating your food right when you turn on the oven.
- Plug air leaks in windows and doors to increase energy efficiency
- Adjust your thermostat, lower in winter, higher in summer
- Replace old appliances with energy efficient models and light bulbs
- If you have the option, install solar panels in your house. This will also reduce your electricity bill!
- Get a rug. Carpets and rugs keep your house warm and your thermostat low.
- Don't rinse. If you use a dishwasher, stop rinsing your plates before you run the machine.
- Choose a better diaper option. Swaddle your baby in cloth diapers or a new, environmentally responsible disposable brand.
- Use cardboard matches. They don't require any petroleum, unlike plastic gas-filled lighters.

THINGS YOU CAN DO OUTSIDE YOUR HOUSE

- Shop local. Supporting neighbourhood businesses keeps people employed and helps prevent trucks from driving far distances.

- Shop Smart—plan meals, use shopping lists and avoid impulse buys. Don't succumb to marketing tricks that lead you to buy more food than you need, particularly for perishable items. Though these may be less expensive per ounce, they can be more expensive overall if much of that food is discarded.
- Buy Funny Fruit—many fruits and vegetables are thrown out because their size, shape, or color are not "right". Buying these perfectly good funny fruit, at the farmer's market or elsewhere, utilizes food that might otherwise go to waste.
- Bike, walk or take public transport. Save the car trips for when you've got a big group.
- Use a refillable water bottle and coffee cup. Cut down on waste and maybe even save money at the coffee shop.
- Bring your own bag when you shop. Pass on the plastic bag and start carrying your own reusable totes.
- Take fewer napkins. You don't need a handful of napkins to eat your takeout. Take just what you need.
- Shop vintage. Brand-new isn't necessarily best. See what you can repurpose from second-hand shops.
- Maintain your car. A well-tuned car will emit fewer toxic fumes.
- Donate what you don't use. Local charities will give your gently used clothes, books and furniture a new life.
- Vaccinate yourself and your kids. Protecting your family from disease also aids public health.
- Take advantage of your right to elect the leaders in your country and local community.