ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

MKAK 1003

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SYNOPSIS

- Various aspects in environmental management and the concept of sustainability will be introduced.

- **Topics discussed include :**
  - the principles of sustainable development,
  - understanding the environmental sensitive areas (e.g. natural water bodies),
  - catchment management,
  - development of coastal and inland areas.
  - climate change and water supply
  - methods and concepts of sustainable approaches (promote and achieve sustainable development goals).

Synopsis

- At the end of the course, you should be able to understand the basic concept of environmental management.

- The course enables you to understand, plan and incorporate the concept of sustainability in environmental management.

Week 1	**Environmental Sustainability.**
Week 2	Environmental issues and problems: i. Global warming, ii. Water Security.
Week 3	Classification of natural environmental system: i. Soil, steep slopes; ii. Lake and lakefront.
Week 4	Classification of natural environmental system: i. Rivers; ii. Floodplains; iii. Riverine.
Week 5	Classification of natural environmental system: i. Swamp forest; ii. Wetlands (includes tidal and mudflats wetlands); iii. Coastline. **Assignment 1**
Week 6	Environmental Sustainable Approaches: Sustainable development goal.
Week 7	Integrated river management system.
Week 8	**MID SEMESTER BREAK**
Week 9	Water security.
Week 10	Water security. **Assignment 2**
Week 11	Water footprint.
Week 12	Life cycle analysis
Week 13	Carbon footprint; carbon credit and payment for environmental services.
Week 14	Green building
Week 15	**Assignment 3 and Student presentation**
Week 16-19	**REVISION WEEK AND FINAL EXAM**

COURSE ASSESSMENT

Continuous Assessment	Percentage
Assignment 1	20
Assignment 2	20
Assignment and Presentation	20
Final Examination	40
Grand Total	100

Attendance

- Students must attend **<u>NOT less than 80%</u>** of lecture hours as required for the subject.

- The students will be **<u>prohibited</u>** from attending any lecture and assessment activities upon failure to comply the above requirement. **<u>Zero mark</u>** will be given to the subject.

1. ENVIRONMENTAL SUSTAINBILITY

POPULATION GROWTH AND THE ENVIRONMENT

- **The Human Population is Close to 8 Billion**

  - Double the population of 1960

  - Still growing by 90 million per year

  - Doubling time about 50 years

  - Very large population of women approaching the child-bearing ages

As Countries Develop, they go through a <u>Demographic Transition</u>

- All countries seem to go through a series of population changes as they develop:

  - Pre-transition: both the death and birth rates are high (population growth is slow) .

  - Early Transition: A period in which **the death rate drops** but the birth rate stays high (the population shoots up rapidly)

  - Late Transition: A period in which the birth rate also start to decline.

  - Post-Transition: the population stabilizes.
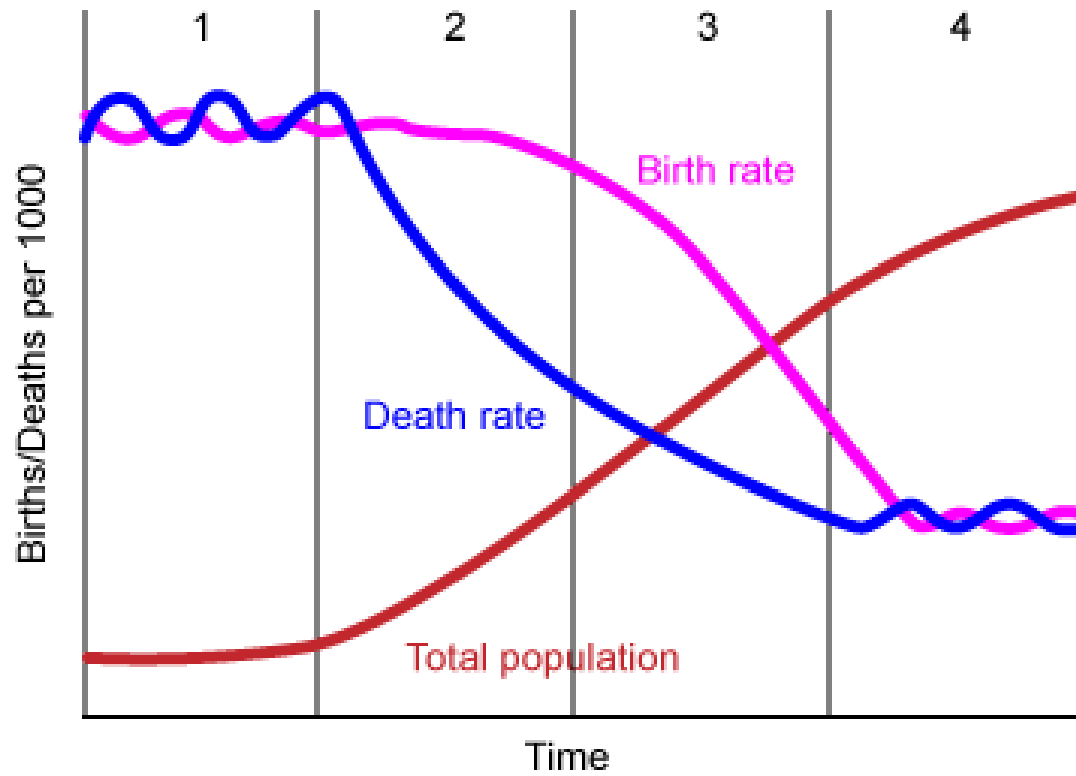
Possible reasons for demographic transition:

➢ More children survive in developed countries (Decrease in mortality, *How?*)

➢ Women have more opportunities for careers in developed countries.

➢ School costs are higher in developed countries

Fact: All these reasons contribute to decrease the fertility.

- **Under-Developed Countries Have High Fertility Rates**

  - Most of Africa, South & Central America and India still have high fertility rates

  - World average is 2.5 children per woman (UN, 2015).

  - Most under-developed countries have had large reductions in fertility rates in the last 30 years, but they are still high

  - 95% of the population growth in the next century will occur in the under-developed countries

- **Rapidly Growing Countries Have Younger Populations Than Slowly Growing Countries**

  - Rapidly growing countries like Kenya, Bangladesh and Nigeria have a **broad base of younger people** and very few older people

  - Slowly growing countries such as Japan, Germany or Italy have a narrow base of younger people and a **higher proportion of middle aged and older people.**

- **The Human Population May be Close to the <u>Carrying Capacity</u> of the Earth**
  - Because the earth has a finite size the number of people it can support is limited
  - The upper limit that can be sustained is called the ***carrying capacity***
  - The carrying capacity can be increased by technological advances, but it cannot be increased indefinitely
- **Further Growth of the Population Will Create Massive Problems**
  - When the population gets too large it puts strains on all resources
  - Some of the problems:
    - More crowding
    - Less personal freedom
    - More pollution
    - Food scarcity and starvation
    - Extinction of species
    - Wars over space and resources

Limits on the developing world??

- While current first world countries polluted significantly during their development, the same countries **encourage third world countries to reduce pollution,** which sometimes impedes growth.

- Some consider that the implementation of sustainable development would mean a **reversion to pre-modern lifestyles. (WHY ??)**

• Environmental Management

Environmental management involves **reducing pollution, waste, and the consumption of natural resources** by implementing an environmental action plan. This plan brings together the key elements of environmental management, including an organization's environmental **policy statement, an environmental audit, environmental management system, and standards** such as the EC ECO-Management Audit Scheme and ISO 14000.

What is Sustainability and How is it Achieved?

- Many unsustainable aspects of technology cause environmental pollution, loss of land productivity, and exhaustion of essential resources

- We enter the anthropocene in which human influences dominate

- Sustainability can be defined as managing Earth and its resources so that future generations may have hospitable conditions and a satisfactory standard of living for an indefinite period of time

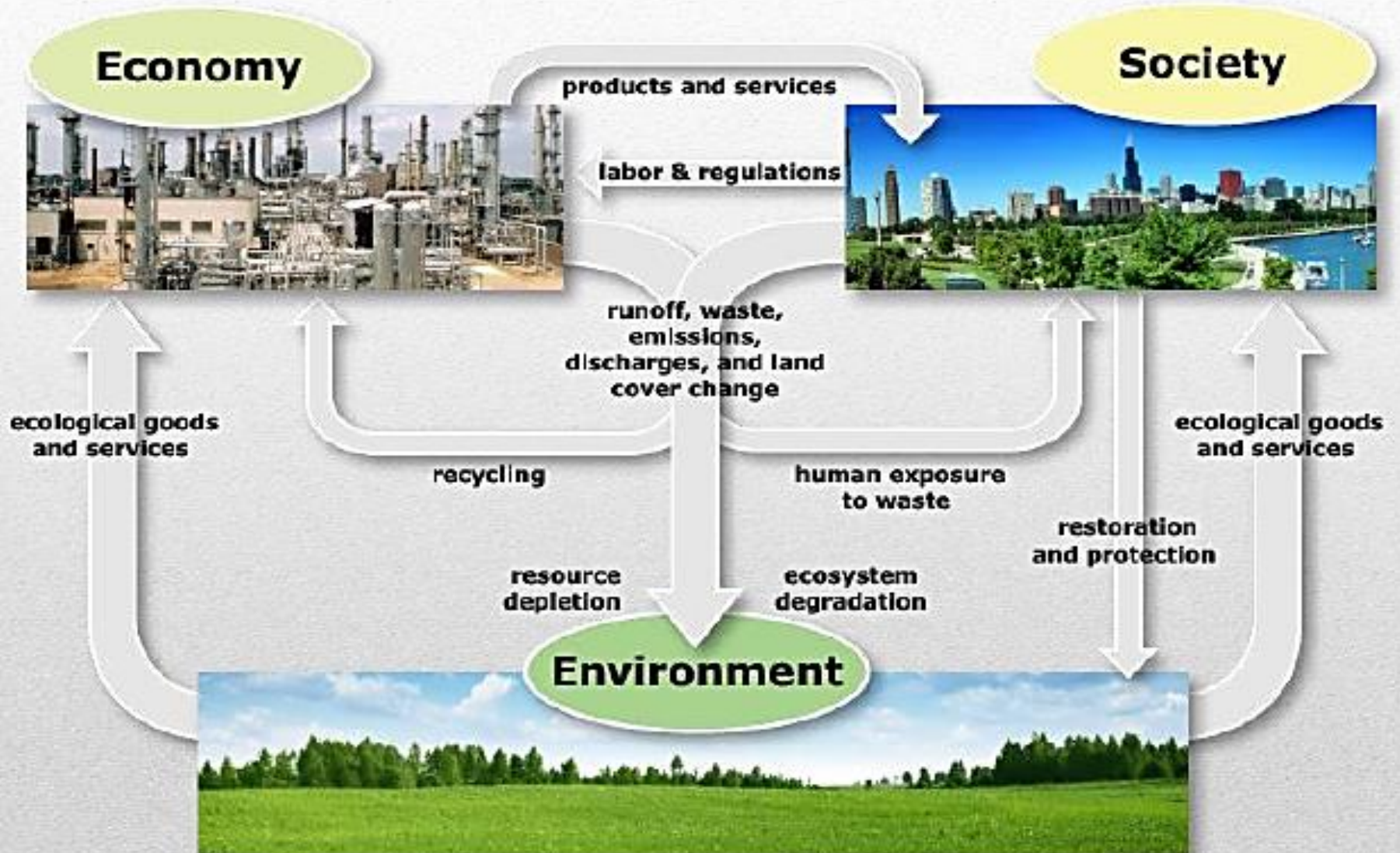**If we do not change direction, that will not happen!**

Sustainability

Sustainability has many definitions but the basic principles and concepts remain constant: *balancing a growing economy, protection for the environment, and social responsibility*, so they together lead to an improved quality of life for future generations and ourselves.

Scheme of Sustainable Development

Sustainability Framework

Economy

Society

products and services

labor & regulations

runoff, waste, emissions, discharges, and land cover change

ecological goods and services

recycling

human exposure to waste

ecological goods and services

restoration and protection

resource depletion

ecosystem degradation

Environment

Sustainable development (SD)

Sustainable development (**SD**) is a pattern of RESOURCE use, that aims to meet human needs while preserving the ENVIRONMENT so that these needs can be met not only in the present, but also for generations to come (sometimes taught as **ELF**-Environment, Local people, Future).

- Development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."

- **Definition of ANTHROPOCENE**

- The period of time during which human activities have had an environmental impact on the Earth regarded as constituting a distinct geological age. (*Merriam-Webster dictionary*)

"Most scientists agree that humans have had a hand in warming Earth's climate since the industrial revolution—some even argue that we are living in a new geological epoch, dubbed the *Anthropocene*" —*Nature*, 12 Feb. 2004

The United Nation's definition

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

It contains within it two key concepts:

1. the concept of 'needs', in particular the essential **needs of the world's poor**, to which overriding priority should be given; and

2. the idea of **limitations imposed by the state** of technology and social organization on the environment's ability to meet present and future needs."

Sustainable Development

vs

Green Development

The only thing you can do when you feel overwhelmed is:

Environmental sustainability

- the process of making sure current **processes of interaction with the environment** -the idea of keeping the environment as pristine as naturally possible.

- An **"unsustainable situation"** occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished.

- Human activity only uses nature's resources at a rate at which they can be **replenished naturally**.

- Inherently the concept - intertwined with the concept of **carrying capacity.**

- Theoretically, the long-term result of environmental degradation is the inability to sustain human life.
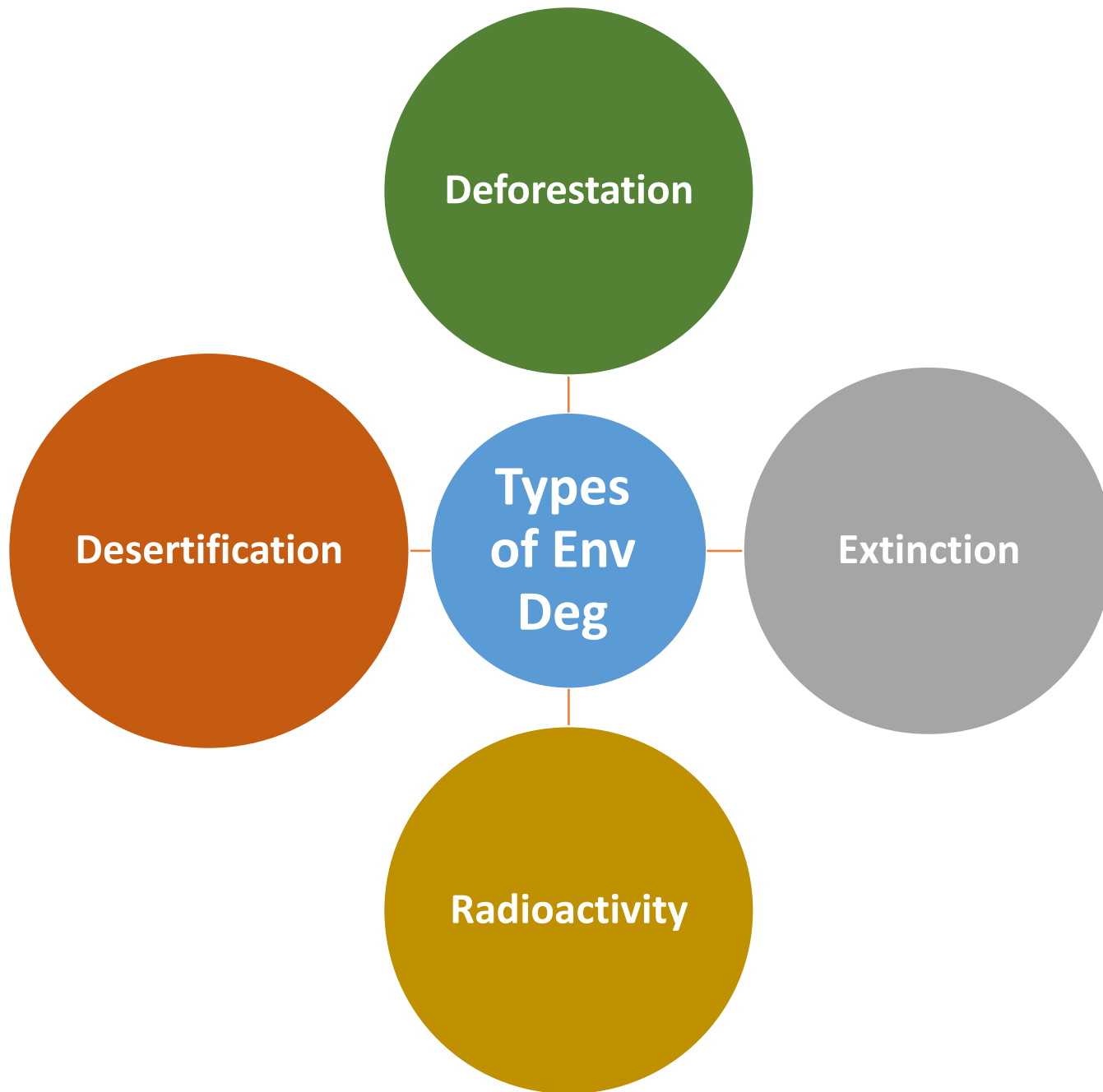
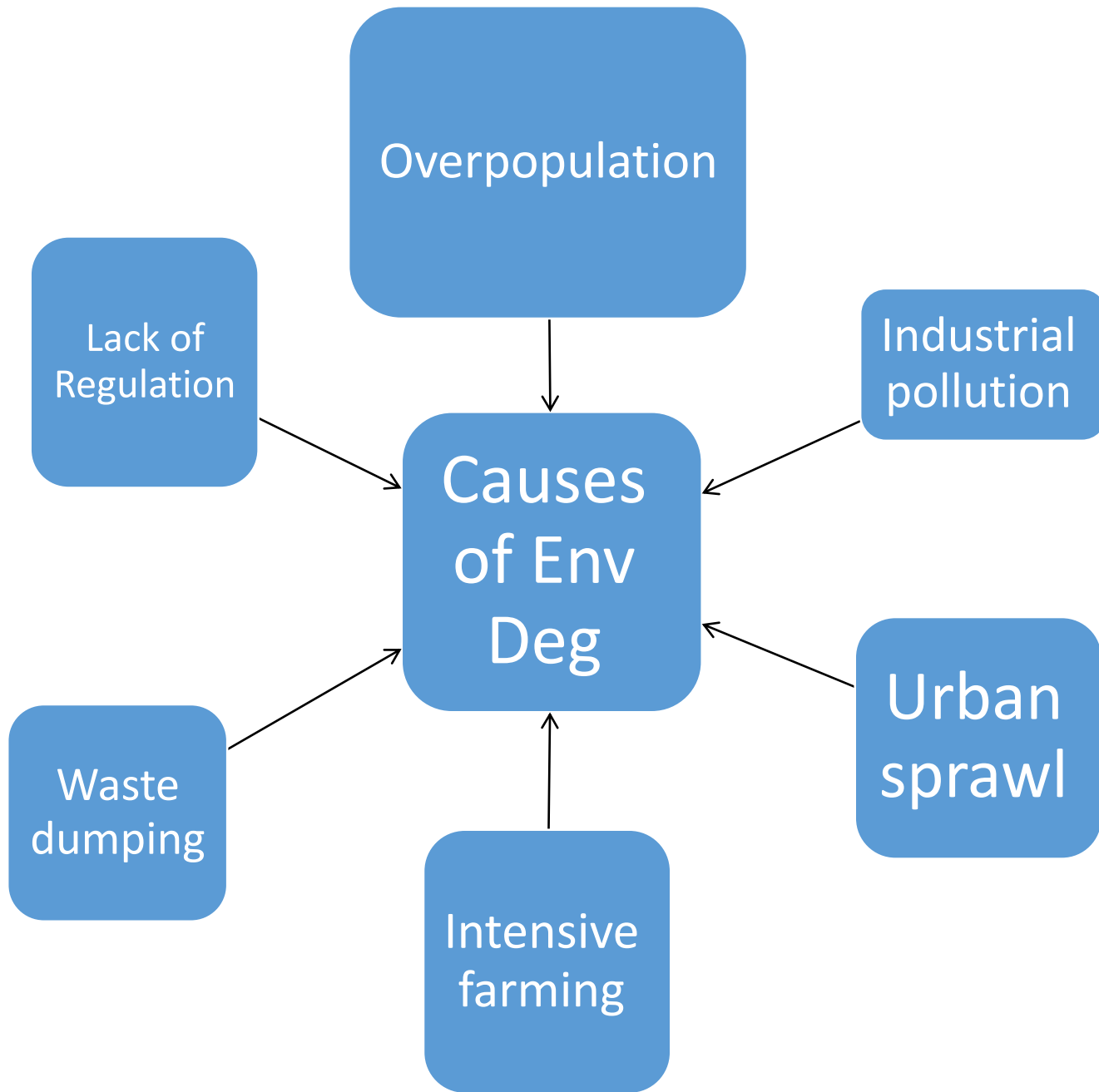# Environmental sustainability

- **Environmental degradation** is the damage to the biosphere as a whole due to human activity.

Types & Causes of Environmental Degradation

▪ Environmental degradation occurs when:

➢ Nature's resources (trees, habitat, earth, water and air) are being **consumed faster than nature can replenish them.**

➢ **Pollution** results in irreparable damage done to the environment

➢ Human beings destroy or **damage ecosystems** in the process of development.

Overpopulation

Lack of Regulation

Industrial pollution

Causes of Env Deg

Waste dumping

Urban sprawl

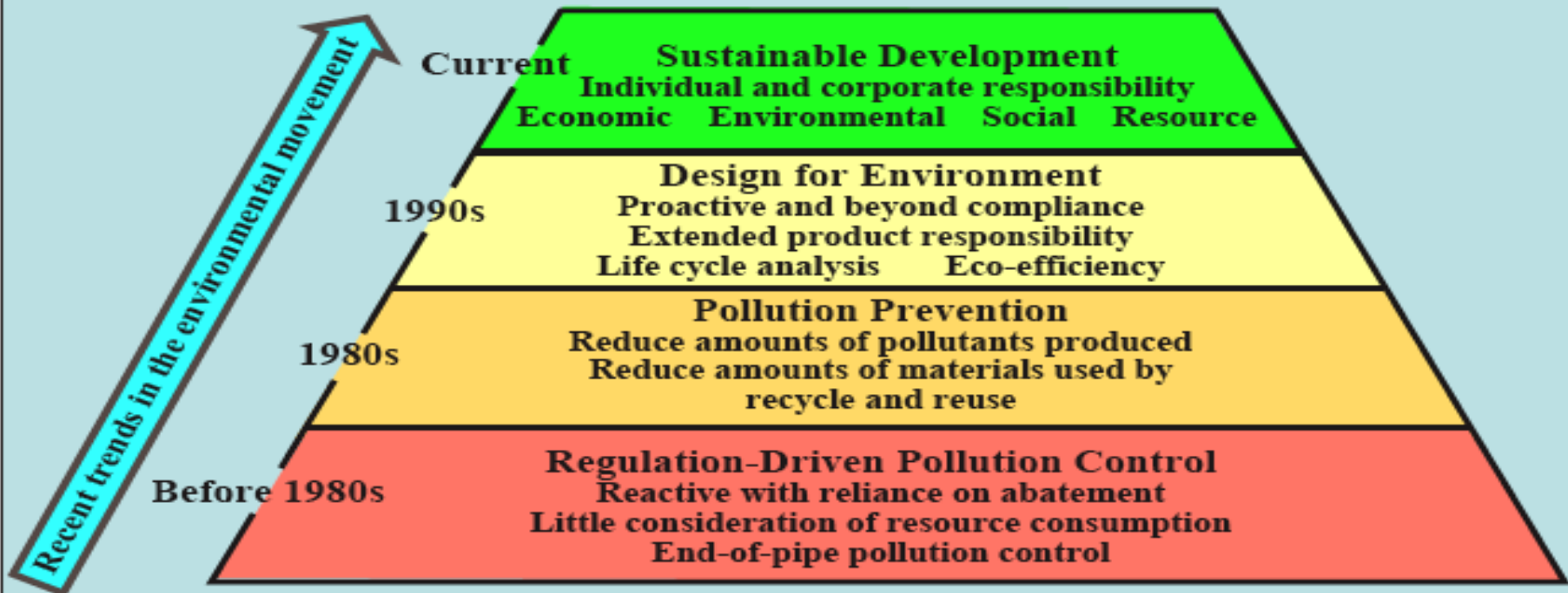Intensive farming

Environmental Sustainability

- The goal of environmental sustainability is to minimize these and other causes, to halt and, ideally, reverse the processes they lead to.

Economic Sustainability:

- **Agenda 21** - clearly identified information, integration, and participation as key building blocks to help countries achieve development that recognises these interdependent pillars.

- everyone is a user and **provider of information.**

- need to change from old sector-centered ways of doing business to **new approaches that involve cross-sectoral** co-ordination and the integration of environmental and social concerns into all development processes.

- broad **public participation** in decision making is a fundamental prerequisite for achieving sustainable development.[
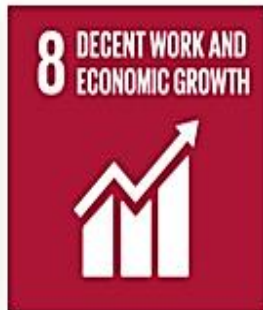
Towards Sustainability

Evolution of the environmental movement from pollution detection and treatment to sustainability

Figure 1.1. Evolution of the environmental movement from pollution detection and treatment to sustainability

Recent trends in the environmental movement

Current — **Sustainable Development**
Individual and corporate responsibility
Economic   Environmental   Social   Resource

1990s — **Design for Environment**
Proactive and beyond compliance
Extended product responsibility
Life cycle analysis   Eco-efficiency

1980s — **Pollution Prevention**
Reduce amounts of pollutants produced
Reduce amounts of materials used by
recycle and reuse

Before 1980s — **Regulation-Driven Pollution Control**
Reactive with reliance on abatement
Little consideration of resource consumption
End-of-pipe pollution control

SUSTAINABLE DEVELOPMENT GOALS (SDG)

- The Sustainable Development Goals (SDGs), otherwise known as the Global Goals - came into effect in January 2016

- A universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

- key areas including poverty alleviation, democratic governance and peace building, climate change and disaster risk, and economic inequality.

- 17 GOALS - climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities.

WHY DO WE NEED SDG??

- more than 800 million people around the world still live on less than $1.25 a day

- hunger and malnutrition

- 6 million children die every year before their fifth birthday,

- Poverty, armed conflict and other emergencies keep many, many kids around the world out of school

- gross inequalities in work and wages, lots of unpaid "women's work" such as child care and domestic work, and discrimination in public decision-making.

- by 2050 at least one in four people are likely to be affected by recurring water shortages

- more people will need cheap energy

- job growth is not keeping pace with the growing labour force.

- four billion people have no way of getting online (Lack of industrialization).

- Income inequality is a global problem.

WHY DO WE NEED SDG??

- Cities lack public transport, green spaces, and poor involvement in urban planning decisions.

- Improper utilization of natural resources and disposal of solid and toxic waste.

- drastic effects of climate change – losses due to tsunamis, tropical cyclones and flooding.

- nearly a third of the world's fish stocks overexploited, 13,000 pieces of plastic litter on every square kilometer of ocean.

- Arable land is disappearing 30 to 35 times faster than it has historically. Deserts are spreading. Animal breeds are going extinct.

- plagued by armed conflict, crime, torture and exploitation, all of which hinders their development.
  - 193 countries agreed on these goals.

1. END EXTREME POVERTY IN ALL FORMS BY 2030.

2. END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE.

3. ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING 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 INDUSTRIALIZATION AND FOSTER INNOVATION

10. REDUCE INEQUALITY WITHIN AND AMONG COUNTRIES.

11. 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.

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 REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

What is Green Technology I

➢ **The field of "green technology" encompasses a continuously evolving group of methods and materials, from techniques for generating energy to non-toxic cleaning products.**

➢ The present expectation is that this field will bring innovation and changes in daily life of similar magnitude to the "information technology" explosion over the last two decades. In these early stages, it is impossible to predict what "green technology" may eventually encompass.

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What is Green Technology

➢**Lowering greenhouse gas emissions,**

➢**Increasing the efficient use of natural resources, and**

➢**Improving air and water quality**

What is Green Technology

Green Technology spans all levels of education and skill sets including those used for:

- ➤ **Research & Development of alternative energies,**

- ➤ **Building new efficient homes and facilities, and**

- ➤ **Operating cleaner more efficient utilities**

EXERCISE/ASSIGNMENT

- Choose 2 out of the 17 Goals from the United Nation's SDG and make report on its critical importance to your country.