

THEORY – 5

ENVIRONMENTAL STUDIES

3RD SEMESTER, MECHANICAL

Prepared by -

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CHAPTER - 1

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

➤ DEFINITION :

□ INTRODUCTION :

- The word environment is derived from the French word 'environner' means "to encircle or surround."

- The environment is a very wide term.
- It concerns with the “**Biosphere**” which include all biotic parts of hydrosphere, lithosphere and atmosphere.
- The environment consists of both biotic (living) and abiotic (physical or non living) substances i.e. consists of water, sunlight, air, temperature, electricity etc.

➤ **DEFINITION :**

- Environment is the sum of all social, economical biological, physical or chemical factors which constitute the surroundings of men/living organism, who is both creator and moulder of this environment.

- **Environmental science** is multidisciplinary branch of science involving chemistry, physics, botany, medical sciences, geography and many other fields.
- **Environmental science** or **studies** is the study of the characteristics, composition functions and systematic study of different components of the natural environmental systems
- The **Environment** includes both physical or non living (abiotic) and living (biotic) environment.
- With increasing scientific knowledge, man is able to modify the environment suit his immediate needs much more than any other organism.

- Since, the very beginning of human civilization man started interfering with the environment .
- He devastated forests for the use of tree as wood, land under civilization.
- He had polluted rivers and other water resources for transporting, production of electricity, discharging sewage and drainage system etc.
- He had utilized all natural resources, modify as required according to his needs.
- Therefore man is responsible for massive degeneration of nature, natural systems, environment and wild life.

- The environmental science is , therefore a **multidisciplinary science**, which may require attention of experts from different branches of science when decisions regarding environmental matters have to be taken.
- **India** occupies **7th place** in industrialized countries of the **world**.
- Number of industrial effluents and emissions, especially toxic gases discharged into the air daily.
- A rapid increase in atomic and nuclear energy has added a huge amount of radioactive substances in the atmosphere.
- Thus the environment is deteriorated to such extent that it has crossed the limit and has become lethal (very harmful or cause to death) to all organism, including man.

- The craze of progress of agriculture, industry, transportation and technology is taken as the general criterion of development of any country.
- Such activities of man has created adverse effects on all living organism in the biosphere.
- Today environment has become foul, contaminated, undesirable.
- Therefore it is harmful for the death of living organisms (including man).
- So far as pollution is concerned, environment includes the air, the water, the soil, the noise, the building, the landscapes, the oceans, the lakes, the rivers, the vehicles and many other things.
- Not only addition of the constituents in these adversely alter the natural quality of the environment but also removal of constituents caused pollution.

❑ **SCOPE AND IMPORTANCE :**

- Environment consists of **all living** and **non living** things which surround us.
- The basic components of the environment are :-
 1. Atmosphere or the air
 2. Hydrosphere or the water
 3. Lithosphere or the rocks and soil
 4. The biosphere
- Environment influence and shaped our life.
- It is the environment from which we get food to eat, water to drink, air to breathe and all necessities of day to day life.
- Hence environment is the life support system.

➤ Environmental pollution (like industrial wastes, toxic gases, nuclear radioactive substances) on one hand and **deforestation**, soil erosion, population explosion, global warming on the other hand interference in ecosystem and biosphere are threatening life on the earth.

➤ According to Eric Jantsch in 1970 (born in Austria, 1929-1980, an American astrophysics (Astronomy + Physics + Chemistry)) environmental science attempts to solve major environmental problems with the help of **interdisciplinary** and **transdisciplinary** approaches i.e. the entire knowledge of all the discipline of science such as Math, Physics, Chemistry, Biology, Geography, Computer Science, Medical Science, Biotechnology as well as Social Science such as Economics, Sociology and Psychology.

➤ Hence the **scope and importance** of the environment can be well understand.

Some Major Problems/Issues to be addressed in Environmental Science

Major Thrust Areas/Contributions made by Disciplines of

Biodiversity Conservation

Resource Recovery, Waste Disposal and Treatment

Air, Water, Soil, Noise and Marine Pollution

Environmental Ethics and Awareness

Global Climate Change and Water Scarcity

Computer Simulation and Analysis

Population Explosion, Urbanisation, Land use Human Resource and Sustainable Development

Energy Crisis and Non-conventional Sources

Globalisation and World Trade

Global Environmental Problems

Modelling and Management of Resources

Power Generation, Dams and Technosphere

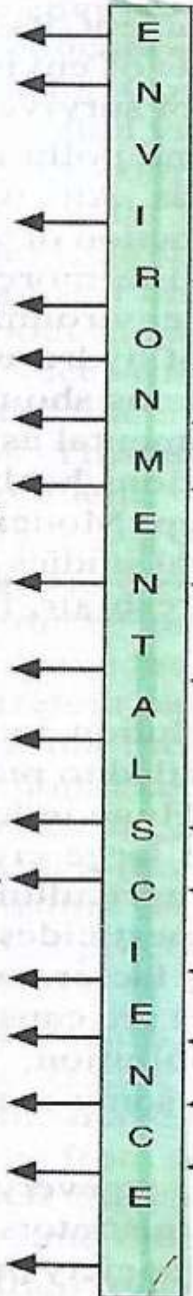
Disease, Drug Abuse and AIDS

Toxic Chemicals, Pesticides and Radioactivity

Resource Depletion, Deforestation

Specific Problems of Various Habitats (e.g. Problems of Aquaculture)

Perturbations of Biogeochemical Cycles



Microbiology and Biotechnology

Atmospheric, Ocean and Space Science

Ethics, Behavioural Science and Literature

Meteorology and Telecommunication

Computer Science and Information Technology

Social Sciences

Physics, Chemistry, Geology, Geography

Management Science and Environmental Law

Mathematics

Engineering

Medical Science

Ecophysiology and Ecotoxicology

Ecology/Environmental Biology

Life Science/Bioscience/Biology

- Environment is responsible for creating conditions suitable for the existence of a healthy biosphere on this planet.
- Environment regulates temperature, absorbs harmful ultraviolet radiations by the vital **Ozone layer**, the atmosphere plays a quick and effective media for transfer, transport and dissemination of waste and obnoxious (toxic) gases.
- All animals depend on plants for their food.
- Insects, bacteria, virus and other organism are one hand harmful but very helpful on the other like pollination, regeneration etc.
- Since life is dependable on environment, its absence causes many adverse and harmful effects.

➤ Over exploitation of natural resources and pollution of environment like air, water, soil, marine pollution, food adulterations, decreasing agricultural land, **extinction** of various plants and animals (like dinosaur, Dodo, Mammoth) , global warming which are the major factors, making our life more and more difficult.

➤ Industrial effluents, nuclear hazards, solid waste management, mining impact, hydro-electric projects are very dangerous and effects environment .

➤ Therefore , environmental aspect should be in mind while planning industries, township, research centres/institutions, health centres etc.

➤ Modern technologies should be developed to reduce the pollution in **every step**.

❑ **Environmental studies** is very important for getting clean drinking water, hygienic living conditions, clean and fresh air, fertile land, healthy food etc.

❑ **IMPORTANCE OF ENVIRONMENTAL STUDIES :**

➤ In the industrialized era that we live today, every component that we intake - be it, air, water or food are contaminated by industrial activities.

➤ **THERE IS NO ZERO POLLUTION.**

➤ To minimize this problem, knowledge of environmental studies is essential.

➤ An in-dept study of environmental studies will help us in the following ways:

1. We will begin to appreciate and adopt the idea of "DEVELOPMENT WITHOUT DESTRUCTION OF THE ENVIRONMENT"
2. Knowledge about "VARIOUS TYPES OF ENVIRONMENTS & DIFFERENT ENVIRONMENTAL HAZARDS"
3. Playing an effective role in protecting the environment by "DEMANDING CHANGES IN LAW AND ENFORCEMENT SYSTEMS".
4. Having a "POSITIVE IMPACT" on "QUALITY OF LIFE".
5. Creating a "CONCERN AND RESPECT FOR THE ENVIRONMENT".

❑ **NEED FOR PUBLIC AWARENESS :**

➤ Industrialization, urbanization, faster mode of transport, changing food habits, deforestation, decreasing agricultural land, wide spread of insecticides, pesticides, improper use of fertilizers and chemicals, water pollution, soil pollution, marine pollution, noise pollution, global warming, nuclear hazards etc. are some **major factors** for which **public awareness is necessary**.

➤ The active co-operation of **every one** at **every level** of social organizations, scientists, educationists, social workers, politicians, administrators and public is needed for issues concerning environment.

➤ (1) POPULATION GROWTH :

- Increasing of population in an exponential way causing over exploitation of natural resources, decreasing of fossil fuel (oil, coal, natural gas), shortage of food, in terms decreasing agricultural land, soil erosion, nutrients depletion, urbanization, increasing carbon-dioxide, causing global warming etc.
- Hence adopting family planning scheme is necessary to control population and can help to protect/ save environment.

➤ (2) URBANISATION :

- Increasing of large crowded cities, changing the food habits, deforestation need to be control/proper planning.

➤ (3) INDUSTRIALIZATION :

- To meet of increasing population need in huge quantity, development of technology industry in every sector increasing day by day. Increasing of toxic effluents, toxic gases resulting increasing of temperature, depletion of Ozone layer protecting ultra violet rays coming from Sun. Resulting Acid rain and global warming which needs to be control.

➤ (4) NOISE POLLUTION :

- The noise which is increasing pollution due to population explosion, industrializations and urbanisations.
- People should know the effects of noise pollution.
- Ear drum can be damaged when exposed to very loud and sudden noise. Noise pollution affects human health, comfort and efficiency. It causes contraction of blood vessels, high blood pressure, mental distress, high cholesterol, heart attacks, neurological problems, birth defects, abortion etc.
- Hence proper rules and parameter to be adopted to control noise pollution.

➤ (5) SEWAGE AND DRAINAGE :

Sewage and drainage which is mandatory for every society, town, cities, industry and in increasing with urbanisation. Sewage which cause nuisance, leads to chronic diseases need to be dispose with proper treatment, which people should aware.

➤ (6) USE OF PUBLIC TRANSPORT :

- Movements should start at grass root level irrespective of Rules/Law by Govt.
- We must avoid personal vehicle for mode of transport for single use. It will be better if we use **public transport** or **sharing** there by helping environment reducing pollution from burning of fuel and noise from maximum number of vehicles.

➤ (7) MARINE ECOSYSTEM :

- Marine ecosystem includes the oceans, seas, sea shores, bays of the world.
- Leakage from oil tankers, ships, oil drilling in addition all waste materials, sewage, drainage from all parts of land, coastline polluted rivers and the sea water and the ocean.
- Which in terms effects the flora and fauna, various species , fishes and other water organisms.

➤ (8) EDUCATIONAL INSTITUTION :

- If we have to improve the **environment**, **public awareness** is the primary requirement.
- There are a number of ways in which we can spread **awareness** and educate the **public** how to **protect** the **environment**.
- This is particularly important because as citizens, most of the **environmental** issues arise out of our **way of living**.
- Introduce the **3 R's**: **reduce waste**, **reuse resources**, and **recycle materials** .
- Organise tree planting days at school and tell them why trees are important to the environment.
- Encourage children to switch off all appliances and lights when not in use.
- Ensure taps are closed properly after you have used them and use water sparingly.
- **Environmental Education** (EE) is a process of learning by giving an overall perspective of knowledge and awareness of the environment.

➤ (9) INTERNATIONAL LEVEL :

- **World Environment Day** is observed **5th June** every year to aware people about environment.
- In addition to this **United nations** organized many summits/seminars/meeting/policies/ rules time to time and advice to all countries to protect environment at National level.

➤ (10) GOVERNMENT ACTION :

- To prevent the environment from further degradation, the **supreme court** has ordered and initiated environmental protection awareness through government and non-government agencies to take part in protecting our environment.
- **Environmental Protection Act** was introduced in **1976** as **42nd amendment act** in the Constitution in our country.

➤(11) ROLE OF MEDIA :

- The most important way to **aware public** is now a days is **media** consisting of –
- **Print media** by news paper, magazines, books etc.,
- **Social media** by face book, whatsapp, instagram, twitter etc.,
- **Digital media** by software, digital images, digital video, video games, web pages and websites etc.
- **Electronic media** by television, radio, internet, fax, CD-ROMs, DVD etc.
- **Public awareness** campaigns are **important** because they can be used to contribute to policy change by putting pressure on policy-makers and encouraging the community to take action.

➤ **Environmental pollution** cannot be prevented by **laws** alone by the Government.

➤ **Public participation** is equally important with regard to environmental protection in all respects.

QUESTIONS :

1. Define environment. (2 marks) (2016-W)
2. Explain, “Environmental science is a multidisciplinary science.”
3. Discuss some major issues, which help in solving the problems in environmental science.
4. Discuss in detail the scope and importance of environment.
5. Write an essay on “public awareness to protect our environment.” (5 marks) (2016-W)
6. Give an account of the role of public in Environmental protection.

- THANK YOU -