

Q1) Define environmental management. State all characteristics EVM.

- Environmental management seeks to steer the development process to take advantage of opportunities, try to avoid hazards, mitigate problems, and prepare people for unavoidable difficulties by improving adaptability and resilience.
- Environmental management is a process concerned with human– environment interactions
- Seeks to identify: what is environmentally desirable;
- What are the physical, economic, social and technological constraints to achieving that;
- What are the most feasible options

Characteristics:

- It supports sustainable development;
- It is often used as a generic term;
- It deals with a world affected by humans
- It demands a multidisciplinary, interdisciplinary or even 'holistic' approach;
- It has to integrate and reconcile different development viewpoints;
- It seeks to co-ordinate science, social science, policy making and planning;
- It is a proactive process;
- It generally embraces the precautionary principle;
- It recognises the desirability of meeting, and if possible exceeding, basic human needs;
- The timescale involved extends well beyond the short term, and concern ranges from local to global;
- It should identify opportunities as well as address threats and problems;

Q2 Environmental Issues relevant to India

Environmental Issues relevant to India

1 Growing Population: A population of over thousands of millions is growing at 2.11 per cent every year. It puts considerable pressure on its natural resources and reduces the gains of development. Hence, the greatest challenge before us is to limit the population growth. Although population control does not automatically lead to development, yet the development leads to a decrease in population growth rates.

2 Poverty: India has often been described a rich land with poor people. The poverty and environmental degradation have a nexus between them. The vast majority of our people are directly dependent on the nature resources of the country for their basic needs of food, fuel shelter and fodder. About 40% of our

people are still below the poverty line. Environment degradation has adversely affected the poor who depend upon the resources of their immediate surroundings. Thus, the challenge of poverty and the challenge environment degradation are two facts of the same challenge. The population growth is essentially a function of poverty. Because, to the very poor, every child is an earner and helper and global concerns have little relevance for him.

3 Agricultural Growth: The people must be acquainted with the methods to sustain and increase agricultural growth with damaging the environment. High yielding varieties have caused soil salinity and damage to physical structure of soil.

4 Ground Water: It is essential of rationalizing the use of groundwater. Factors like community wastes, industrial effluents and chemical fertilizers and pesticides have polluted our surface water and affected quality of the groundwater.

5 Development and Forests: As such, the dams on the river Narmada, Bhagirathi and elsewhere have become areas of political and scientific debate. Forests in India have been shrinking for several centuries owing to pressures of agriculture and other uses. Vast areas that were once green, stand today as wastelands.

6 Loss of Biodiversity According to the International Union for Conservation of Nature's Red Data Book, some 47 species of plants and animals in India are listed as critically endangered. Loss of ecology and natural habitats have left many indigenous species,

7 Evil Consequences of Urbanization Nearly 27 per cent Indians live in urban areas. Urbanization and industrialization has given birth to a great number of environmental problems that need urgent attention. Over 30 per cent of urban Indians live in slums. Out of India's 3,245 towns and cities, only 21 have partial or full sewerage and treatment facilities. Hence, coping with rapid urbanization is a major challenge.

8 Hazard Waste Management Problem of electronic, plastic, biomedical hazardous waste disposal

9 Air Pollution A portion of the world's most polluted urban communities are in India; the natives of Delhi are as of now experiencing the insufferable effect of poor air quality.

10 Groundwater Depletion Rapidly depleting levels of groundwater is one of the biggest threat to food security and livelihood in the country.

11 Garbage Disposal and Sanitation Lack of safe garbage disposal systems in the country make India one of the most unhygienic countries in the world. The rural regions of the country are worse off than urban tracts in this regard. This is one of the areas where the country's government and people need to work hard and improve the prevailing conditions.

Q3 Define environment. Explain components of environment.

The word environment means surroundings, in which organisms live. Environment and the organisms are two dynamic and complex component of nature. Environment regulates the life of the organisms including human beings. Human beings interact with the environment more vigorously than other living beings. Ordinarily environment refers to the materials and forces that surrounds the living organism. In

other words environment refers to those surroundings that surrounds living beings from all sides and affect their lives.

Components of Environment Our environment has been classified into four major components:

1.Hydrosphere, 2.Lithosphere, 3.Atmosphere, 4.Biosphere.

1) Hydrosphere Hydrosphere includes all water bodies such as lakes, ponds, rivers, streams and ocean etc. Hydrosphere functions in a cyclic nature, which is termed as hydrological cycle or water cycle.

2) Lithosphere Lithosphere means the mantle of rocks constituting the earth's crust. The earth is a cold spherical solid planet of the solar system, which spins in its axis and revolves around the sun at a certain constant distance .Lithosphere mainly, contains soil, earth rocks, mountain etc. Lithosphere is divided into three layers-crusts, mantle and core (outer and inner).

3)Atmosphere The cover of the air, that envelopes the earth is known as the atmosphere. Atmosphere is a thin layer which contains gases like oxygen, carbon dioxide etc. and which protects the solid earth and human beings from the harmful radiations of the sun. There are five concentric layers within the atmosphere, which can be differentiated on the basis of temperature and each layer has its own characteristics.

4)Biosphere It is otherwise known as the life layer, it refers to all organisms on the earth's surface and their interaction with water and air. It consists of plants, animals and microorganisms, ranging from the tiniest microscopic organism to the largest whales in the sea. Biology is concerned with how millions of species of animals, plants and other organisms grow, feed, move, reproduce and evolve over long periods of time in different environments. Its subject matter is useful to other sciences and professions that deal with life, such as agriculture, forestry and medicine. The richness of biosphere depends upon a number of factors like rainfall, temperature, geographical reference etc. Apart from the physical environmental factors, the man made environment includes human groups, the material infrastructures built by man, the production relationships and institutional systems that he has devised. The social environment shows the way in which human societies have organized themselves and how they function in order to satisfy their needs

#### Q4 Significance of Environment Management for contemporary Managers

1 Planning to control emission of hazardous gases like, CO, CO<sub>2</sub>, NO<sub>x</sub>, etc from Industries

2 Planning to control air pollution from automobiles

3 Planning to control Noise pollution

4 Planning to grow more trees in surrounding areas

5 Planning to recycle and utilize Solid waste and liquid waste

6 Planning for awareness program for public

7 Planning to recycle Electronic Wastes

8 Planning for Hazardous waste management system

9 Planning to control pollution from agricultural products

10 Planning to design and implement solar based vehicles

11 Planning to design and implement Non renewable energy sources like, wind, solar, tidal, biomass, geothermal

12 Planning to control Mobile Tower Radiation

13 Planning to control Nuclear Pollution

Q5 ) State and explain career opportunities with respect to environmental management

1 Research and Development (R & D) in Environment To solve environmental problems in scientific manner and carry our R&D activity for promoting sustainable development

2 Green Advocacy To implement various laws related to environment there is need for environmental lawyer who should be able to file the cases related to environmental problems

3 Green marketing Environmental auditors and managers to check the quality of product as per ISO 14000 standard

4 Green Media Environmental awareness can be spread through mass media like, TV, radio, news paper, magazine, advertisement for which environmentally educated person are required.

5 Environmental Consultancy To tackle the environmental related problems

6 Ecologist Study the relationships of organisms and their environment , in addition to their research they gather data and analyze it for importance, they study environmental problems and gives solution for improvement.

7 Nature Conservation Officer Manage, protect and improve areas of environmental importance through conservation work, publicity and scientific monitoring

8 Waste Management Officer Preparing, planning and implementing safe waste disposal strategies

9 Recycling Business Collect waste from Industry or Municipal Corporation and Recycle it by some processes to develop different products.

10 Professor To teach different subjects related to environmental Management.

## Module 2

Q1) What is acid rain? Explain causes and effects of acid rain

Acid rain describes any form of precipitation that contains high levels of nitric and sulfuric acids. It can also occur in the form of snow, fog, and tiny bits of dry material that settle to Earth. Normal rain is slightly acidic, with a pH of 5.6, while acid rain generally has a pH between 4.2 and 4.4.

## Causes of acid rain

- Rotting vegetation and erupting volcanoes release some chemicals that can cause acid rain
- The biggest sources are coal-burning power plants, factories, and automobiles.
- When humans burn fossil fuels, sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) are released into the atmosphere.

## Effects

- Sulphur dioxide and nitrogen oxides are not primary greenhouse gases that contribute to global warming, one of the main effects of climate change.
- Acid rain has many ecological effects, especially on lakes, streams, wetlands, and other aquatic environments.
- Some species can tolerate acidic waters better than others. However, in an interconnected ecosystem, what affects some species eventually affects many more throughout the food chain, including non-aquatic species such as birds.
- Acid rain and fog also damage forests, especially those at higher elevations.
- The effects of acid rain, combined with other environmental stressors, leave trees and plants less healthy, more vulnerable to cold temperatures, insects, and disease.

## Q2) What is global warming? Explain causes and impact of global warming.

Global warming is the phenomenon of a gradual increase in the temperature near the earth's surface. This phenomenon has been observed over the past one or two centuries. This change has disturbed the climatic pattern of the earth. However, the concept of global warming is quite controversial but the scientists have provided relevant data in support of the fact that the temperature of the earth is rising constantly.

### Causes:

- ♣ Global warming occurs when carbon dioxide (CO<sub>2</sub>) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface.
- ♣ Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter.
- ♣ These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called the greenhouse effect.
- ♣ Our current era of global warming is directly attributable to human activity—specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect.

#### Impact:

- Scientists agree that the earth's rising temperatures are fueling longer and hotter heat waves, more frequent droughts, heavier rainfall, and more powerful hurricanes.
- In 2015, for example, scientists concluded that a lengthy drought in California—the state's worst water shortage in 1,200 years—had been intensified by 15 to 20 percent by global warming.
- The earth's ocean temperatures are getting warmer, too—which means that tropical storms can pick up more energy. In other words, global warming has the ability to turn a category 3 storm into a more dangerous category 4 storm.
- The impacts of global warming are being felt everywhere.
- Extreme heat waves have caused tens of thousands of deaths around the world in recent years.
- And in an alarming sign of events to come, Antarctica has lost nearly four trillion metric tons of ice since the 1990s.
- Disappearing glaciers, early snowmelt, and severe droughts will cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.
- Rising sea levels will lead to even more coastal flooding on the Eastern Seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.

#### Q3) What is hazardous waste? Explain different its characteristics?

- Hazardous waste is waste that has substantial or potential threats to public health or the environment.
- Hazardous waste can be the by-products of manufacturing processes or discarded commercial products.
- Hazardous waste can be specifically defined by Environmental Protection Agency regulations or can be wastes that exhibit at least one of four characteristics—ignitability, corrosivity, reactivity, or toxicity.
- Hazardous waste treatment and disposal facilities must be permitted to accept and treat a specific type of hazardous waste.

#### Characteristics:

- ♣ Hazardous wastes are classified on the basis of their biological, chemical, and physical properties.
- ♣ These properties generate materials that are either toxic, reactive, ignitable, corrosive, infectious, or radioactive.
- ♣ Toxic wastes are poisons, even in very small or trace amounts.
- ♣ They may have acute effects, causing death or violent illness, or they may have chronic effects, slowly causing irreparable harm.

- ♣ Some are carcinogenic, causing cancer after many years of exposure.
- ♣ Others are mutagenic, causing major biological changes in the offspring of exposed humans and wildlife.
- ♣ Reactive wastes are chemically unstable and react violently with air or water.
- ♣ They cause explosions or form toxic vapours.
- ♣ Ignitable wastes burn at relatively low temperatures and may cause an immediate fire hazard.
- ♣ Corrosive wastes include strong acidic or alkaline substances. They destroy solid material and living tissue upon contact, by chemical reaction.
- ♣ Infectious wastes include used bandages, hypodermic needles, and other materials from hospitals or biological research facilities.
- ♣ Radioactive wastes emit ionizing energy that can harm living organisms.
- ♣ Because some radioactive materials can persist in the environment for many thousands of years before fully decaying, there is much concern over the control of these wastes.

Q4) What you understand by loss of biodiversity? Explain important components responsible for loss of biodiversity.

- Biodiversity loss, also called loss of biodiversity, a decrease in biodiversity within a species, an ecosystem, a given geographic area, or Earth as a whole.
- Biodiversity, or biological diversity, is a term that refers to the number of genes, species, individual organisms within a given species, and biological communities within a defined geographic area, ranging from the smallest ecosystem to the global biosphere.
- Biodiversity loss describes the decline in the number, genetic variability, and variety of species, and the biological communities in a given area.
- The primary drivers of biodiversity loss are influenced by the exponential growth of the human population, increased consumption as people strive for more affluent lifestyles, and reduced resource efficiency.

Components:

1. Natural biodiversity loss
  - ♣ An area's biodiversity increases and decreases with natural cycles.
  - ♣ Biodiversity loss is typically associated with more permanent ecological changes in ecosystems, landscapes, and the global biosphere.
  - ♣ Natural ecological disturbances, such as wildfire, floods, and volcanic eruptions, change ecosystems drastically by eliminating local populations of some species and transforming whole biological communities.
2. Human-driven biodiversity loss

- ♣ Humans (*Homo sapiens*), their crops, and their food animals take up an increasing share of Earth's land area.

- ♣ Researchers estimate that the current rate of species loss varies between 100 and 10,000 times the background extinction rate (which is roughly one to five species per year when the entire fossil record is considered).

- ♣ In addition, a 2019 report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services noted that up to one million plant and animal species are facing extinction due to human activities.

- ♣ Forest clearing, wetland filling, stream channeling and rerouting, and road and building construction are often part of a systematic effort that produces a substantial change in the ecological trajectory of a landscape or a region.

### 3. Important drivers of Biodiversity Loss

- Habitat loss and degradation—which is any thinning, fragmentation, or destruction of an existing natural habitat—reduces or eliminates the food resources and living space for most species. Species that cannot migrate are often wiped out.

- Invasive species—which are non-native species that significantly modify or disrupt the ecosystems they colonize—may outcompete native species for food and habitat, which triggers population declines in native species. Invasive species may arrive in new areas through natural migration or through human introduction.

- Overexploitation—which is the harvesting of game animals, fish, or other organisms beyond the capacity for surviving populations to replace their losses—results in some species being depleted to very low numbers and others being driven to extinction.

- Pollution—which is the addition of any substance or any form of energy to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harmless form—contributes to biodiversity loss by creating health problems in exposed organisms. In some cases, exposure may occur in doses high enough to kill outright or create reproductive problems that threaten the species survival.

- Climate change associated with global warming—which is the modification of Earth's climate caused by the burning of fossil fuels—is caused by industry and other human activities. Fossil fuel combustion produces greenhouse gases that radiation enhance (heat the energy) atmospheric and absorption trap of infrared the heat, influencing temperature and precipitation patterns.

### 4. Ecological effects

- ♣ The weight of biodiversity loss is most pronounced on species whose populations are decreasing.

- ♣ The loss of genes and individuals threatens the long-term survival of a species.

- ♣ The wholesale loss of populations also increases the risk that a particular species will become extinct.

- ♣ Biodiversity loss also threatens the structure and proper functioning of the ecosystem.

### 5. Economic and societal effects

- Biodiversity loss affects economic systems and human society.

- Humans rely on various plants, animals, and other organisms for food, building materials, and medicines, and their availability as commodities is important to many cultures.



- The loss of biodiversity among these critical natural resources threatens global food security and the development of new pharmaceuticals to deal with future diseases.
- Simplified, homogenized ecosystems can also represent an aesthetic loss.

Q5) Write notes on endangered species and life science.

- ♣ An endangered species is a type of organism that is threatened by extinction.
- ♣ Species become endangered for two main reasons: loss of habitat and loss of genetic variation.
  - ♣ A loss of habitat can happen naturally. Dinosaurs, for instance, lost their habitat about 65 million years ago.
  - ♣ Human activity can also contribute to a loss of habitat.
    - ♣ Development for housing, industry, and agriculture reduces the habitat of native organisms. This can happen in a number of different ways.
    - ♣ Development can also endanger species indirectly. Some species, such as fig trees of the rain forest, may provide habitat for other species.
    - ♣ As trees are destroyed, species that depend on that tree habitat may also become endangered.
    - ♣ Plants such as vines, fungi such as mushrooms, and insects such as butterflies live in the rain forest canopy. So do hundreds of species of tropical birds and mammals such as monkeys.
    - ♣ As trees are cut down, this habitat is lost. Species have less room to live and reproduce.
    - ♣ Loss of habitat may happen as development takes place in a species range.
      - ♣ Loss of habitat can also lead to increased encounters between wild species and people. As development brings people deeper into a species range, they may have more exposure to wild species.
      - ♣ Genetic variation is the diversity found within a species. It's why human beings may have blond, red, brown, or black hair. Genetic variation allows species to adapt to changes in the environment. Usually, the greater the population of a species, the greater its genetic variation.
      - ♣ Loss of genetic variation can occur naturally. Cheetahs are a threatened species native to Africa and Asia. These big cats have very little genetic variation.
        - ♣ They cannot adapt to changes in the environment as quickly as other animals, and fewer cheetahs survive to maturity. Cheetahs are also much more difficult to breed in captivity than other big cats, such as lions.
        - ♣ Human activity can also lead to a loss of genetic variation. Overhunting and overfishing have reduced the populations of many animals.
        - ♣ Monoculture, the agricultural method of growing a single crop, can also reduce genetic variation. Modern agribusiness relies on monocultures.

♣ However, farmers must use fertilizers and pesticides to ensure healthy crops because the plant has almost no genetic variation.

♣ Plant breeders often go back to wild varieties to collect genes that will help cultivated plants resist pests and drought, and adapt to climate change. However, climate change is also threatening wild varieties.

♣ Species that are not threatened by extinction are placed within the first two categories—least concern and near-threatened.