

(Part II)

Question No: 8

(C)

Deforestation:

“Deforestation means the felling and clearing of forest cover or tree plantations in order to accommodate agriculture, industrial or urban use.”

It involves permanent end of forest cover to make that land available for residential, commercial or industrial purposes. Over the last century, the forest cover around the globe has been greatly compromised, leaving the green cover down to an all-time low of about 30 percent.

According to the United Nations Food and Agriculture Organization (FAO), an estimated 18 million acres of forest are lost each year

Causes of Deforestation

There are many causes of deforestation which are given below

(a) Agricultural & Industrial activities

Agricultural and industrial activities are one of the major factors affecting deforestation. Due to overgrowing demand for food products, huge amount of trees are fell down to grow crops and for cattle grazing. Similarly, many industries in petrochemicals release their wastes into rivers which results in soil erosion, contamination and making it unfit for growing plants and trees.

(b) Urbanization

Apart from agricultural and industrial activities, wood base industries like paper, match-stick, furniture etc. also need a substantial amount of wood supply. Wood is used as fuel, both directly and indirectly, therefore,

trees are chopped for supplies. Firewood and charcoal are examples of wood being used as fuel. Some of these industries thrive on illegal wood-cutting and felling of trees.

(c) Desertification of land

Some of other factors that lead to deforestation are part natural and part anthropogenic, like desertification of land. It occurs due to land abuse making it unfit for growth of trees.

Effects of Deforestation

Deforestation causes many serious effects on humans, plants, animals and environment.

(a) Increase in Global warming

Trees play a major role in controlling global warming. They utilize the greenhouse gases, restoring the balance in atmosphere. With constant deforestation, the ratio of

greenhouse gases in the atmosphere has increased, adding to our global warming woes.

(b) Climate Imbalance

Deforestation also affects the climate in more than one way. Trees release water vapours in the air, which is compromised with the lack of trees. Trees also provide the required shades that keeps the soil moist. Deforestation leads to the imbalance in the atmospheric temperature.

(c) Wildlife Extinction

Due to massive felling down of trees, various species of animals are lost. They lose their habitat and forced to move to new locations. Some of them are even pushed to extinction. Our world has lost so many species of plants and animals during the last couple of decades.

Solutions to Deforestation

(a) Implementation of Rules & Laws

The best solution to deforestation is to curb the felling down of trees, by employing a series of rules and laws to govern it. Deforestation in the current scenario may have reduced, the money-churner that forest resources can be, is tempting enough for deforestation to continue.

(b) Restoring ecosystem

Restoring the ecosystem services provided by forests including carbon storage, water cycling and wildlife habitat.

(c) By Introducing plantation

Land skinned of its tree cover for urban settlements should be urged to plant trees in the vicinity and replace the cut trees. Also the cutting must be replaced by planting young trees.

Biodiversity Loss

Biodiversity:

“Biodiversity or biological diversity is a term that describes the variety of living beings on earth.”

Biodiversity also refers to the number or abundance of different species living within a particular region.

Elements of Biodiversity

Biodiversity has three essential elements.

- i) Genetic diversity
- ii) Ecosystem diversity
- iii) Species diversity

Recently, a new term/aspect **molecular diversity** has also been added.

Importance of Biodiversity

Biodiversity has a number of functions on the earth. These are as follows:

(a) Balance of Ecosystem:

Ecosystem services are the benefits obtained by people from ecosystem. These include:

- i) Provisioning services
- ii) Regulatory services
- iii) Supporting services

(b) Climate Stability

Vegetation influences climate at macro as well as micro levels. Growing evidence suggests that undisturbed forests help to maintain the rainfall in the vicinity by recycling water vapours at a steady rate back into the atmosphere.

Biodiversity Loss:

Biodiversity is diminished or destroyed

in a number of ways either by natural changes or by human disruption. The loss of even a single specie is considered as a tragedy as each form of life is a natural storehouse of irreplaceable substances of the genetic materials

Causes of Biodiversity loss

The main cause of biodiversity can be attributed to the influence of human beings on the world's ecosystem. The threats to biodiversity can be summarized in the following main points:

(a) Alteration and Loss of Habitat:

The transformation of the natural areas determines not only the loss of the vegetable species, but also a decrease in the animal species associated to them.

(b) Introduction of exotic species & genetically modified organisms.

Species originating from a particular area introduced into new natural environments can lead to different forms of imbalance in the ecological equilibrium.

(c) Alteration in Ecosystem Composition

Assemblage of species and their interactions with their ecosystems is critical for not only saving the species, but also for their successful future evolution. In the event of alterations, ecosystems can begin to change. Alterations to ecosystems are critical factors contributing to species and habitat loss.

The rest changes are listed below

1. Filling-up of wetlands
2. Destruction of coastal areas
3. Uncontrolled commercial exploitation
4. Soil degradation and erosion
5. Diminishing green cover
6. Infrastructure developments (Roads, river valley projects)
7. Shifting cultivation
8. Urbanization

Impacts of Biodiversity Loss

Though losses of biodiversity may have only small impacts on an ecosystem in the short-term, they may reduce its capacity to adjust the changing environment in future.

(a) Affect on regulating Services

Biodiversity also affects regulating services that regulate ecosystem processes, climate, floods, diseases and water quality.

(b) Decline in diversity

There have been worldwide decline in the diversity of pollinating insects that are essential for the reproduction of many plants.

(c) Influence on climate

Biodiversity, in particular the diversity of plant forms and the distribution

of land scapes patches, influences climate at local, regional and global scales. Thus changes in land use and land cover that affect biodiversity can, in turn affect climate.

Question no: 7

Eutrophication

The word "eutrophic" comes from the Greek word eutrophos meaning well-fed.

Some more acceptable definitions of Eutrophication are as follows:

“The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae dies and decompose, high levels of organic matter and decomposing organisms deplete the water of available oxygen, causing the death of organism, such as fish.”

Eutrophication is defined as:

An increase in the rate of supply of organic matter in an ecosystem.
(Nixon, 1995)

Types of Eutrophication

There are two types of eutrophication

1. Natural eutrophication
2. Cultural eutrophication

Natural Eutrophication

It refers to the excessive enrichment of water bodies via natural events.

Example:

The nutrients from the land can be washed away in a flood and deposited into a lake or river. These water bodies become overly enriched with

nutrients, enabling the excessive growth of algae and other simple plant life.

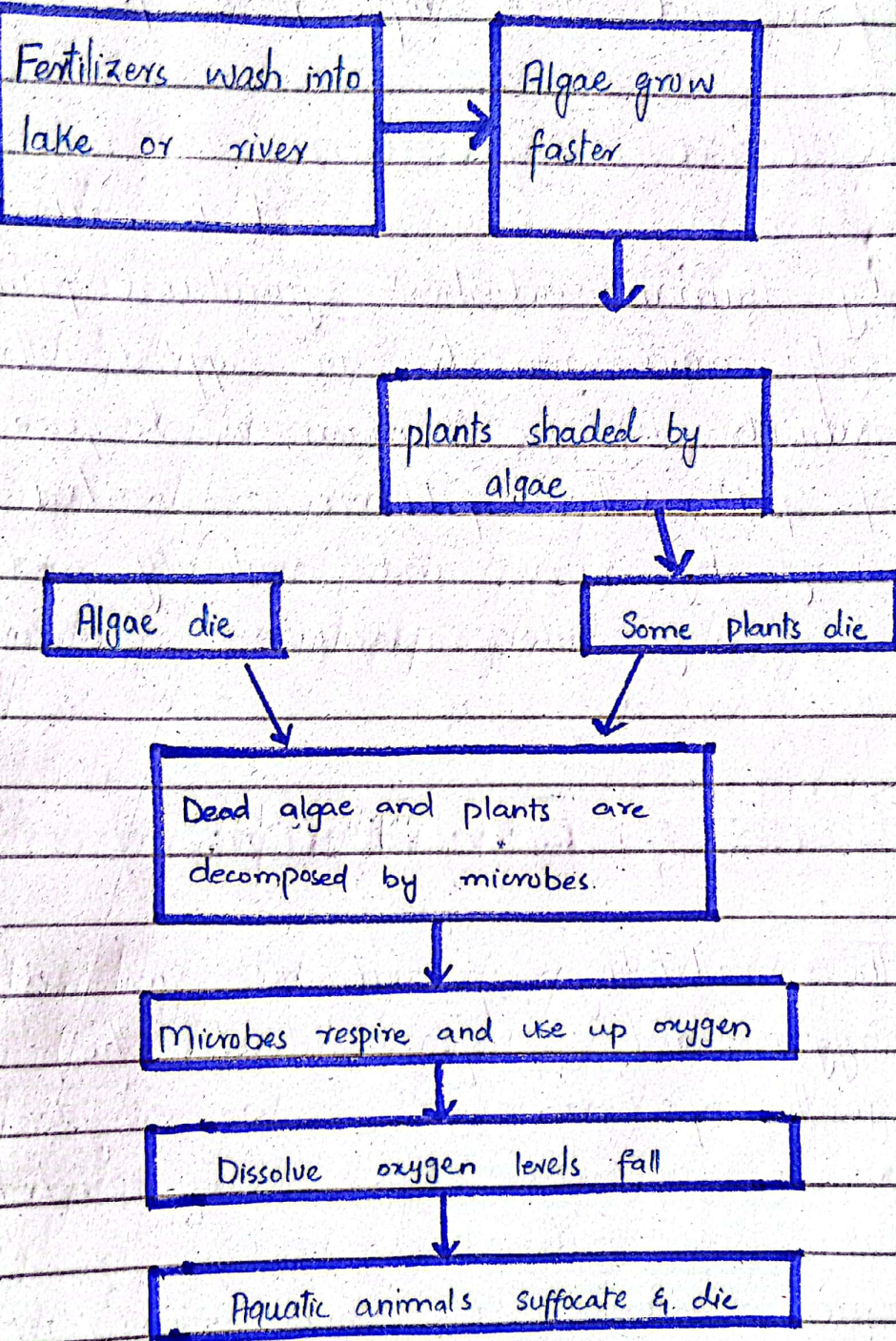
2. Cultural Eutrophication:

It is caused by human activities - agricultural farms, golf courses, lawn etc. are supplied with nutrients by the humans in the form of fertilizers. These fertilizers are washed away by rains and eventually find their way into water bodies such as lakes and rivers.

Causes of Eutrophication:

The availability of nutrients such as oxygen and phosphorus limits the growth of plant life in an ecosystem. When water bodies are overly enriched with these nutrients, the growth of algae, plankton and other simple plant life is favoured over the growth of more complex plant life.

Steps of Eutrophication



Effects of Eutrophication

Adverse effects of eutrophication on lakes, reservoirs, rivers and coastal marine waters are as follows:

- i. Toxic or inedible phytoplankton species.
- ii. Increased Biomass algae
- iii. Decrease in water transparency
- iv. Taste, odour and water treatment problems
- v. Dissolved oxygen depletion
- vi. Increased incidences of fish kills.
- vii. Loss of desirable fish species
- viii. Reduction in harvestable fish and shellfish.
- ix. Decreased biodiversity
- x. Decrease in perceived aesthetic value of the water body

When an ecosystem experiences an increase in nutrients, primary producers reap the benefits first. In aquatic ecosystems, species such as algae experience a population increase (algal bloom). Algal bloom limits the sunlight available to

bottom-dwelling organisms and cause wide swings in the amount of dissolved oxygen in the water.

Solutions to slowdown Eutrophication

The following procedures have been recommended as solutions to slow down the eutrophication process.

(a) Decreasing amount of nutrients

Limiting the amount of nutrients entering the lake.

(b) Removal of algal bloom

Harvesting and removal of algal bloom and mechanical removal of higher plants, this can reduce the amount of nutrients recycled into the water upon the death of algae and higher plants.

(c) Setting-up of natural food-webs

By encouraging the setting-up of natural food-web (fishes) which can remove the algae and subsequently harvesting the fish.

Question no. 5

Solid Waste Management:

Solid waste management is a polite term for garbage management. As long as humans have been living in settled communities, solid waste or garbage has been an issue, and modern societies generate far more solid waste than early humans ever did. Daily life in industrialized nations can generate several pounds of solid waste per consumer, not only directly in the homes but indirectly also in factories that manufacture goods purchased by consumers.

Approaches of SWM

There are few approaches/methods which are adopted to discard wastes.

1. Sanitary Land Fill
2. Incineration

3. Composting

4. Pyrolysis

Sanitary Land-Fill

It is a sanitary landfill, garbage is spread out in thin layers, compacted and covered with clay or plastic foam. In the modern landfill, the bottom is covered with an impermeable liner, usually several layers of clay, thick paste and sand. The liner protects the groundwater from being contaminated due to percolation of leachate.

Advantages

1. It is simple and economical
2. Segregation of waste is not required
3. Natural resources are returned to soil and recycled.

Disadvantages:

1. Fatal accidents (Scavengers buried under waste piles)

2. Infrastructural damage (damage to access roads by heavy vehicles).

Incineration

The term incinerate means to burn something until nothing is left but ashes. An incinerator is a unit or facility used to burn trash and other types of waste until it is reduced to ash. It is constructed by heavy, well-insulated materials, so that it does not give off extreme amounts of external heat. The process through incinerator reduces the volume of waste to 20-30% of the original volume which need further disposal by sanitary landfill or some other means.

Advantages

1. Require little space
2. Safest from hygienic point of view
3. Cost of transportation is not high if the incinerator is located within city limits.

Disadvantages

1. Its capital and operating cost is high
2. Operation need skill personnel
3. Formation of smoke, dust and ashes need further disposal that may cause air pollution.

Composting

Due to shortage of space for landfill in bigger cities, the biodegradable yard waste is allowed to decompose in a medium. A good quality nutrient rich and environment friendly manure is formed which improves the soil conditions and fertility. It is the natural process of decomposition of organic waste

Advantages

1. It makes soil easier to cultivate
2. It helps in preventing soil erosion by keeping the soil covered

Disadvantages

1. Non-consumable have to be disposed separately
2. The technology has not caught up with the farmers and hence does not have an assured market

Pyrolysis

Pyrolysis is a form of incineration that chemically decomposes organic materials by heat in the absence of oxygen.

Pyrolysis typically occurs under pressure and at operating temperatures above 430° (800°F).

In practice, it is not possible to achieve a completely oxygen-free atmosphere.