

## (Part - II)

Q. 5(a)

Agenda 21:

Agenda 21 is an action plan of United Nations related to sustainable development and was an outcome of United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992.

A comprehensive blueprint of action to be needed to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which humans directly affect the environment, and this will require national strategies, plan and policies.

**Composition:**

Agenda 21 is a comprehensive programme run globally, nationally and locally. Word "21" refers to the 21st century. It was submitted at the Earth summit in 1992. This document contains 900 pages, 4 sections and 40 chapters.

**Content:**

The content of the document was divided in four sections

## (Section-I)

### Economic and Social Aspect

Poverty, Health,  
Energy consumption, sustainable settlement and population.

## (Section-II)

### Conservation of Resources

Atmosphere, Deforestation  
and Biodiversity.

## (Section-III)

### Stakeholders importance and Role

Particularly women,  
youth, locals, NGOs and industries.

## (Section-IV)

### Implementation Mechanism

Education, Science, Transfer  
of Technology, Institutional and financial mechanism

## Evolution of Agenda 21

The evolution of Agenda 21  
was done in three events.

### i) Rio +5, 1997

Special session to appraise status in  
which the performance was declared uneven.

ii) Rio + 10, 2002:

WSSD was conducted in which UN members gave their commitment to full implementation of Agenda 21.

iii) Rio + 20, 2012:

UN conference on sustainable development was held.

### Key Focuses of Agenda 21.

Following environmental issues are the key focus of Agenda 21.

i) Sustainable Development:

Sustainable development encourages the conservation and preservation of natural resources of the environment.

ii) Conservation and Preservation

Conservation is the sustainable use and management of natural resources. Preservation attempts to maintain in its present condition areas of the Earth that are so far untouched by humans.

iii) Energy:

Energy is needed for heating, cooking electricity, manufacturing, construction and

transportation.

## Transport:

Transport is damaging our environment producing pollutants that lead to acid rain poor air quality and global warming.

## Waste:

The more waste we produce, the more we have to dispose of. Sustainable waste management encourages the generation of less waste.

## Conclusion:

Agenda 21 was to tackle the social and environmental problems. It was implemented in hierarchy. Agenda 21 was evolved through three events. It focused on the sustainable development, conservation and preservation, energy waste and transportation.

Question no: 5(B)

## Eutrophication

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

Some more acceptable definitions of Eutrophication are as follows:

66 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 organisms, such as fish. 39

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.

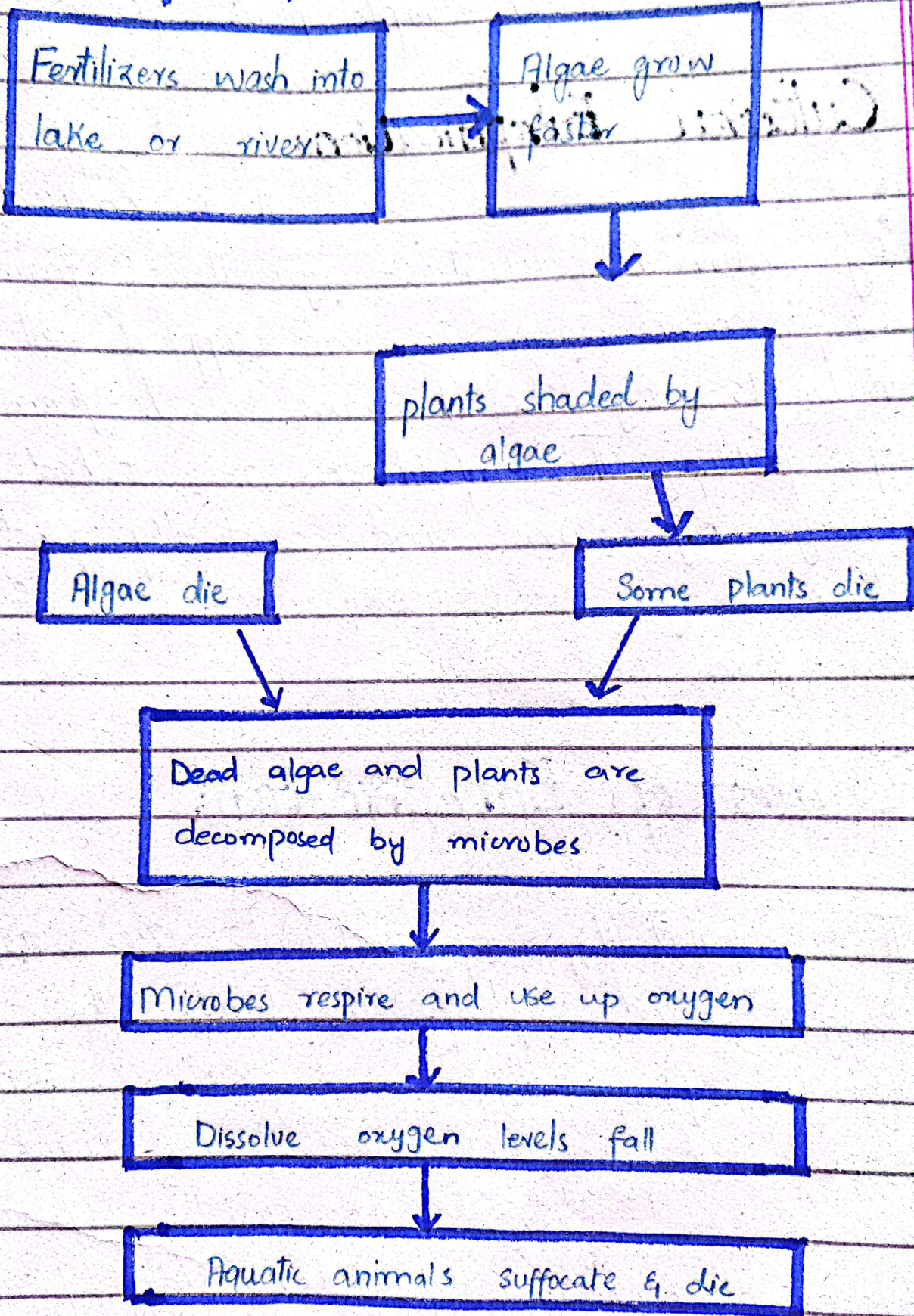
## 2. Cultural Eutrophication:

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 <sup>are</sup> 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.

## Conclusion:

Eutrophication is caused by the excess of nutrient present in the water which enhances the growth of algae and fungi. These spread over the surface and causes a hinderence in the passing of sunlight and oxygen to the marine life. This leads to the death of marine animals. This puts a stressing pressure on the normal functioning of life cycle.

## Q.3(B)

### Biodiversity:

Biodiversity is a term that describes "the variety of living beings on Earth."

"Degree of variation of life."

Biodiversity also refers to the number of different species living within a particular region. It represents the wealth of biological resources available to us. It is all about sustaining the natural area made up of community of plants, animals and other living organisms that are being reduced at a steady rate as we plan human activities that is being reduced by habitat destructions.

### Causes of Biodiversity Loss:

The following are causes of biodiversity loss.

#### Alteration and loss of the 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.

(ii) Introduction of exotic and genetically modified species:

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

(iii) Climate change

Heating of earth's atmosphere and earth surface affects biodiversity because it endangers all the species that adapted to the cold due to the latitude or the altitude.

(iv) Overexploitation of resources:

When the activities connected with capturing and harvesting a renewable natural resource in a particular area successively intense, the resource itself may become exhausted as in the case of Sardines, herring, cod, tuna and many other species that man capture without leaving enough time for the organism to reproduce.

## Effects of Biodiversity loss:

There are some effects of biodiversity loss.

## Effects regulating services:

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

## Decline in diversity:

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

## Climate change:

Biodiversity, particularly the diversity of plants forms and the distribution of landscape patches, influence climate at local, regional and global scales. Thus changes in land use and land covers that effects biodiversity, can affect climate.

## Importance of Biodiversity:

The following points will clarify the importance of biodiversity in human life.

### (i) Biodiversity and food:

80% of human food supply comes from 20 kinds of plants. But humans use 40,000 species for food, clothing and shelter. Biodiversity provides for variety of food for planet.

### (ii) Biodiversity and industry:

Biological sources provide many industrial materials. These include fibre, oil, dyes, rubber, water, timber, paper and food.

### Conclusion:

The biodiversity is the variety of species that is under danger due to many human activities as well natural phenomena of habitat losses and many more. The loss of biodiversity has perils on the life of living organism. Through its vast applications, it is important for humans and their well-being.

## Q.4(B)

### Environmental Impact Assessment:

The systematic identification and evaluation of potential impacts of proposed projects, plans, programmes or legislative actions relative to the physical, chemical, biological, cultural and socioeconomic components of the total environment.

### Process of EIA:

There are following steps in the process of EIA.

#### (a) Screening:

EIA process Kicks off with project screening which is done to determine whether or not a proposal should be subject to EIA and if so, at what level of details. The output of the screening process is often a document called an **Initial Environmental Examination (IEE)**. This will determine whether an EIA is needed and if so, to what details.

#### (b) Scoping:

The aim of EIA is not to carry out



exhaustive study on all environmental impacts for all projects. Scoping is used to identify the key issues of concern at an early stage in the planning process. The results of scoping will determine the scope, depth and terms of reference to be addressed within the environmental statement.

### (iii) Baseline data collection

The term baseline refers to the collection of background information on the biophysical, social and economic setting of proposed project area. Normally, information is obtained from secondary source, or the acquisition of new information through field samplings, interviews, surveys and consultations with the public.

### Impact analysis and Prediction:

Positive and negative, reversible and irreversible, temporary and permanent impacts need to be predicted which pre-supposes a good understanding of

the project by the assessment agency. Predicting the magnitude of development likely impacts and evaluating their significance is core of EIA.

#### (v) Analysis of Alternatives

Analysis of alternatives is done to establish the preferred or most environmentally-sound financially feasible and benign options for achieving project objectives.

#### (vi) Mitigation and Impact Management:

Mitigation is done to avoid, minimize or offset predicted adverse impacts and where appropriate, to incorporate these into an environmental management plan or system. For each potential adverse impact, the plan for its mitigation at each stage of the project should be documented and costed, as this is very important in the selection of the preferred alternative.

(vii)

## Environmental Impact statement (EIS)

The final environmental impact assessment report is referred to as EIS. Most national laws have specified what the content of EIS should have. Multilateral and bilateral financial institutions have also defined what should be contained in an EIS.

(viii)

## Decision-Making:

At each stage of EIA, interim decisions are made. These decisions influence final decisions made about the EIA. The EIA is submitted to designate authority for scrutiny before the final decision. If the EIS is accepted, an EIA license is issued.

## Conclusion:

EIA certainly has a crucial role to play in addressing environmental issues surrounding project development and especially power projects. The integration of environment into development planning is the most important tool in achieving sustainable development.

Q.1(A)

## National Conservation Strategy:

The Government of Pakistan (GoP) formally requested the IUCN (agreed to provide technical support) and CIDA (agreed to provide funds), work on Pakistan national conservation strategy began in 1985-86.

After seven year on 1<sup>st</sup> March 1992, PNCS was approved by the cabinet of Pakistan. The PNCS provided the agenda for the action and the implementation strategy over 10 years (1992-2001)

## Objectives of PNCS:

The main objectives of PNCS were

- i) Conservation of natural resources
- ii) Making sustainable development
- iii) Improving efficiency in the use and management of resources

## Parts of PNCS:

The 406 pages document was

divided into three parts

### Part I:

It deals with the state of Pakistan's environments

### Part II:

It presents detailed recommendation for various sectors of the economy.

### Part III:

It contains programmes with expected output and physical investment required over the 40-year period.

## Main attributes of PNCS:

It contains 14 core programme areas for priority implementation and including 68 specific programmes, each with long-term goal, expected results and resource investments.

## Recommended Core programme areas:

The 14 core programme areas for priority implementation were

- 1) Monitoring soils in croplands.

- ii) Increasing irrigation efficiency
- iii) Protecting watersheds
- iv) Supporting forestry and plantation
- v) Restoring rangelands and improving livestock
- vi) Protecting waterbodies and fisheries
- vii) Conserving biodiversity
- viii) Increasing energy efficiency
- ix) Developing and deploying renewable energy resources
- x) Controlling pollution
- xi) Managing urban waste
- xii) Supporting institutions
- xiii) Preserving cultural heritage
- xiv) Integrating population and environmental programmes

## Review of PNCS

The review of PNCS was completed in May 2000.

### Achievements:

The review concluded that PNCS was highly instrumental in

- i) Creating awareness about environment and conservation

ii) Initiating a consultative process for achieving its goals at various levels.

iii) Putting in place the environmental institutional framework.

### Limitations:

The review was concluded that PINCS has not resulted in.

i) Influencing macro-economic and sectoral policies.

ii) Providing incentives and safeguards for clean growth.

iii) Proper reporting on sustainable development and state of the environment.

### Conclusion:

'Pakistan National Conservation Strategy was partial successful and some objectives were not achieved'. The government of Pakistan could not implement it in true sense and so cannot obtained the perceived results of the strategy.

## Question no. 3(A)

### 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

## i) 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).

## i) 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.

## iii) 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

## iv) 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  $430^{\circ}$  ( $800^{\circ}\text{F}$ ).

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