

Read the question carefully and address exactly what is asked, avoiding unnecessary deviation.

Question No 2

Start with a clear and relevant introduction that shows understanding of the topic.

(a) Evolution of Environmental governance in Pakistan

Structure the answer logically: introduction, explanation/analysis, and a brief conclusion.

Environmental Evolution in Pakistan
Pakistan is among the most endangered countries

Use correct scientific terminology (e.g., biodiversity, sustainability, carbon cycle, eutrophication).

Due to the climate change driven by human intervention in natural system - Moreover, Pakistan has had its own environmental protection as follows:-

Explain concepts clearly and accurately, avoiding vague or generalized statements.

Constitution of Pakistan 1973
Constitution of Pakistan 1973 did not mention or focused on environment, rather it is considered to be silent on the issue.

Support answers with relevant examples, preferably from Pakistan or global case studies where appropriate.

Pakistan Environmental Protection Ordinance
The first legal document adopted by Pakistan was

Include data, statistics, or facts (e.g., temperature rise, deforestation rates) when relevant to strengthen arguments.

Pakistan Environmental Protection Ordinance (1973)
Its key features were being environment, threat to

Incorporate environmental laws, agreements, or protocols (e.g., Paris Agreement, Kyoto Protocol, SDGs) where applicable.

environment and mitigation measures to deal with the problems.
PEPA laid down the foundation of following:-

a) National Conservation Strategy (NCS)

b) Pakistan Environmental Protection Council (PEPC)

c) Pakistan Environmental Protection Agency (PEPA)

Show cause-and-effect relationships in environmental processes.

National Conservation Strategy:-

Focus on analysis and application rather than rote definitions.

Pakistan was the first country to call for a national conservation strategy in the world, due to which the document is referred as Pioneer-

Present balanced views by mentioning impacts,

NCS was finalized with the help of International Union for Conservation of Nature (IUCN) and Canadian International Development Authority (CIDA).

Following goals were included in National Conservation Strategy -:

- a) Promotion of sustainable development.
- b) Building Institutional Capacity to protect environment.
- c) Creating Public Awareness regarding environment.
- d) Mitigation land, water and soil pollution.
- e) Protection of agriculture through avoiding soil erosion and managing agricultural water runoff.
- f) Improving national forest cover and reduce deforestation.
- g) Increasing productivity of livestock through establishment of veterinary hospitals and other necessary measures.
- i) Conducting survey in Coastal Area, providing alternative employment opportunities to Coastal population and encountering marine pollution.
- j) Shifting towards renewable energy sources.

~~Policy~~ Rio Summit 1992

Pakistan presented its Plan and got 2-3 million dollars in order to achieve the goals, from IMF, World Bank (98%) and CIDA (2%).

NCS mid term report (2000)

In the progress report of NCS in year 2000, it was noted that Pakistan has improved in spreading public awareness, institutional capacity building and cooperation. However, it failed to shift towards sustainable development.

Pakistan Environmental Protection Council (PEPC)

PEPC is federal institution under the chairmanship of Prime Minister to formulate policies and oversee the environmental protection.

Stakeholders

- a) Ministry of Climate Change
- b) Ministry of Planning
- c) Ministry of Environment
- d) Ministry of Finance
- e) Ministry of Industries
- f) Agricultural department
- g) Provincial Environmental Authorities

Responsibilities / Agenda ::

- a) Supervise environmental development in Pakistan.
- b) Maintain sustainable development -
- c) Policy making regarding environment
- d) Review of annual progress report and give

Directions on environmental issues-

e) Ensure Solid Waste management-

f) ~~Take~~ ~~Supervise~~ measures to counter Pollutions (Air, Noise, Land, Water)

Pakistan Environmental Protection Agency -:

It is also ~~an~~ a Federal Institution for Administration of Environmental Development in Pakistan. Following duties were assigned to PEPA:

- i) To control industries and factories
- ii) To control ~~the~~ Commercial centers and markets
- iii) To conduct surprise visits -
- iv) To enforce environmental laws and policies
- v) To penalize violation of law -
- vi) To manage traffic laws and rules
- vii) To ensure sustainable development
- viii) To counter all types of pollutions -

Other necessary Policies of Pakistan:

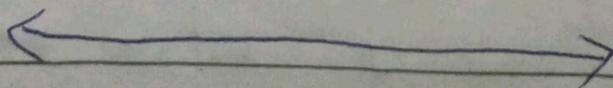
Policy for Clean Drinking Water (2009)

~~the~~ National Policy for Carbon Marketing (2024)

National Action Plan (2023)

National Policy on Climate Change

National Policy for Clean Drinking Water Revised (2018)



Question No 2 Part B

Climate Change and Key hindances in resolving climate change

Climate change is the change in Rainfall Pattern -

Or more broadly, it is all about the phenomena wherein, global temperature & weather system has been changed due to human intervention in the Natural setting.

Thus, world has been witnessing significant changes including weather pattern, resulting into catastrophic disasters and socio economic losses.

Indicators of climate change

- 1- Change in weather patterns.
- 2- Change in rainfall pattern
- 3- Change in monsoon timeline
- 4- Change in migration pattern of migran species.
- 5- Global warming
- 6- Ozone depletion.

Contributors in Average Normal climate ::

a) Global climate

The main contributors in weather pattern globally are LA Nina and EL Nino phenomena, which keep the standard weather.

b) Regional or local climate

Forests, mountains, seasalts, rivers and oceans determine the climate at regional or local level.

Effects of Climate Change ::

- i) Drought causing urban flooding.
- ii) Glaciers melting at accelerated pace, increasing water flow into rivers results in floods.
- iii) Increase in sea water level (8 inches) placing Coastal population (Approx 2 billion) under risk
- iv) Droughts affecting Agriculture and leading towards food insecurity.
- v) Causing Poverty and hunger.
- vi) Result in Homelessness.

Hindrances in resolving Climate Change Problem ::

Following main hindrances in resolving climate change merit attention :-

1- Population explosion

The increase in population results in deforestation, energy consumption and more transportation, increasing the addition of pollutants in atmosphere

2- Energy consumption

Burning of Coal, Gas, diesel and Petroleum releases the Carbon dioxide into the atmosphere changing natural setting.

3- Deforestation

Forests are natural sponges, responsible to absorb green house gases and maintain the temperature. Rapid deforestation leads towards climate change

d) Rapid Industrialization

Industrialization has improved life with a heavy cost of Air Pollution

b) releasing the pollutants into the climate.

e) unplanned urbanization

Unplanned urbanization generates more waste and transport that means additional pollutants both land and so atmosphere.

f) generation of solid waste

Due to urbanization, there is more generation of solid waste which releases CO₂ and methane into the air.

g) Volcanic eruption.

Volcanic eruption is a natural reason for climate change with ash and heat as an input into climate.

Changes in Atmosphere

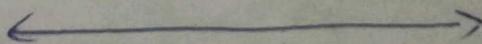
Addition of Greenhouse gases enhance the greenhouse effect and lead toward global warming.

Changes in lithosphere

Desertification, eutrophication and deforestation all contribute in climate change.

Changes in Hydrosphere

The water vapors that generate from oceans and all into atmosphere due to global warming increase and change weather patterns.



Question No 3 (Part A)

Define Eutrophication - Give its types, Processes and Controlling measures -

Eutrophication

Eutrophication is the process of @biotic of plants or Algae in the waters mainly in shallow water due to addition of growth ^{factors} ~~compounds~~ including Carbon, Phosphorus, Nitrogen.

Types of Eutrophication

There are mainly two types of eutrophication as given below :-

i) Natural Eutrophication

Natural Eutrophication is the type of Eutrophication wherein there is no involvement of human activities - It is generally slow process taking years and less harmful too -

ii) Cultural Eutrophication

This type of Eutrophication is caused by human activities - The process is rapid that can only take few weeks or months due to which it is considered to be more harmful -

Process of Eutrophication -:

Process of Eutrophication involves following steps -

- 1) Addition of growth factors into the water mainly due to Agricultural runoff or animal waste enters in the water with the help of rain water -

2- Growth factors result in growth of unnecessary plants and Algae in the water, covering the upper surface of water bodies-

3- This growth ~~is~~ reflects and stops entering entirely of solar radiation in the water

~~Controlling measures~~

4- Thus, resulting in death of plants -

5- Moreover, ~~to~~ with the passage of time plants start to decompose -

6- This decomposition process results in less oxygen and more Carbon dioxide leading towards suffocation.

7- At the end it changes water clarity, pH level, chemical composition and leads towards death of fishes in the water -

Controlling measures -:

1- The most important step in controlling Eutrophication managing agricultural water runoff and by reducing use of fertilizers -

2- Proper solid waste management and ~~discourage~~ open dumping

3- Proper management of Animal Waste specially dung to avoid the Eutrophication

Question No 3(b)

Phenomena of GHG and depletion of Ozone layer in relation with global warming-

Green House Effect

Green House effect is the natural process where in the green house gases (CO_2 , CH_4 , O_3 , NO) absorb & scatter the heat coming from sun. Green house gases mainly Carbon dioxide & Methane and Nitrogen perform this function.

Enhanced Green House Effect

Due to human activities, there is increase in green house gases in the atmosphere. ~~Due~~ This increase results in more absorption of heat coming from sun. Thus, leading towards increase in average temperature of earth called global warming.

Depletion of Ozone layer

Ozone layer is layer of gas present in the Earth Atmosphere (Stratosphere), which protects earth from ultra violet Radiation. However, release of Chloro fluoro carbons started affecting this layer causing a hole in it. This hole or depletion of was identified of Sherwood, Molina and Manabe in 1983. Thus Montreal protocol was adopted to control ozone layer depletion.

Ozone layer Depletion and Global Warming

Ozone layer is capable to protect earth from Ultra violet radiations coming from sun, whereas it reflects the UV rays and most of the solar content. However, due to depletion of ozone layer, there is a hole left for passing of UV rays and solar content without any disturbance or stoppage. This increase in penetration of solar radiations into the earth atmosphere causes global warming.

Conclusion -

Green House Effect is a natural process, which has been enhanced by human activities - leading towards global warming. Moreover human activities have also depleted the natural defense i.e. ozone layer i.e. another major reason behind increase in the Global Warming.

Question No 7. (Part A)

What is food insecurity - threats to agriculture posed by global warming & give appropriate measures

Food Insecurity

Food insecurity refers to shortage of food to fulfill the needs of any group, city or country. This means that there is not enough food to feed the population.

Causes of food Insecurity

1. Population explosion :- Increase in population at an accelerated rate has given rise to the problem of food shortage.
2. Natural Disasters :- Disasters like floods destroy the standing crops leading towards shortage of food.
3. ~~Droughts~~ Droughts :- less precipitation also affects food production.

Effects of food Insecurity

1. One of the major effect of food insecurity is hunger.
2. Another effect includes increase in Poverty rate.
3. Inflation also rises due to shortage of food.
4. Malnutrition in children leading to infant mortality.
5. Increasing mortality rate in pregnant women due to less provision of essential nutrients.

Threat to Agriculture Posed by Global Warming:-

Global warming has posed many threats to Agriculture as given below:-

1. Shortage of water leads towards fertile lands go completely barren.
2. Floods caused by glaciers melting at accelerated rate not only destroy the standing crops of wheat, sugarcane and rice but also wipe off the upper fertile layer of soil.
3. Global warming has changed weather patterns resulting in less productivity. For example production of Mango in Pakistan during 2022 was less than usual.
4. Global warming causes droughts that turns fertile lands into deserts as witnessed in Sindh and Balochistan.

Appropriate measures

Most important measures to save agriculture from Global warming are as follows:-

1. Construction of large dams to store water during floods or rain fall. And using the same in times of water scarcity in order to save lands from turning into deserts.
2. Establishing proper irrigation system in order to avoid wastage of water and provide

required capacity for the crops for enhancement in agricultural productivity.

3- Afforestation specially in water shed area will help in increasing precipitation and can also slow down the water flow during the heavy floods.

4- Advance methods to be introduced for agriculture production especially in rural and backward areas.

Question No 7 (Part B)

What is EIA. Process of EIA, benefits of EIA.

Environmental Impact Assessment

EIA or Environmental Impact Assessment is a framework designed to protect environment during the due to the effect of project activities including construction of roads, Railway tracks, Jam, Flyover, Airport, Under Pass or any other that may causes to impact environment more or little.

Process

Process of EIA involves following steps.

1- Project screening

This is the initial stage where cost, duration, location and type of project are analyzed before it starts.

2. Project Scoping :-

Project scoping is second phase to calculate socio economic benefits like employment opportunities, etc growth etc of the project.

3. Collection of basic Information :-

This is the third phase where data is collected including presence of plantation & water bodies, fisheries, topography, land form, agricultural lands, Archeology and direction of the project.

4. Prediction of basic threats :-

During the fourth phase, the possible threats to environment are assessed or predicted like noise pollution due to commercial activity or

5. Severity of threats :-

Severity of threats whether large or small is analyzed after prediction of threats and are classified accordingly.

6. Mitigation measures :-

This phase requires control measures to protect environment and ensure sustainable development.

7. Environmental monitoring :-

This is done during the project to analyze any violation of approved standards of environment.

8. Environmental Audit

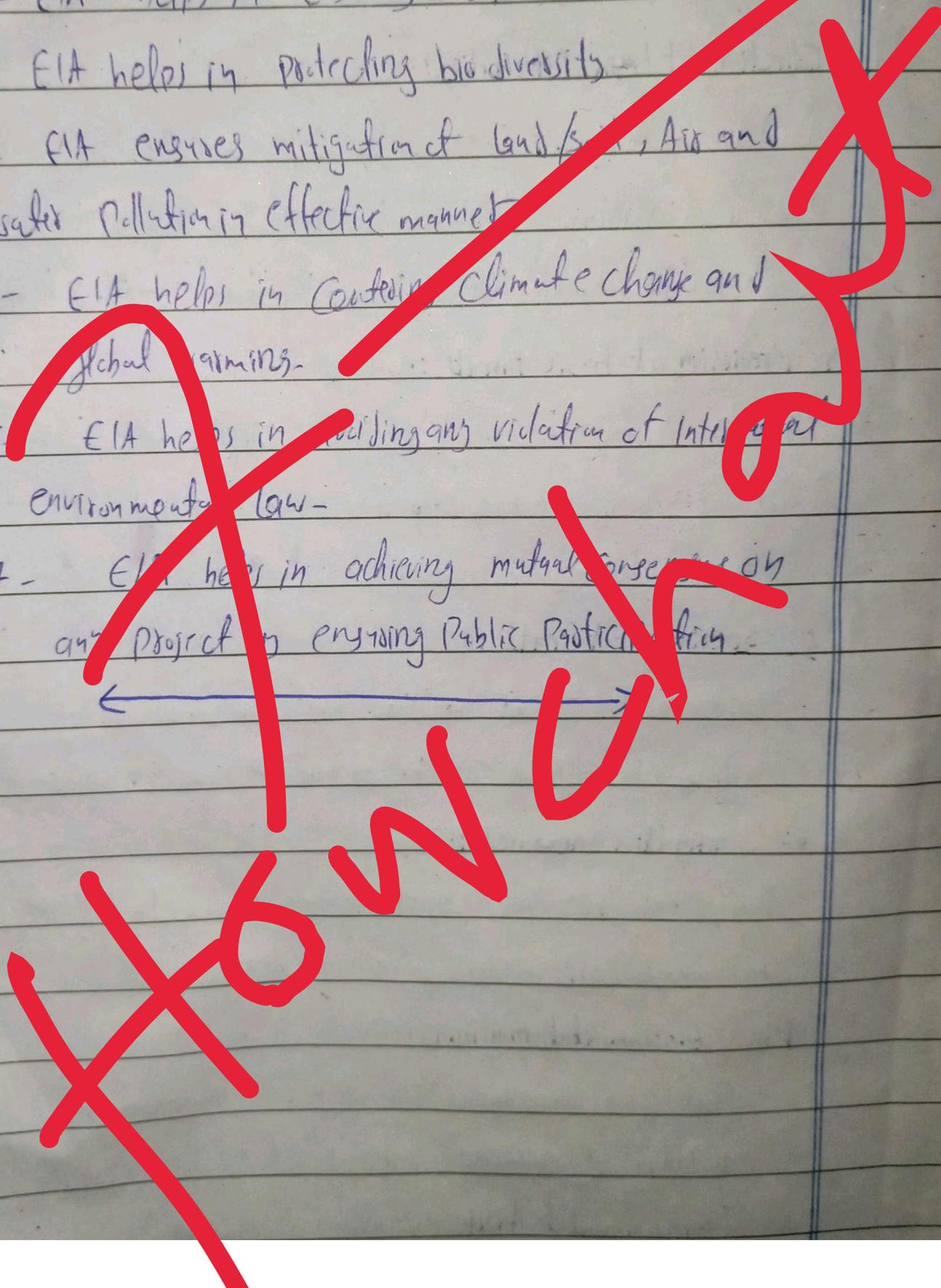
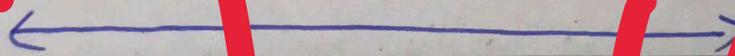
After completion of project, Audit is conducted by PEPA to assess the situation.

9. Public Participation

Public participation is necessary as per law in Pakistan.

Benefits of EIA

- 1- EIA helps in protecting environment
- 2- EIA helps in ensuring sustainable development
- 3- EIA helps in protecting bio diversity
- 4- EIA ensures mitigation of land/s, Air and water pollution in effective manner
- 5- EIA helps in containing climate change and global warming.
- 6- EIA helps in avoiding any violation of International environmental law.
- 7- EIA helps in achieving mutual consensus on any project by ensuring Public Participation.



Question No 6 (Part A)

What is solid waste management....?

Solid waste

Any waste which contains solid or semi solid particles is called solid waste - for example plants waste, food waste, Animal waste etc.

Types of Solid Waste :-

- Biodegradable waste :- The waste that can be easily decomposed (Animal waste)
- Inert waste :- The waste that is not decomposed (dirt, debris, construction waste)
- Recyclable waste :- That can be recycled (plastics, cans, glasses)
- Electric waste :- This include batteries, wires, ACs & other appliances.

Locations for generation of Solid Waste :-

The solid waste is mainly generated from following locations

- Institutional waste
- Industrial waste
- Municipal waste
- Community waste -

Solid waste Management :-

Following three steps are involved in solid waste management -

1- Collection Point - from where the waste is collected

Human resource - trained and efficient staff to do the job

vehicles - short and long vehicles in adequate

number to collect the waste.

2. Temporary Storage

This is the place where waste is brought for temporary storage to separate the recyclable components - Metals, this can only be done in 12-24 hours anywhere in between city.

3. Solid Waste management / decomposition -

1- Open dumping is discouraged for its adverse effects. Open dumping is the first method to ^{manage} decompose the solid waste by placing it openly in some designated location.

2- Composting

The second most efficient method is composting that involves biological method to turn the waste into compost.

3- Incineration

Incineration means burning of solid waste with the help of chemicals. (This is mainly applicable of hazardous waste).

4- Land filling

Land filling is the fourth and last method where the waste is buried into the land.

Pakistan's Solid Waste Management Policy ::

Pakistan adopted SWMP policy 2022 which highlighted following:

1- Employment of Municipal staff and vehicle allocation to manage solid waste -

2- Composting and Incineration location (like in Pakistan Institute of medical sciences)

Question No 6 Part B

Define biodiversity - Causes and effects of biodiversity loss.
value of biodiversity -

Biodiversity

Bio means life and diversity means variety.
Thus Biodiversity refers to the variety of life on Earth or in any geographic area.

Types

There are 3 classification of biodiversity.

a) Genetic

Genetic classification is on the basis of genes of species - Every living organism has its own genetic material.

b) Species

Classification of the biodiversity on the basis of species which have common characteristics or activities.

c) Ecosystem

The classification on the basis of ecosystem - Different ecosystem carry their own set of living organisms.

Benefits of biodiversity :-

1. Provision of food to survive
2. Helps in creating medicine
3. Timber industry runs on biodiversity.

Causes of biodiversity loss ::

The main causes behind biodiversity loss include ::

- 1- Population explosion that leads to deforestation -
- 2- Environmental laws violation by hunting or killing species -
- 3- Rapid industrialization
- 4- Solid waste management also caused loss in biodiversity.
- 5- Unplanned urbanization and Global warming -

Effects of biodiversity loss ::

- 1- Reduction in food availability & breeding leads to food insecurity -
- 2- Adverse effects on timber industries of furniture and ~~wood~~ Paper Industries -
- 3- Loss of precious animals and plants gone extinct
- 4- Change in natural setting of environment -

Value of biodiversity ::

Biodiversity is most valuable to keep the EC system going otherwise its loss can have adverse effect on life overall -