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Batch : 63

Subject : Environmental Science.

→ Q.No.1. Discuss in detail the salient features of Pakistan environmental Protection act 1997.

→ Historical Background:-

Pakistan Environmental Policy is based on Participatory approach to achieving objectives of sustainable development through legally, administratively and technically sound institutions. The Federal Environment Ministry was established in Pakistan in 1975 as follow up a Stockholm declaration of 1972. The Ministry was responsible for promulgation of the environmental Protection Ordinance of Pakistan in 1983. It was the first comprehensive legislation prepared in the country. The main objective of ordinance 1983 was to establish institutions i.e. to establish Federal and Provincial Environmental Protection ~~and~~ Agencies and Pakistan Environmental Protection

council (PEPC)

In 1992 Pakistan attended the Earth Summit in the state of Brazil and thereafter became Party to various international conventions and Protocols. This Political commitment augmented the environmental Process in the country. Same year, Pakistan Prepared a National Conservation Strategy, providing a broad framework for addressing environmental concerns in the country. In 1993 Environmental Quality Standards were designed.

The Pakistan Environmental Protection Act was enacted on 6th December 1997, repealing the Pakistan Environmental Protection Ordinance, 1983. The PEPA 1997 Provides the framework for implementation of NCS, establishment of Provincial Sustainable Development funds, Protection and conservation of species, conservation of renewable resources, establishment of Environmental Tribunals and appointment of Environmental Magistrates, Initial Environmental Examination, and

Environmental Impact Assessment.

⇒ Introduction:-

The Pakistan Environmental Protection Act 1997 was passed by the National Assembly of Pakistan on September 3, 1997, and by the Senate of Pakistan on November 7, 1997. The Act received the assent of the President of Pakistan on December 3, 1997. The Act repealed the Pakistan Environmental Protection Ordinance of 1983. This is "an act to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution and promotion of sustainable development."

It provides policy, legal and institutional framework for:

1. Implementation of National Conservation Strategy.
2. Establishment of Provincial Sustainable development fund.
3. Protection and conservation of species.
4. Conservation of renewable resources.
5. Establishment of environmental tribunals and magistrates.

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6. Initial environmental examination and EIA

⇒ Pakistan Environmental Protection Council

The apex body was first constituted in 1984 under section 3 of the Pakistan Environmental Protection Ordinance, 1983, with President of Pakistan as its chairman. In 1994, an amendment was made in the Ordinance to provide for the Prime Minister or his nominee to be the head of the council.

The council was reconstituted after enactment of the new law i.e. Pakistan Environmental Protection Act, 1997. It is headed by the Prime Minister of Pakistan. The council is represented by trade and industry, leading NGOs, educational institutions, experts, journalists and concerned ministries.

⇒ Establishment of Pakistan Environmental Protection Agency under Section 5:

In 1993, the Pakistan Environmental Protection Agency was established under section 6(d) of the Pakistan Environmental Protection Ordinance, 1983. The Agency started with meager

Staff and Resources.

However, a number of actions were taken which included notification of NEQS in 1993 for municipal and liquid industrial effluents and industrial gaseous emissions, motor vehicle exhaust, and noise. The functions and responsibilities of the Agency enhanced and it was strengthened technically and logistically to meet the environmental challenges. Pak-EPA also provides technical support to the Ministry of Environment.

⇒ Functions of Pak-EPA under Section 6

The Federal Agency may undertake inquiries of investigation into environmental issues, either of its own accord or upon complaint of any person or organization.

⇒ Powers of Federal Agency under Section 7

The Federal Agency may

⇒ Summon and enforce the attendance of any person and require him to supply any information or document need for the conduct of any.

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enquiry or investigation into any environmental issues;

⇒ enter and inspect and under the authority of a search warrant issued by the environmental magistrate, search at any reasonable time, any land, building, premises, vehicle, vessel, or other place where or in which, there are reasonable grounds to believe that an offence under this act has been or being committed

⇒ Provincial Environmental Protection Agencies

In all four Provinces, Environmental Protection agencies were created under the Provision of Pakistan Environmental Protection Act, 1997. The Federal Government has delegated its powers to the Provincial governments and they have further delegated powers to the Provincial Environmental Protection Agencies.

⇒ Initial Environmental Examination and Environmental Impact Assessment under Section 12:-

Environmental Assessment is a process to examine the environmental risks

and benefits associated with the developmental projects. The IEE and EIA Process has begun in the country in an organized manner. Section 12 explains that no Proponent of a Project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the Project is likely to cause an adverse environmental effect, an Environmental Impact assessment and has obtained from Federal Agency Approval. An IEE/EIA Regulations, 2000 has been notified under this section.

⇒ Prohibition of Import of Hazardous Waste under Section 13:-

The Pakistan Environmental Protection Act, 1997 requires that no person may import hazardous substances of which chemical activity is toxic, explosive, flammable, corrosive, radioactive, cause directly or in combination with other matters, an adverse environmental effect.

⇒ Regulation of Motor Vehicle under Section 15:-

Operation of a motor vehicle from

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Which gaseous emission or noise exceeds the NEQS, or other standards established by Pak-EPA where ambient conditions so require, have been prohibited. To ensure compliance with the NEQS, the Pak-EPA has been empowered to direct that pollution control devices by installed in motor vehicles or fuels specified by Pak-EPA be used in them or specified maintenance or testing be carried out on them.

⇒ Establishment of Environmental Tribunals under section 20:-

The Government is empowered to constitute Environmental Tribunals to hear cases relating to Pakistan Environmental Protection Act, 1997. The Federal Government has established four Environmental Tribunal one in each Province.

⇒ Formulation of Environmental Rules:-

Section 31 and 33 of this Act provide the powers for drafting and notification of any environmental act/law. Some of the environmental rules drafted and notified include:

1. NEQS Rules, 2001.

2. Environmental Sample Rules, 2004.
3. Pollution charge for Industry Rules, 2000.
4. Hospital Waste Management Rules, 2005.
5. PEPA Regulations, 2000.

⇒ Delegation of Powers:-

Powers pertaining to environmental governance can be delegated from federal government to ~~(federal)~~ Provincial governments and local governments under section 26 of Act.

⇒ Establishment of Environmental Tribunals:-

To ensure the conformity with environmental rules in Pakistan, section 20 of PEPA, 1997 directs to form environmental tribunals.

⇒ Overview of Pakistan Environment Protection Agency (PAK-EPA):-

PAK-EPA was established under section 5 of this Act. Earlier, in 1993, similar was formed under section 6(d) of PEPA, 1993. The functions of PAK-EPA are mentioned in section 6(2) of this Act.

PAK-EPA can undertake any type of inquiry or investigation into environmental issues. PAK-EPA can summon anybody and can enter and inspect any premises, building, and vehicle through warrants issued by

Magistrate as per provision of section 7 of this Act. EPA can be established in all Provinces.

→ IEE/EIA:-

This Act enables the institutional machinery to conduct Initial Environment Examination and Environment Impact Assessment of any Project under Powers provided in Section 12.

The Purposes of IEE/EIA provided in this act are.

1. To examine the environmental risks and benefits associated with development Projects a process is used and is called EA
2. No Proponent of the Project shall commence construction or operation without IEE.

⇒ Prohibition of Import of Hazardous Waste:-

Section 13 of the Act prohibits the import of hazardous substances. This act defines such a substance as a substance which is toxic, explosive, inflammable, corrosive, radioactive, etc.

⇒ Regulation of Motor vehicles:-

Section 15 of this Act is focused

on the regulation of use of motor vehicles. It directs the case of vehicle if gaseous emission or noise exceeds the limits provided in NEQS or other standards.

→ Penalties of Non-Conformance:-

Section 17(5) of this Act provides the power to environmental magistrates to impose following penalties in case of violation and non-conformance with the provision of this act:

1. Imprisonment up to 2 years.
 2. Closure of the factory.
 3. Confiscation of the factory; its machinery; owner vehicles, material or substances, etc.
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Q² Discuss in detail the climate mitigation and adaptation keeping in view the climate change risk index of Pakistan. (Marks = 20)

→ Introduction:

Pakistan ranks 8th globally in the climate change risk index, making it highly vulnerable to climate change impacts. Rising temperatures, altered precipitation patterns, and increased frequency of extreme weather events threaten Pakistan's economy, infrastructure, and human well-being. To mitigate and adapt human to these risks, Pakistan needs comprehensive strategies. Climate mitigation strategies focus on reducing greenhouse gas emissions to limit global warming and prevent catastrophic climate change impacts.

1) → Climate Mitigation Strategies:

Climate change poses an existential threat to human societies, ecosystems, and economies worldwide. Mitigation efforts focus on reducing greenhouse gas emissions to limit global warming.

(A) Energy Sector Mitigation:-

Energy Sector Mitigation refers to strategies and actions to reduce greenhouse gas emissions from the energy sector, which accounts for approximately 65% of global GHG emissions.

Energy Sector Mitigation objectives:-

1. Reduce dependence on fossil fuels
2. Decrease GHG emissions.
3. Enhance energy security.
4. Promote sustainable development.

Energy Sector Mitigation strategies:-

1. Renewable Energy Transition (solar, wind, hydro)
2. Energy Efficiency (building insulation)
3. Fuel Switching (natural gas, biomass)
4. Carbon capture and storage
5. Nuclear Energy
6. Smart Grids and Energy Storage
7. Green transportation (electric/hybrid vehicles)
8. Energy-Efficient Buildings

Energy Sector Mitigation Benefits:-

1. Reduced GHG emissions
2. Improved air quality
3. Economic benefits
4. Water conservation

Energy Sector Mitigation Challenges:-

1. High upfront costs.
2. Infrastructure constraints.
3. Policy and regulatory frameworks.
4. Technological limitations.

⇒ Pakistan's Energy Sector Mitigation:

1. Renewable Energy Policy (2019)
2. Alternative Energy Development Board
3. Pakistan Renewable Energy Society.
4. Energy Efficiency and Conservation Act (2016)

(1) Renewable Energy Transition:-

A Key Energy Sector Mitigation Strategy.

The energy sector accounts for approximately 65% of global greenhouse gas emissions.

Transitioning to renewable energy sources is crucial for mitigating climate change.

Renewable Energy Sources:-

1. Solar Energy
2. Wind energy
3. Hydroelectric power
4. Biomass Energy
5. Geothermal Energy.

⇒ Transition Strategies:-

1. Increase renewable energy share in energy mix.
2. phase out fossil fuel subsidies.

3. Implement policies and incentives.
4. Promote decentralized energy generation.
5. Invest in grid infrastructure and storage technologies.

⇒ Pakistan's Renewable Energy Potential:-

1. Solar : 1.09 million MW.
2. Wind : 346,000 MW.
3. Hydro : 60,000 MW.
4. Biomass : 3,000 MW.

Pakistan's Renewable Energy Targets:-

1. 20% renewable energy share by 2025.
2. 30% renewable energy share by 2030.

⇒ Energy Efficiency:-

Energy efficiency involves reducing energy consumption while maintaining or improving economic output and quality of life.

Energy Efficiency Measures:-

1. Building Insulation and Design.
2. Efficient Lighting (LED, CFL)
3. Smart Grids and Metering Energy Management Systems.

Benefits of Energy Efficiency:-

1. Reduced GHG emissions (up to 40% by 2030).
2. Energy cost savings (up to 30%).

3. Enhanced economic competitiveness.

Energy Efficiency Technologies:-

1. Energy-efficient HVAC systems.
2. Smart thermostats.
3. Power-saving electronics.
4. Energy-efficient motors.

B → Transportation Mitigation:-

Reducing Emissions from the world's most polluting sector. The transportation sector accounts for nearly 15% of global greenhouse gas emissions, making it one of the largest contributors to climate change. Transportation mitigation strategies aim to reduce GHG emissions from various modes of transportation, including road, air, rail, and maritime.

The Urgency for Transportation Mitigation:-

1. Rapid growth in global ~~to~~ transportation demand.
2. Increasing emissions from transportation.
3. Air pollution and public health concerns.
4. Energy security and economic implications.

Transportation Mitigation Objectives:-

1. Enhance air quality.

2. Promote sustainable transportation modes.
3. Support economic growth and development.
4. Reduce GHG emissions from transportation.

Key Transportation Mitigation Strategies:

1. Sustainable transportation modes.
2. Smart transportation systems.
3. Electrification of transportation.

Pakistan's Transportation Mitigation context:

1. Rapid Urbanization and transportation growth.
2. Increasing air pollution and public health concern.
3. Need for sustainable transportation infrastructure.

Pakistan's Transportation Mitigation Initiatives:

1. National Transport Policy (2018)
2. Electric Vehicle Policy (2020)
3. Public Transportation Projects.
4. Cycling and Walking Infrastructure Development.

→ C. Industrial Mitigation:

The industrial sector accounts for approximately 21% of global greenhouse gas emissions, making it the largest emitting sector worldwide. Industrial mitigation sector aims to reduce GHG emission from various industrial processes.

1. Cement Production.

2. Steel manufacturing.
3. Chemical Processing
4. oil refining
5. Paper and Pulp Production.

The Urgency for Industrial Mitigations

1. Resource depletion and waste management concerns.

2. Climate change impacts on industrial operations.

3. Rapid industrial growth in emerging economies.

Key Industrial Mitigation Strategies:-

1. Circular Economy Practices (recycling, waste reduction).

2. Carbon capture and storage.

Pakistan's Industrial Mitigation Context:-

1. Rapid industrialization and urbanization.

2. Need for sustainable industrial development.

Pakistan's Industrial Mitigation Initiatives:-

1. National climate change policy.

2. Industrial Energy Efficiency Program.

Climate Adaptation Strategies:-

Building Resilience to a changing climate.

Climate change impacts are unavoidable, and

adaptation is essential for building

resilience and minimizing harm.

Climate adaptation strategies aim to adjust

natural and human systems to cope.

with climate-related stresses.

The Urgency for Adaptation:-

1. Devastating climate-related disasters and economic losses.
2. Vulnerable populations and ecosystems at risk.
3. Insufficient global adaptation efforts.

Adaptation Objectives:-

1. Reduce climate-related risks and vulnerabilities.
2. Enhance resilience and adaptive capacity.
3. Protect human health, livelihoods, and ecosystems.

Key Climate Adaptation Strategies:-

1. Infrastructure Adaptation (sea walls)
2. Ecosystem-Based Adaptation (ecosystem restoration)
3. Social Adaptation (water management)
4. Economic Adaptation.
5. Institutional Adaptation (policy, governance)

Pakistan's Adaptation Context:-

1. High climate vulnerability ranking.
2. Water scarcity and agricultural challenges.
3. Frequently extreme weather events.

Pakistan's Adaptation Initiatives:-

1. National climate change Policy (2012)
2. Climate change Adaptation plan (2018)
3. Climate-Resilient Agriculture Program

Challenges and Opportunities:-

1. Limited financial resources.
2. Institutional Capacity gaps.
3. Climate information and early warning systems.

