

Date: 22-01-25

Maham - 141 - Westridge
Env. Sciences

Day: _____

Q2. What are the env. management options ...

(1)

1) INTRODUCTION:

Environmental management is a critical field that focuses on the sustainable interaction between human activities and natural environment. As environmental issues such as climate change, pollution, biodiversity loss and resource depletion becomes increasingly pressing, effective management strategies are essential to mitigate these problems.

2) ENVIRONMENTAL MANAGEMENT

Environmental management refers to:

“The process of allocating natural and artificial resources as to make optimum use of the environment in satisfying the human need without compromising the need of next generations that is also a sustainable process of managing the environment.”

3) Environmental Management Options in Addressing Environmental Problems:

The key management approaches include:

1) Environmental Management Systems:

To address the environmental problems early and actively the incorporation of environmental

management approaches such as environmental impact assessment (EIA) can be adopted and is made compulsory before any of the developmental projects are started so that we can gain the environmental data and find the impacts of the project on the environment and suggest mitigation and adaptive measures before hand.

2) Regulatory frameworks:

One of the primary options for environmental management involves establishing regulatory frameworks that set standards and limits for pollutant and for resource use. Governments can implement laws and regulations that requires industries to implement specific environmental standards. For example the safe drinking water policy of Pakistan renewed in 2018 and made in 2009. This policy includes standards for water that is considered drinkable.

3) Economic Instruments:

As business and industries only understand the language of money, this can be used as an economic instrument like taxes, subsidies and tradeable permits designed to internalize

the external costs associated with environmental degradation. For instance, carbon pricing mechanism such as carbon taxes encourages companies to reduce carbon emissions and subsidies like carbon-crediting and to promote renewable energy and clean energy over fossil fuels.

4) Sustainable Resource Management:

Sustainable Resource Management (SRM) focuses on using natural resources in a way that meets current needs without compromising future generations' ability to meet their own needs. This includes practices such as water conservation strategies, Integrated water resource management (IWRM), that ensures water resources are managed properly and their ecological health should also be taken under consideration.

5) Technological Innovation:

Advancement in technology play a significant role in addressing environmental problems through improved efficiency and reduced waste generations. Innovations such as renewable energy technology (solar panels, wind turbines), waste recycling systems,

and pollution control devices help minimizing negative impacts on the environment. Furthermore, smart technologies can optimize resource use in agriculture or urban planning, (smart cities) leading to more sustainable outcome.

(4)

6) Conservation Strategies:

Conservation strategies aims to protect ecosystems and biodiversity through various means such as establishing protected areas (national parks and wild life reserves), restoring degraded habitats, and implementing species recovery programs. These efforts help maintain ecological balance while providing essential services like clean air and water.

(4)

7) Community Engagement & Environmental education and awareness:

Engaging local communities in environmental decision-making processes is crucial for successful environmental management. Community-based initiatives empower individuals to take actions regarding local environmental issues through educational programs that raise awareness about sustainable practices. Communities can help develop tailored solutions for problems.

(2)

3) International Cooperation:

Many environmental issues transcend national borders, thus, international cooperation is substantial for effective management strategies. Treaties such as the Paris Agreement on Climate Change and the International Conferences like COP1 session exemplify global efforts to combat shared challenges through collective action among countries worldwide. The transfer of technology and developmental aids should also be made a part of sustainable development initiatives to encourage developing nations for incorporating environmental friendly technologies and developments.

4) CONCLUSION:

In conclusion, addressing the environmental problems requires a multifaceted approach that combines regulatory measures, economic incentives, community engagement, technological innovations, conservation efforts and international collaboration. By employing these diverse strategies collectively rather than in isolation, societies can work together toward sustainable developmental goals while safeguarding the planet's health for future generations.

14/20

4. What is Bio-diversity?

1)

BIODIVERSITY:

Bio means "life" and versity means "variety". Collectively it means "variety of life."

According to conservation of biodiversity this term is defined as.

"About the variability in between the living organisms, among the living organisms and within the species of living organisms."

It encompasses different species of plants, animals, fungi and microorganisms, as well as genetic diversity within these species and ecosystems they form.

2)

LEVELS OF BIODIVERSITY:

Genetic level

Species level

Ecosystem level

(i) Genetic level biodiversity:

This level refers to the variation in genes among individuals within a species. Genetic diversity is crucial for a population's ability to adapt to a changing environment and resist diseases.

(ii) Species Diversity:

This level pertains to the variety of species within a particular region or ecosystem. It includes both number of different species (species richness) and their relative abundance.

(7)

(iii) Ecosystem Diversity:

This level encompasses the variety of ecosystems in a given area, including forests, wetlands, grasslands and oceans. Each ecosystem has its own unique community of organisms that interact with one another and their environment.

3) IMPORTANCE OF BIODIVERSITY:

Biodiversity is vital for several reasons.

(i) Ecosystem Services:

Biodiversity contributes to essential services that supports life on Earth, such as pollination of plants, purification of water and air, nutrient cycling and climate regulation.

(ii) Food Security:

A diverse range of species ensures a stable food supply by providing various crops and livestock that can withstand pests and diseases.

... an example of
... minimize loss during natural

i) Medinal Resources:

Many medicinals are derived from natural compounds found in plants and animals. A rich biodiversity increases the chances of discovering new medicinal resource. It is estimated that about 10-100 million variety is present on Earth and we only have explored/discovered 1.5-2.5 million variety.

ii) Cultural Value:

Biodiversity holds significant cultural importance for many communities around the world. It influences traditions, spirituality and identity. Eating habits are also determined by biodiversity. For example in Bangladesh coastal communities consume rich and fish on daily basis.

iii) Recreational Value:

Different biodiversity and ecosystems around the world has encourage a huge tourism industries because of the recreational value of the unique ecosystems and their benefits and beauty.

iv) Resilience to Change:

Ecosystem with high biodiversity are generally more resilient to environmental changes such as climate change or natural disasters.

4) BIODIVERSITY LOSS:

Biodiversity loss refers to

"The decline in the number and variety of living organisms in a specific area or globally."

9

(i) MECHANISM OF BIODIVERSITY LOSS:

This loss occurs through various mechanisms, enlisted below:

a) Habitat Destruction:

Human activities such as deforestation, urbanization, agricultural expansion, and mining lead to habitat loss for many species.

b) Environmental Pollution:

The contaminants released in air, water and soil can harm wild life directly or disrupt ecosystems by altering habitats.

c) Climate Change:

Changes in climate patterns affect species' habitats and food sources; some may adapt quickly enough to survive these changes.

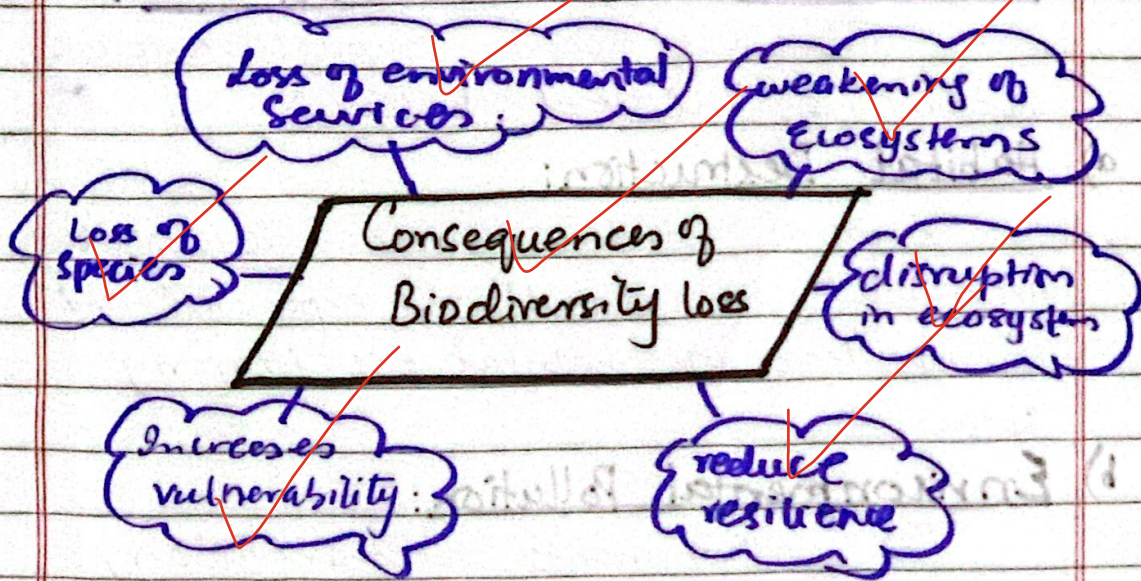
d) Overexploitation of resources:

Unsustainable hunting, fishing, logging and harvesting practices deplete populations faster than they can reproduce.

4) Invasive Species:

Non-native species introduced into an ecosystem can out compete native species for resources or introduce diseases that native populations cannot withstand.

(10)



5- CONCLUSION:

The biodiversity is crucial for maintaining healthy ecosystems that supports life on Earth through various levels, while its loss poses significant risks not only to wildlife but also human survival.

14/20

Q6. Explain Climate change - - - - -

1. UNDERSTANDING CLIMATE CHANGE:

(11)

CLIMATE CHANGE:

Climate change refers to:

"It is defined as long term alterations in temperature, precipitation, wind patterns, and other elements of the Earth's climate system."

Climate change is primarily accelerated due to the human activities, particularly burning of fossil fuels, deforestation and industrial processes that increase concentration of greenhouse gases (GHGs) in the atmosphere. These changes result in a range of environmental impacts including rising sea level, more frequent and severe weather events (such as floods and droughts), shifts in agricultural productivity, and threats to biodiversity.

2. CLIMATE CHANGE AND PAKISTAN:

Pakistan is significantly affected by climate change despite contributing less than 1% of global GHGs emissions. The country ranks as one of the most vulnerable nations to get affected by climate related disasters due to its geographical factors like location and terrain

disasters.

socio-economic conditions, and resiliences on agriculture. Over 33 million people were internally displaced due to floods exacerbated by climate change as of 2022. (UN report)

(12)

3. ADAPTATION MEASURES FOR: CLIMATE CHANGE IN PAKISTAN:

(i) National Action Plan (NAP):

In July 2023, Pakistan unveiled its National Adaptation Plan which aims to create a climate resilient society by addressing income inequality and social disparities. The NAP emphasized on strengthening local community capacities through green jobs, sustainable infrastructure development, technology transfer, and effective collaboration among government bodies, private sectors and civil society. However, it relies heavily on foreign funding for implementation without clearly defined financing mechanisms.

(ii) Local-Level Implementation:

Effective adaptation strategies must focus on local governance rather than national-level directives due to the politicized nature of public services in Pakistan. Identifying

Strategic priorities at sub-national levels can lead to more meaningful outcomes. This includes creating vulnerability maps to pinpoint regions most at risk from climate impacts.

(iii) Community Capacity Building:

Training programs are essential for equipping communities with knowledge about disaster preparedness and resilient technologies and weather resilient crops such as cotton and wheat. Community-led initiatives have been recognized globally for their effectiveness in implementing adaptation strategies.

(iv) Infrastructure development:

There is a pressing need for reinforcing existing infrastructure to withstand extreme weather events. Development of green infrastructure is also crucial for enhancing resilience against flooding and other climate related disasters. The concept of sustainable and smart cities and sponge cities by China and Japan should be taken as an example for minimizing loss during natural disasters.

(v) Public Awareness Campaigns:

Raising awareness about available technologies for climate adaptation among low income populations is critical. Advocacy efforts should aim at informing communities about new agricultural practices that can mitigate the effects of climate change.

(14)

(vi) International Collaboration:

Pakistan's leadership role at international forum like COP27 and COP29 has highlighted its commitment to addressing climate challenges. The establishment of a loss and damage fund during these summits could provide vital financial support for implementing adaptation measure outlined in the NAP.

13/20

4) CONCLUSION:

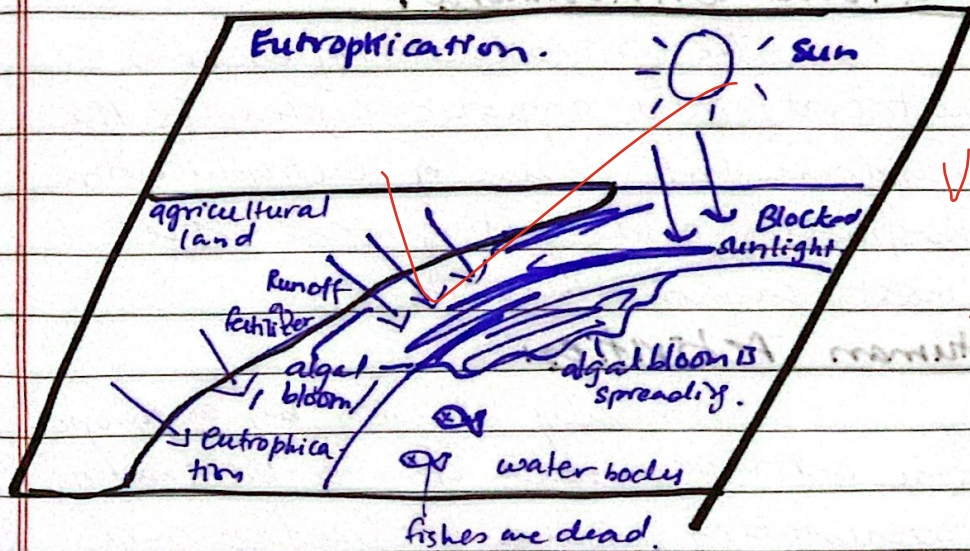
In summary, while Pakistan has made strides towards developing comprehensive adaptation strategies through frameworks like National Action Plan (NAP), successful implementation will require localized approaches that engage communities directly affected by climate change impacts.

Q8.

EUTROPHICATION:

"Eutrophication is a process characterized by the accumulation of nutrients in a body of water, leading to excessive growth of aquatic organisms, particularly algae."

(15)



V. Good

Types of Eutrophication:1) Natural:

This type of eutrophication is occurred naturally and its slower as compared to the cultural eutrophication.

2) Cultural:

This type of eutrophication is contributed by human activities, resulting in what is known as cultural eutrophication.

CONTRIBUTERS OF EUTROPHICATION:

Primary nutrients involved are phosphorus and nitrogen, which can originate from agricultural runoff, sewage discharge and industrial waste.

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Causes of Eutrophication:

1) Nutrient enrichment:

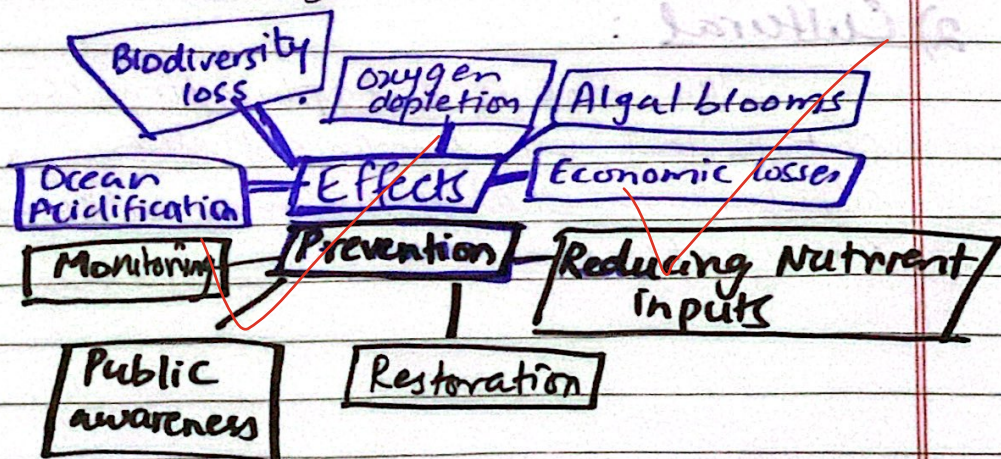
The introduction of excess nutrients into aquatic system is the fundamental cause of eutrophication. Phosphorus and nitrogen are the most common culprits.

2) Human Activities:

Primarily driven by anthropogenic activities such as, urbanization, deforestation, industrialization and agricultural expansion.

3) Natural Processes:

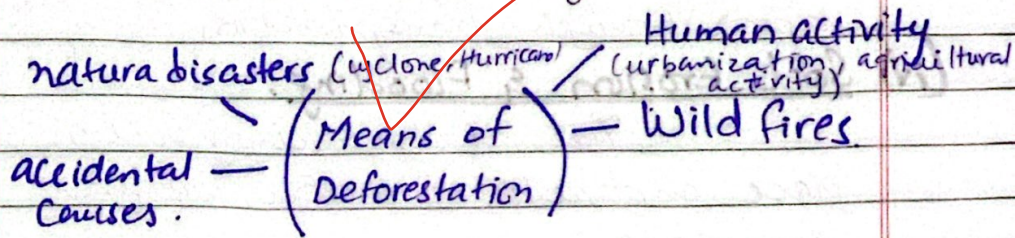
When human activity plays a significant role, natural process also contribute to this process over time through sedimentation and nutrient cycling while in ecosystem.



1) DEFORESTATION:

Deforestation refers to
 "Intentional clearing and
 destruction or removal of trees and
 forests."

This process can occur through
 various means, including:



The primary driver of deforestation
 is agriculture, according to UN food
 and Agriculture organization (FAO), which
 accounts for approximately 80% of forests
 loss globally.

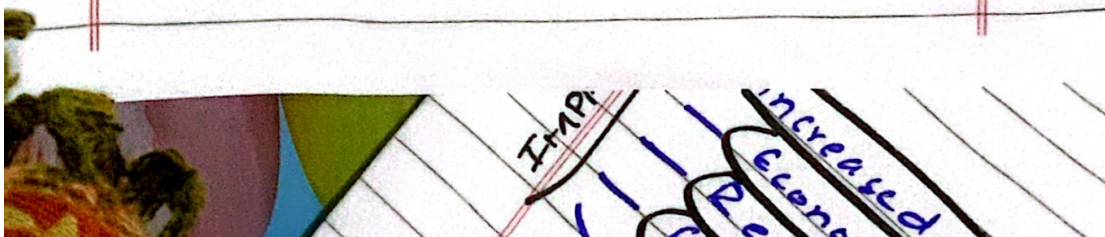
2) Environmental Effects of Deforestation:

(i) Loss of Habitat:

One of the most critical
 consequences of deforestation is habitat
 loss for countless species. According to
 World Wildlife fund (WWF) about 70% of
 the terrestrial animals and plants species
 depends on forests for their survival.

(ii) Increased Green House Gases (GHGs):

Trees plays vital role in
 absorbing carbon dioxide from the
 atmosphere, therefore, they are known as
 'Carbon sinks.' When forests are cleared



this absorption capacity diminish.

(iii) Water Cycle Disruption:

Forest are essential for maintaining the water cycle. They help regulate atmospheric moisture levels by releasing water vapors through transpiration.

(iv) Soil Erosion & Flooding:

Trees help anchor soil in place and retain water within ecosystems.

3) Global Trends in deforestation

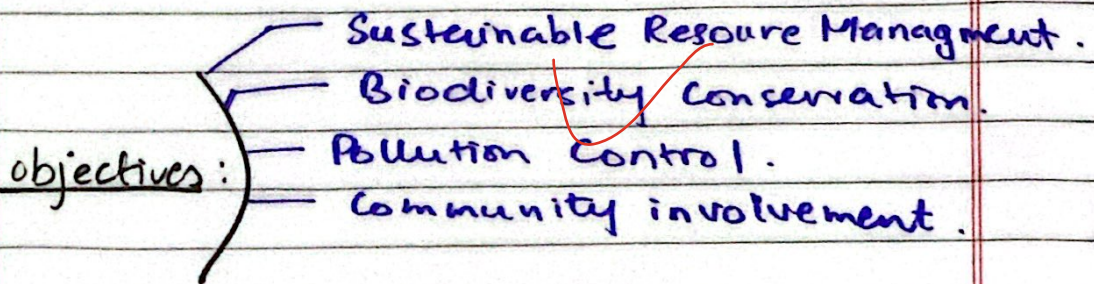
It is estimated that around 10 million hectares of forest are lost each year due to deforestation activities. According to WWF report, between 2000-2020 alone, there was a net loss of approximately 4.7 million hectares annually when accounting for deforestation and afforestation (tree planting) efforts.

1) National Conservation Strategy (NCS):

The National Conservation Strategy (NCS) of Pakistan is a comprehensive framework aimed at addressing the environmental challenges faced by the country. First introduced in 1992 as a result of an initiative taken after Rio Summit of 1992. It is the guiding document for sustainable development and environmental management in Pakistan.

2) Objectives of NCS:

National Conservation Strategy was developed in response to increasing environmental degradation, loss of biodiversity and unsustainable resources use in Pakistan.



3) Key Components:

(i) Policy Framework:

Establishing policies that integrate with environment as well as developmental sector.

(ii) Institutional Arrangements:

Strengthening institution responsible for environmental governance.

(iii) Public awareness:

Raising awareness among citizens about environmental issues

20

(iv) Research & Monitoring:

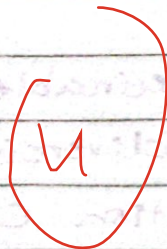
Encouraging scientific methodology and research to monitor environmental changes and assess the effectiveness of conservation initiatives.

Implementation Mechanisms

Legislation

Financial Support

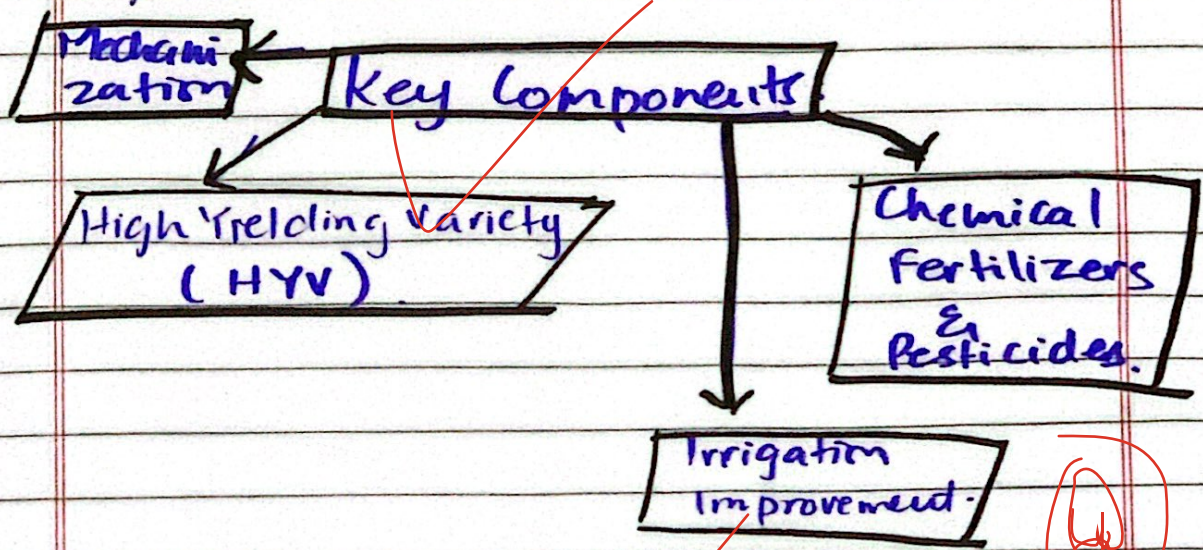
Capacity Building



GREEN REVOLUTION

Often green revolution is referred as Third Agricultural Revolution, was a significant period in agricultural history characterized by introduction of new technology and practices that dramatically increased crop yields. This movement began in developed countries in early 20th Century and expanded until the 1980s.

21



- IMPACTS**
- Increased Food Production
 - Economic Growth.
 - Reduction in Poverty.
 - Environmental Concerns.
 - Population Growth.

3