

24/3/23

ASSIGNMENT 3

Unit - 3

Biodiversity and Conservation

Q.1 Define Biodiversity. Enlist the levels of Biodiversity.

→ Biodiversity refers to the variety of living organisms that exist on Earth, including the diversity of species, their genetic variety and the diversity of ecosystems and ecological processes in which they occur.

The levels of biodiversity can be classified into three categories :

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

A.2 Explain Genetic and Species and Ecosystem diversity

→ Genetic diversity refers to the variability of genes within a species. This diversity arises due to mutations, genetic recombination and gene flow, which lead to differences in traits among individuals within a population. Also it is the raw material for evolution, allowing species to adapt to changing environments & develop new traits. Finally it is essential for the breeding of crops and livestock, which rely on genetic diversity to maintain productivity and adapt to new challenges.

→ Species diversity refers to the variety of different species in an ecosystem or on the planet. For example, some species are predators that help to regulate populations

of other species, while others are pollinators that enable the reproduction of plants. It also provides ecosystem services, such as food, medicine and recreation which are important for human well-being. It is threatened by habitat destruction, climate change, overexploitation and pollution, which reduce the availability of resources and increase the risk of extinction.

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Ecosystem diversity refers to the variety of different ecosystems such as forests, wetlands, grasslands and oceans that exist on Earth. This diversity is important because different ecosystems provide different habitats for different species and it also contributes to the regulation of the Earth's climate and biogeochemical cycles, as each ecosystem has its own patterns of energy and nutrient flow. It is threatened by habitat destruction, climate change and the spread of invasive species, which disrupt ecological processes and reduce the ability of ecosystems to provide services.

Q.3

India as mega biodiversity nation.

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India is considered a mega biodiversity nation due to its vast and diverse array of flora and fauna. It is one of the top 17 countries in the world that are considered as "megadiverse", and it is home to about 7-8% of the world's recorded species.

→ India is home to over 50,000 species of plants and more than 90,000 species of animals including about 1,300 species of birds, 450 species of mammals and 500 species of reptiles. It is also home to a large number of endemic species, which are found only in India and nowhere else in the world. For example, the Western Ghats, a mountain range in south India, is one of the world's eight "hottest hotspots" of biodiversity and is home to many endemic species of plant, birds and mammals.

→ India has also established a network of protected areas, including national parks, wildlife sanctuaries and biosphere reserves, to conserve its biodiversity. These protected areas cover about 5% of the country.

Q.4 Enlist and explain biogeography zones of India.

→ India's biogeography can be broadly divided into ten zones based on the climatic conditions, topography and distribution of flora and fauna, which are :-

i) Trans-Himalayan Zone.

This zone covers the high-altitude regions of Ladakh and Tibet. The vegetation here is sparse and the fauna is adapted to the harsh cold desert conditions.

ii) Himalayan Zone.

This zone covers the Himalayan mountain range, which is rich in biodiversity. The vegetation ranges from tropical to temperate, and the fauna includes species such as snow leopard, Himalayan black bear & musk deer.

iii) Desert zone:

This zone covers the Thar Desert and the surrounding areas. The vegetation here is xerophytic and the fauna includes species such as Indian bustard, desert fox & Great Indian Bustard.

iv) Semi-arid Zone

This zone covers the areas between the desert zone and the Deccan Plateau. The vegetation here is thorny and the fauna includes species such as Indian gazella, Indian wolf and Indian fox.

v) Western Ghats Zone:

This zone covers the mountainous region of the western Ghats, which is rich in biodiversity. The vegetation ranges from evergreen to semi-evergreen and the fauna includes species such as lion-tailed macaque, Nilgiri tahr and Malabar giant squirrel.

vi) Deccan Plateau Zone:

This zone covers the Deccan Plateau, which is mainly composed of black soil. The vegetation here is dry deciduous, and the fauna includes species such as Indian rhinoceros, Indian elephant and Bengal tiger.

vii) Gangetic Plain Zone.

This zone covers the fertile plain of the Ganges River. The vegetation here is tropical deciduous and the fauna includes species such as Indian rhinoceros, Indian elephant and Ganges river dolphin.

viii) North-East Zone.

This zone covers the north-eastern states of India. The vegetation here is tropical evergreen and the fauna includes species such as Hoolock gibbon, clouded leopard and Asian Elephant.

ix) Islands Zone

This zone covers the Andaman and Nicobar islands and Lakshadweep islands. The vegetation here is tropical and the fauna includes species such as dugong, saltwater crocodile and Nicobar pigeon.

x) Coastal zone

This zone covers the coastal areas of India. The vegetation here is mangrove, and the fauna includes species such as Olive Ridley Turtle, Indian bullfrog and painted stork.

Q5 Brief on In-Situ and Ex-Situ Conservation of biodiversity.

→ In-Situ conservation refers to the conservation of species and ecosystems in their natural habitat.

It involves the collection, breeding and maintenance of living organisms in captivity. It involves the protection and management of natural areas such as national parks, wildlife sanctuaries and biosphere reserves as well as the conservation of species on private lands, community lands and other areas under the jurisdiction of local communities. The aim of in-situ conservation is to maintain and restore natural ecosystems and their processes and to protect the biodiversity they support.

→ Ex-Situ conservation, on the other hand, refers to the conservation of species outside their natural habitats. It involves the collection, breeding and maintenance of living organisms in captivity, such as zoos, botanical gardens and seed banks. The aim of ex-situ conservation is to preserve genetic diversity, to provide a safety net against the loss of biodiversity in the wild, and to support research, education and public awareness of biodiversity.

→ Also, In-Situ is often called "On-Site conservation" and ex-situ is often called "Off-Site conservation".

Q.6 Enlist threats of biodiversity & explain habitat loss.
→ i) Habitat loss and fragmentation.

This is the biggest threat to biodiversity. Human activities such as deforestation, urbanization, activities

agriculture, mining and infrastructure development are destroying and fragmenting them into smaller and isolated patches. Habitat loss leads to the loss of species, disruption of ecological processes and the spread of invasive species.

ii) Climate Change.

It is the altering in temperature, rainfall patterns and sea levels, which are affecting the distribution and abundance of species.

Climate change is causing the extinction of species, changing the timing of seasonal events and increasing the frequency and intensity of extreme weather events.

iii) Overexploitation.

This refers to the unsustainable use of natural resources such as wildlife, fisheries and forests. Overexploitation can lead to the extinction of species, the depletion of natural resources and the collapse of ecosystems.

iv) Pollution

Pollution including air, water, soil pollution is affecting the health and survival of species. Polluted environments can lead to reduced reproductive success, development abnormalities and the spread of diseases.

v) Invasive Species

Invasive species are non-native species that

are introduced into new environments and can cause harm to the native species and ecosystems. Invasive species can outcompete native species, disrupt ecological processes and alter habitats.

Q.7 Describe value of biodiversity.

-iv) Ecological Value.

This Biodiversity plays a crucial role in the functioning of ecosystems. It contributes to the regulation of climate, water and nutrient cycles, the provision of food, fuel and medicine and the maintenance of soil fertility and erosion control. Biodiversity also supports pollination, seed dispersal and pest control and helps to control diseases and regulate populations of species.

v) Cultural Value.

Biodiversity is important to human cultures and societies, providing spiritual, aesthetic and recreational benefits. It forms the basis of traditional knowledge and practices, such as indigenous medicine and is the source of inspiration for art, literature and music.

vi) Economic Value.

Biodiversity provides direct and indirect economic benefits to society, such as the provision of food, fiber and fuel as well as the generation of income and employment through tourism,

recreation and research. Biodiversity also supports ecosystem services such as water purification, carbon sequestration and soil formation which have significant economic value.

iv) Scientific Value

Biodiversity provides a source of scientific knowledge and discovery, allowing us to understand the functioning of ecosystems, the evolution of species and the interactions between living organisms and the environment. Biodiversity also provides a basis for research and development, leading to the discovery of new medicines, technologies and products.

Q.8 Explain different Services of ecosystem and biodiversity.

- i) Provisioning Services.

It refers to the products that humans derive from ecosystems such as food, water, timber and fuel. Ecosystems provide the raw materials and resources that we need for our daily lives and economic activities.

ii) Regulating Services.

It refers to the benefits that ecosystems provide in regulating natural processes and reducing the impacts of natural disasters. For example, ecosystems can regulate the climate, purify the air and water, regulate floods and droughts and control soil erosion.

iii) Supporting Services.

It refers to the benefits that ecosystems provide in supporting other ecosystem services, such as nutrient cycling, pollination and seed dispersal. These services are essential for the functioning of ecosystems and the provision of other ecosystem services.

iv) Cultural Services.

It refers to the non-material benefits that humans derive from ecosystems such as spiritual and aesthetic values, recreational opportunities and cultural heritage. Ecosystems provide inspiration, enjoyment and a sense of identity and belonging to human societies.

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