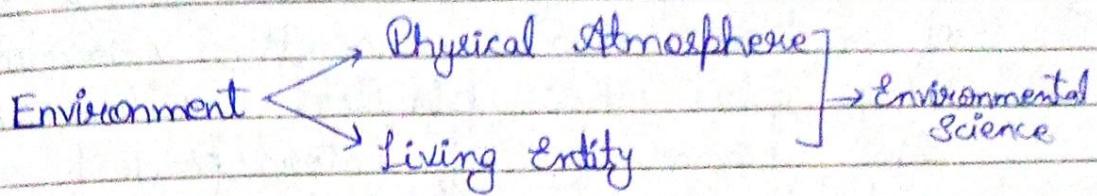


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## # Environmental Science



### \* ECOLOGY [Study about Living Entity Habitat]

- This term was coined by ERNST HAECKEL (Invented) in the year 1866.
- Ecology is the study of organism in their natural habitat.
- ★ → Ecology is the science that deals with the interrelationship between various organism and their natural habitat.
- Ecology is a field in which one person tries to study the living entities with their natural habitat.

\* The Botanist Alexander von Humboldt, He studied the relationship between the distribution of Plants in regional climates, the work of Von Humboldt was followed by

(1) Scientist

(2) ~~The most~~ Botanist → Who studies about Plants.

The most influenced person was 'Charles Darwin'.

↳ The origin of species  
He talked about evolution. → Survival

Q. What do you understand by ecosystem?

A. Ecosystem is defined as a small segment of nature, embracing the community of living things plus the physical environment. It is the community of interdependent organism and the environment they inhabit. A comprehensive and all-encompassing definition of ecosystem is that it is the community of organism and populations interacting with one another and with the chemical and physical components of the environment.

### \* Components of Eco-System:-

- (1) Monera — Bacteria
- (2) Protista — Algae
- (3) Fungi — Mushrooms
- (4) Plantae — Green Plants
- (5) Animalia — Animal Species.

Q. What is the argument of 'The origin of species' by Charles Darwin?

'Darwin' believe that in the struggle for survival there occurs in the nature a competition among various individuals of the species for the survival of life.

Only those organism which persists [to remain] will have adaptation over the others.

These adaptation (changes) are then passed onto the successive generation.

## \* Successional Theory

- In Forest trees fall down and sometimes start burning by fire in trees.
- Nature relates itself
- The successive changes by the nature:  
(In a sequence)

R - Strategist

They are the first colonizer.  
(Colonize)

They make hole  
and they will inhibit.

K - Strategist

- Living entities  
- gradually evolve.

## \* Components of Eco-system:-

- Living factors in the E.V - called (Biotic)
- Non-living factors - (abiotic component).

⇒ The abiotic component include -  
The atmospheric gases, water in different forms.

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## Ch = 2 BIODIVERSITY

- Biodiversity is the shortened form of Biological diversity.
- It was coined by E.O. Wilson, in 1986.
- This term was first used by Thomas Lovejoy in 1980.
- This term describes the variety and variability among living organism on earth.

Diversity :- Variation  
Different animals and Plants.

Bio :- Living entities.

- ⇒ Biodiversity includes all forms of
- Terrestrial and aquatic Plants, animals and micro-organism.
  - Biodiversity is defined by the convention on (Biological diversity) (UNEP) as the variability among living organism.

UNEP:- United Nations Environment Programme.

- \* Levels of Bio Diversity :-  
Biodiversity manifest itself at three levels (short)  
all the levels are interlinked and constitute a gene pool

(a) Genetic Diversity :- It refers to genetic variations within species. A species may have a number of varieties.

(b) Species Diversity:- It refers to the variety of species or the number of kinds of living organism within a region.

(c) Eco-System Diversity:- The variety of eco-system in a given geographic or political region with its own flora and fauna, refers to eco-system diversity, it denotes to the variety of habitats. Biological Communities and eco-social processes.

27/3/93

Q. What is the importance of Biodiversity?

A. Biodiversity is important because there are different animals, plants & various other species which are dependent upon diversity nature. The nature provides them different aspects to live.

① Food of the estimated there are 9 lakh 50 thousand species on earth. Only a few thousand are used food source, these food plants which were originally consumed from the wild are now cultivated, a large no. of plants have been domesticated adding to the range of diversity.

② Timber: It is a commodity that is harvested from the wild and traded world wide both nationally and internationally. For certain developing economies like malasya and midonesia, wood export constitute a significant part of its export earnings.

③ Medicine: Living organism provide us with many useful medicines and drugs. Around 90,000 plants species are believed to be used as medicines in the third world.

29/3/23

\* Pollutant :- Some elements which causes pollution are called Pollutants.

- The presence of any pollutant causes environmental pollution.
- Pollutants can be categorized in two categories
  - (a) Persistent Pollutant:- These Pollutant are not easy degradable and remain unchanged in the environment for a long time.
  - (b) Non-Persistent Pollutant:- They are biodegradable and contain living organism feed on them.

## \* Causes of Pollution

Pollution can be used either due to the activity of man or naturally.

1.) Man-Made Causes :- This pollution has increased drastically. Since the Industrial revolution, the last country some environmental pollution at a bigger level.

2.) The following are man-made Pollution:-

- a) Solid Waste
- b) Fertilizer
- c) Garbage
- d) Noise and Sound
- e) Vehicle Exhausts
- f) Industrial Waste.

2.) Natural Causes :- Pollution due to natural causes are many, some of the causes of pollution by natural causes are volcanic eruptions, forest fires. The eruptions of volcanoes send up huge quantities of ash, smoke, and other particles into the atmosphere, which can lead to pollution, each year forest fires set up huge tracts of forest area, devours devouring the earth of precious green cover.

## \* (Control of Pollution) (Prevention of Pollution)

⇒ International maritime organisation established in 1954, conducted a series of meetings intended to regulate pollution threats faced by oceans from oil tankers.

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- Ques  
 1) Nat  
 2) Organ  
 3) Dom  
 4) Sedi  
 5) Indu

⇒ The Stockholm Conference :- (1972) :- The United nation's conference on Human Environment, 1972 is known as the Stockholm Conference. In this conference, some steps were being taken, related to the ozone depletion, and the aim was to regulate and control pollution.

31/3/23

### \* Pollutant :-

It is a substance which pollute or contaminate something.

Pollutant is something which causes pollution / create pollution.

### \* Types of Pollutant :-

1) Suspended Matter :- It arises from soil and certain solids.

2) Pathogens (microorganisms like viruses, bacteria etc.)

3) Oxygen demanding organic waste is pollutants that can be decomposed by bacteria.

4.) Organic chemicals includes pollutants like oil, plastic, solvents, detergents, etc.

5.) Water soluble inorganic chemicals include acids, salts, metals, etc.

6.) Water soluble radioactive isotopes are a class of pollutants that accumulate in marine organisms & fishes.

7.) Inorganic Plant Nutrients include fertilizers like nitrates and phosphates.

- Q) Describe the major sources of Pollution ?
- ⇒ 1) Natural Pollution
  - 2) Organic Pollution
  - 3) Domestic Pollution
  - 4) Sediment Pollution
  - 5) Industrial Pollution

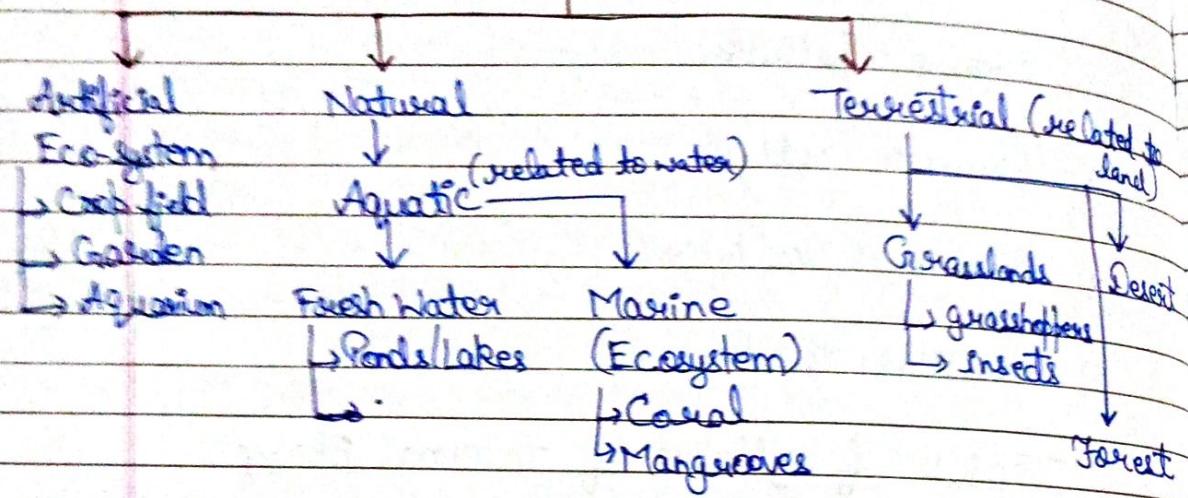
### Topics of Syllabus of Internal Exams

- ⇒ Definition of Eco-system.
- ⇒ Biotic and abiotic Components
- ⇒ Types of ecosystem
- ⇒ Definition of Biodiversity.
- ⇒ Levels of Biological diversity, genetic, species etc.
- ⇒ Environmental Pollution ( Air / Water etc.).
- ⇒ Biodiversity Conservation strategies, habitat loss.
- ⇒ Degradation of Biodiversity.
- ⇒ Emergence of Environmental Issues, climate change, Global warming, Ozone layer depletion, Acid rain etc.

30/4/23



## TYPES OF ECOSYSTEM



- 3.) Cultural  
 (A) Cultural  
 (B) Historical  
 (C) Spiritual  
 (D) Recreational

- 4.) Regulated  
 (A) Decorative  
 (B) Regulated

12/4/23

\* B:

Bio

They  
do

Per

The Millennium ecosystem assessment report

2005.

They defined eco-system service, as the benefit obtained by man from the ecosystem.

Four categories were defined under this term.

1) Subsistence Services :-

- (A) Soil
- (B) Primary Productivity.
- (C) Nutrient Cycle.
- (D) Pollination and Habitat.

2) Provisioning Service:-

- (A) Food.
- (B) Water.
- (C) Medicinal Resources.

3.) Cultural Services :-

- (A) Cultural Experiences → Goddess
- (B) Historical Experiences → Nature
- (C) Spiritual Experience → Worship
- (D) Recreational Experience → garden

4.) Regulatory Services :-

- (A) Decomposition
- (B) Prey Predator  
(relationship is giving)

[Robert Constanza]

↳ Price tag on  
water, air etc

12/4/23

\* BIO-DIVERSITY \*

Biological Diversity refers living organisms.

They are different from each other, there seems to be a lot of diversity.

Proponent :- originator / inventor / coined

19/4/23

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1 May/23

## GLOBAL WARMING

{ when atmospheric gases }  
temperature increase. }

- The earth receives solar energy in great amount.
- Short wave radiations.
- These rays reaches the earth's surface
- Some qualities of heat are re-radiated back into the space.
- Certain gases known as (green house gases) (GHG) absorbs the rays of the sun.

### Atmospheric Gases

- 1) Carbon dioxide
  - 2) Methane
  - 3) Nitrogen oxide
- } → Absorb heat.

Wast  
waste  
Class  
Bio  
Ino:  
Solid

- 1) open
- 2) landf
- 3) Inc
- 4) Pyro
- 5) Com

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1 May'23

## Waste Management

Waste - material - has no any value.

### Classification of waste

- (1) Biodegradable waste → organic waste
- (2) Inorganic waste → Non-Bio.

### Solid Waste Management

- 1) Open dump :- Environment Spoil
- 2) Landfill :- Air Pollute.
- 3) Incineration :- Air Pollution.
- 4) Pyrolysis - Combustion - Charcoal, tar.
- 5) Composting - Bacteria
- 6) Vermiculture - Earthworms
- 7) Plants :-
  - a) Phytoextraction [Through roots]
  - b) Phytoremediation [Toxic]
  - c) Photostimulation [Reduction]
  - d) Photostabilization [Reduce]

8 May 23

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## The Earth Summit:-

Points:- From 3 - 14 June 1992, Rio-de-Janeiro hosted the United Nations Conference on Environment and Development.

⇒ The focus of this conference was the state of the global environment and the relationship b/w economics, science and the environment in a political context. The Conference concluded with the Earth Summit, at which, leaders of 105 nations gathered to demonstrate.

### \* The Prime Objectives of Earth Summit:-

⇒ The Rio-conference and the Earth Summit, was a major United Nations Conference held in Rio-de-Janeiro from 3 to 14 June, 1992, Earth Summit was created as response for member states to cooperate together internationally on development issues after the Cold War.

### ⇒ 2<sup>nd</sup> Objective Conflict regarding (Sustainability)

Sustainability being too big for individual member states to handle, Earth Summit aimed at the future consequences of the resources, to be used by the future generation, Earth Summit also projected its fear for the depletion of the resource, for Sustainability.

\* The main issues included:-

(a) Systematic scrutiny of Patterns of Production -  
Particularly the Production of toxic  
components such as lead in gasoline or  
poisonous waste including radioactive  
chemicals.

(b.) Reliance on Public transportation systems  
in order to reduce vehicle emissions,  
congestion in cities and the health  
problems caused by polluted air and  
smoke.

(c) The growing usage and limited supply  
of waste, were some of the issues,  
which were addressed in the Earth  
Summit.

10 May '23

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Topic: International Agreement on Climate Change / Pollution / Nature for the Protection of Earth

Ronland and Molina

Refrigerant → Ozone Depletion

→ In 1974 (They got their work published ozone depletion)

→ In 1985 → Validation from the Public and Scientists.

↓  
British Antarctica Survey

→ 22 March 1985 - Vienna Convention

→ 16<sup>th</sup> Sept 1987 - Montreal Protocol was signed

→ 1<sup>st</sup> Jan 1989 - Montreal Protocol entered into force.

Q. Write a short note on Montreal Protocol

The Montreal Protocol is an international environmental agreement with universal ratification to protect the Earth Ozone layer by eliminating use of ozone depleting substances which would otherwise

allow increased UV radiations to reach the Earth, resulting in higher incidence of ~~so~~ skin cancer and other diseases.

- \* The Way of working time-table  
By 1990

Annex I Countries validation  
are expected to reduce ODS,  
(chemical ends)

- \* It sets out the mandatory time-table to face out ~~and~~ 'ODS' this time-table sets binding progressive face out obligations on parties.

- \* UNFCCC :-

United Nation Framework Convention  
on Climate Change ]

- Q. What do you understand by UNFCCC?

- Ans.
- \* It is an inter governmental treaty developed to address the problems of climate change.
  - \* The UNFCCC entered into force on ~~21st~~ 21<sup>st</sup> March 1994.
  - \* The ultimate objective of this convention is to stabilize greenhouse gases concentration at a level that would prevent dangerous anthropogenic interference with the climate system.

## Silent Valley [At Kerala]

- Famous for natural beauty.
- A great number of species are being found here.

### Save Silent Valley → Movement against hydro-electric

Silent Valley gets copious amount of rainfall during the monsoons, but the actual amount varies within the region due to the varied topography.

- ⇒ The valley is famous for many rare species of birds and animals, International listed 16 birds species in silent valley as threatened or restricted.
- ⇒ The survey found 10 endangered species recorded in the IUCN (red list), including the red winged crested cuckoo, Malabar Hornbill,

Q. How the silent valley movement came into being?

Ans- Protecting the lion tailed Macaque became the symbol of non-violent struggle to save the evergreen forest from total destruction, many environment groups like the 'Narmada Bachao Andolan' (NBA), 'Bombay Natural History Society' (BNHS) and

Silent Valley action forum participated in the campaign. The prominent leaders were Vandana Shiva, Sunderlal Bahuguna, Baba Amte and Sunita Narain. The campaign launched through the media, the movement was first initiated by the local people and was subsequently taken over by the 'Kerala Sastra Sahitya Parishad' (KSSP).

99/5/23

### \* Great Indian Bustard

- It is a kind of bird which is found in Rajasthan.
- This Bird was a contender for becoming a National bird. (Important)
- State bird of Rajasthan and also was a contender for National Bird of India.
- Critically Endangered.
- Its population is confined mostly to Rajasthan and Gujarat.
- These arid dryland regions are suitable location for the Projects.

Some Places are :- Jaisalmer, Pokharan, Kutch.

### \* Key Point :-

- The Electricity generated also needs to be transferred using high voltage ~~the~~ "Degaray Mataji Duan" → Scared grove of Jaisalmer consist of old bees lines of different local varieties like → Rohira, Kumat, Babul, Kee.

→ Government and Court ordered that the high voltage wires must be covered or undergrounded.

Q. What was the decision of the Government to conserve and protect the Great Indian Bustard?

5/6/23

\* Introduction to (Save Western Ghats Movement)

\* Western Ghats Features:-

→ It's a mountainous range covers area of 14000 km.

→ Parallel to west coast of Indian Peninsula including the states Tamil Nadu, Kerala, Karnataka.

→ Goa, Gujarat, Maharashtra.

→ Biologically rich.

→ High degree of endemism.

→ Rich Ecology.

→ Also cover with diverse, Tropical, Subtropical, broad leaf, forest.

\* Importance of Western Ghats:-

→ World heritage site by UNESCO.

→ Habitat to diverse medicinal plants.

→ The Western Ghats also includes various rivers.

\* Environmental challenge in the face of Western Ghats:-

- Unregulated mining.
- Continuous construction activity.
- Number of rivers have been used for hydroelectric dam construction resulted in loss of riverine ecosystem.

\* Objectives:-

- To create awareness among people towards nature.
- To bring together voluntary organisation working in region to formulate programme
- To save western Ghats.

\* Headers and Participants:-

- (1) Kumar Kalanand (Coordinator), Pandurang, Kaibesh Chandra, Anil Aggarwal, Shri Chandi Prasad.
- NGO (Coordinating committee, woman from 11 states).
- Footmarch completed in 2 parts.
- Northern Part - started from Maharashtra to Goa Border.
- Southern Part from Kanyakumari to Tamil Nadu.

16/6/23

## \* Questions:-

### UNIT-1

- Q. Definition of sustainable development.
- Q. Short note on Global Warming.
- Q. Montreal Convention.
- Q. Kyoto Protocol
- Q. UNEP
- Q. Earth Summit
- Q. Definition of Ecosystem.
- Q. Biotic, Abiotic Component
- Q. Types of ecosystem
- Q. Services of ecosystem.
- Q. Renewable and non-renewable sources
- Q. Definition of Biodiversity.
- Q. Threats to biodiversity.
- Q. Great Indian Bustard short note.
- Q. Gharial Crocodile convention
- Q. Silent Valley features.
- Q. Save Western Cheetah.
- Q. Environment Pollution Control
- Q. Nuclear hazardous
- Q. Solid waste management.

- 1.) Define Ecosystem
- 2.) Describe types of Ecosystem in detail.
- 3.) What do you understand by ecosystem services [ Provisioning, Regulating ].
- 4.) Draw out the discrepancies b/w Renewable & non-renewable energy sources
- 5.) What do you understand by bio-diversity & how to conserve it?

- 6.) India is a mega spot of biodiversity  
~~draw out~~ through  
draw out the statistical survey.
- 7.) Write a short note on Kyoto Protocol,  
Montreal Convention, UNEP.