

## PART II

### Q.8

#### (c) REDD+

Abbreviated as Reducing Emissions from deforestation and forest degradation is an initiative proposed by Papua New Guinea in 2005. It finally became operational in 2008.

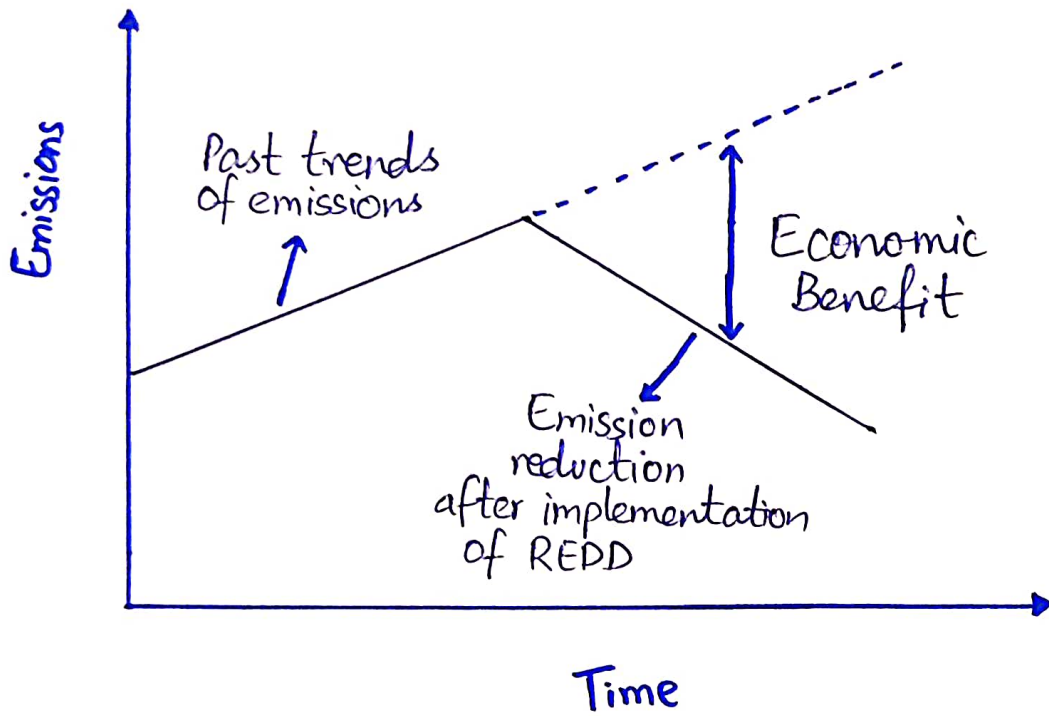
The main purpose of REDD was to keep an eye on the status of deforestation in developing countries. Further, it also aims to help developing world to roll back and preserve their forests. Thus, reducing emissions.

#### • COP 16:-

REDD was modified to REDD+ at COP 16 held in 2010. Beside, reducing deforestation, REDD+ comprises of following additional objectives:-

- (i) To give incentives to developing countries which reduced ~~their~~ forest degradation by implementing REDD+ programmes.
- (ii) REDD+ was characterized by conservation, sustainable forest management practices and increasing global carbon sinks.

## • Mechanism of incentivizing developing countries:-



To incentivize countries, reduction in emissions is compared with reference line. The reference line is shown in above graph as dotted line. The difference between actual emission reduction and emission trend is the economic or financial benefit.

## (b) Remote Sensing

“The scientific technique of studying any object or an area on earth without any physical contact of with that object. is called remote sensing.”

This technique studies various object by capturing electromagnetic radiations emitted by the object on earth. For this purpose, sensors are used.

### (i) Types of Sensors.

Generally, there are two types of sensors used in remote sensing:-

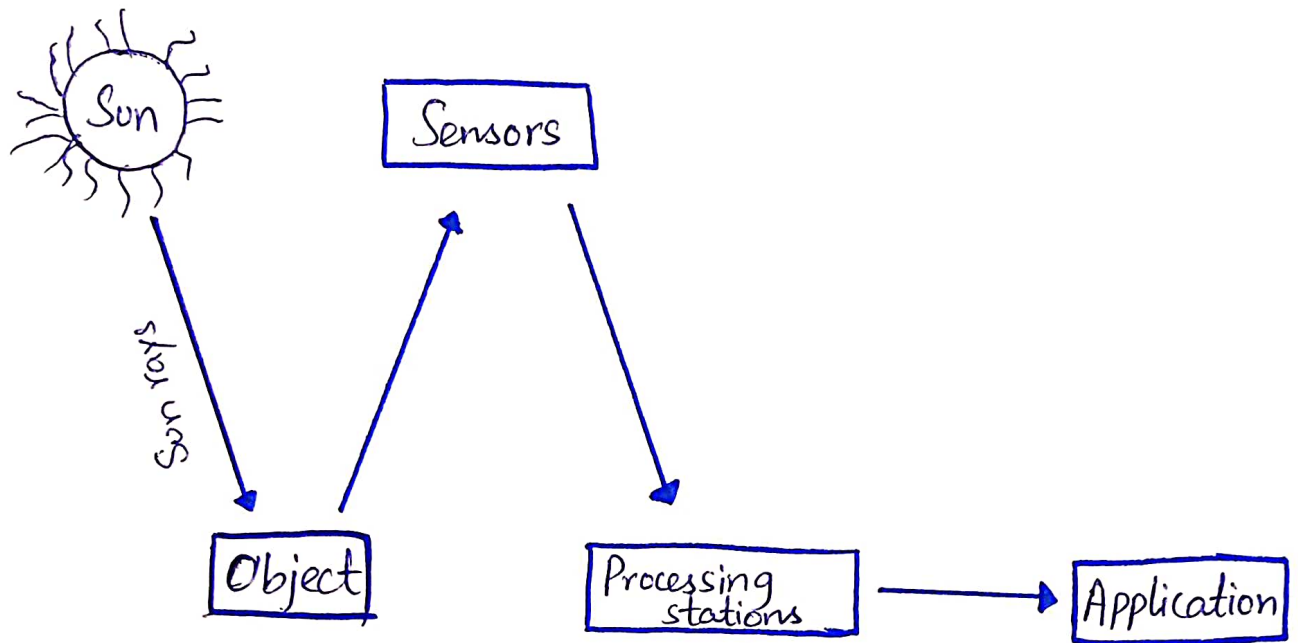
#### (a) Active Sensors:-

These sensors use their own source of light energy to study objects. It means these sensors work even at night as they donot require external source of energy.

#### (b) Passive Sensors

Passive sensors do not have their own energy source. They require sunlight as light source to idenfy objects. They work only when the sun is shining.

## (ii) Process of Remote Sensing:-



The process of remote sensing starts with **the sun**. The electromagnetic radiations reach the earth and interact with the object under study. **The object** then reflects back the EM radiations towards **sensors** placed either on ground or <sup>in</sup> space. The sensors process these radiations and send data to **processing station**, which converts it into meaningful information. Finally, it is applied to various fields.

## (a) Biodiversity Loss

"Biodiversity is defined as variety of species in a particular geographic area at a particular time."

Biodiversity loss is characterized by migration, extinction or endangerment of various species.

### (i) Causes of biodiversity loss:-

Biodiversity loss is linked with various human activities which degrade natural environment. Some causes of biodiversity loss include urbanization, deforestation, desertification, climate change, climate disasters like floods, drought, heat waves, wildfires etc. These causes are making species endangered and extinct.

### (ii) Effects of biodiversity loss

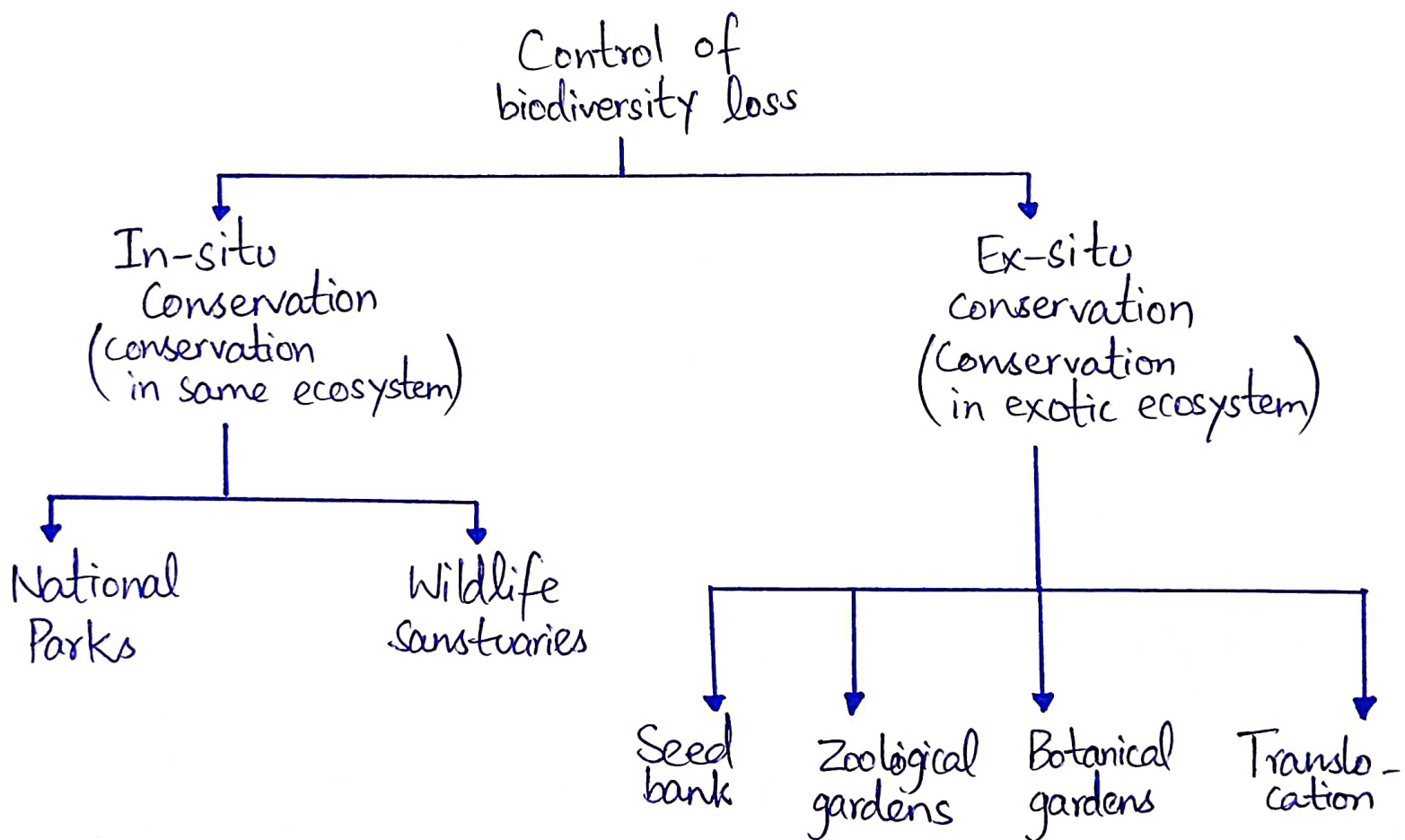
Following are the effects of biodiversity loss:-

(a) Biodiversity loss has repercussions for **climate change**. The loss of species of trees and plants adds more  $\text{CO}_2$  to the atmosphere, which contributes to global warming.

(b) The natural aesthetics and beauty of the ecosystem is lost with the loss of biodiversity.

(c) Biodiversity loss affects the lives of indigenous poor people which depends on flora and fauna for their survival.

### (iii) Ways to control Biodiversity Loss:-



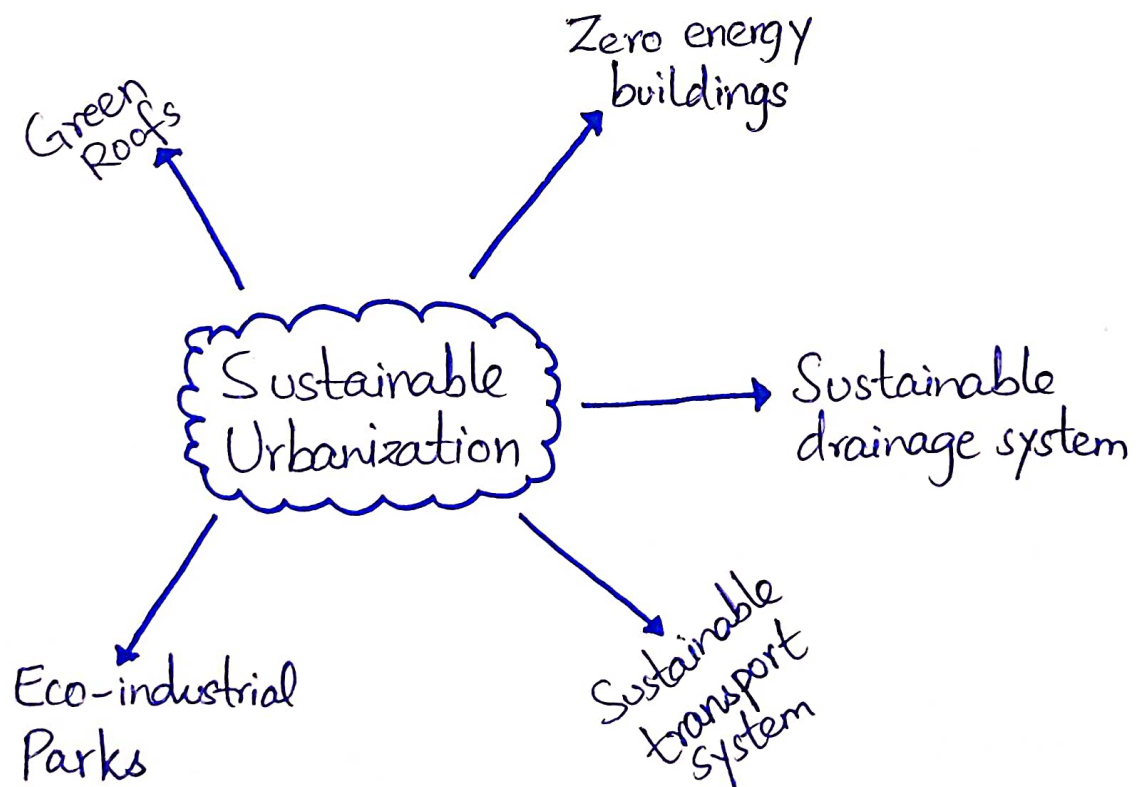
## (f) Urbanization

"Urbanization is rapid expansion of cities either due to the migration of people from rural areas or through increase in population of urban areas."

### • Sustainable Urbanization

"The expansion of cities which does not degrade natural environment, economically viable and socially acceptable is called sustainable urbanization."

### • Ways to achieve sustainable urbanization



### (i) Eco-industrial Parks

Eco-industrial parks is the community of businesses which collaborate with each other, NGOs, and local community in order to achieve economic benefits while preserving environment through pollution control, waste treatment and sustainable industrial practices. There are about 20,000 such parks worldwide.

### (ii) Sustainable transport system

Sustainable urbanization can be achieved through sustainable transport system. Major measures might include electric vehicles, use unleaded fuel, & using public transport etc.

### (iii) Sustainable drainage system:

Drainage system having minimal environmental impact is required. Waste water should be treated properly. before returning back to the environment. Drainage system should be covered properly.

### (iv) Zero energy buildings

Buildings should be energy efficient. It means they must consume renewable energy resources. Moreover, they should have zero environmental impact.



## (v) Green Roofs:-

Instead of using fossil fuels, energy should be generated through alternative sources. One way of doing this is to install solar panels on the roofs of the buildings to make them environment friendly.

## Q.4 (B)

### Eutrophication

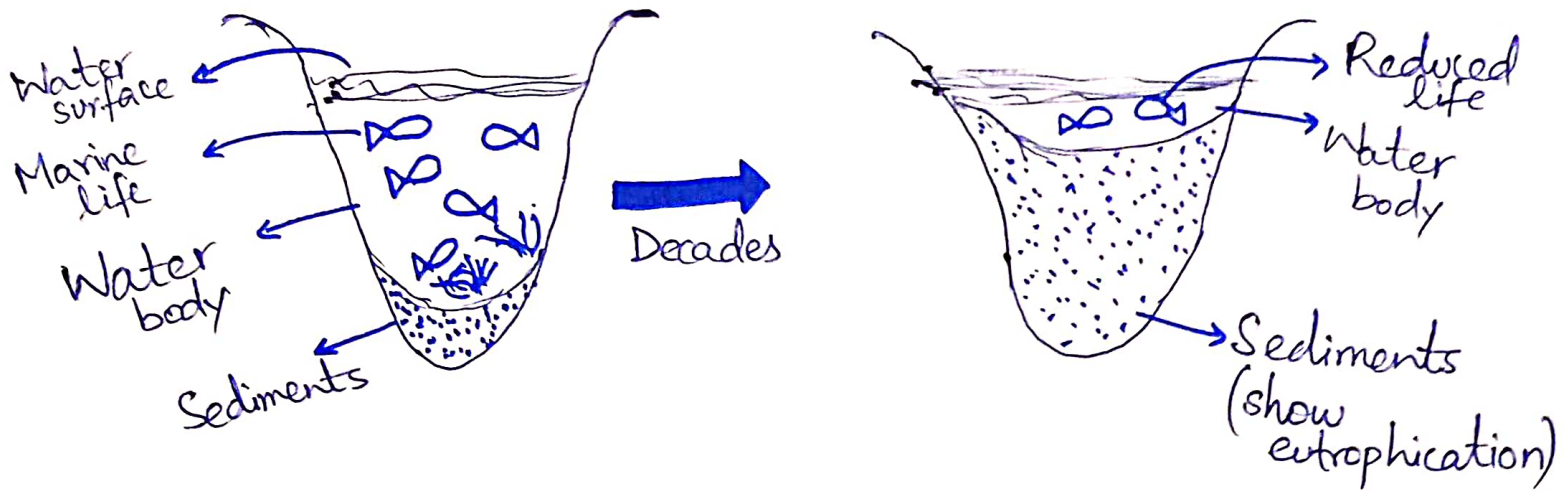
"Eutrophication is a process through which a water body is overwhelmed with excess nutrients, mainly phosphorus and nitrogen, leading to the formation of algal blooms on the surface of water."

### (i) Types of Eutrophication

Eutrophication is caused as a result of both human activities and natural processes. Based on this, eutrophication can be character categorised as natural and cultural eutrophication.

### (a) Cultural Eutrophication

Cultural eutrophication is mainly the result of anthropogenic activities. The main activities include excessive use of fertilizers in agriculture, industrial and domestic wastes. Fertilizers is the main source of cultural eutrophication as it contains excess Nitrogen and Phosphorus. The eutrophication due to human activities is a fast process and can pollute water bodies even in decades.



## (b) Natural Eutrophication

Natural eutrophication, as the name suggests, is caused by natural factors. It is a lengthy and slow process comprising of centuries. With the passage of time, nutrients at surface are washed away by rainwater and accumulate in water bodies. Moreover, floods also carry away these nutrients in water causing the death of marine life.

## (ii) Causes of Eutrophication

Following are the causes of eutrophication:

### (a) Fertilizers:-

To cater the needs of increasing population, the role of agriculture and enhanced productivity of grains gains importance. Fertilizers are extensively used

to increase crop productivity. These fertilizers contains nitrogen and phosphorus. These two chemicals accumulate in water bodies and provide a perfect environment for algal blooms to grow. The thick layer of algae blocks sunlight to reach the bed of water bodies, thus killing marine life.

### (ii) Industrial and Domestic Waste

Toxic chemicals emerging out from industries and homes also contributes to eutrophication of lakes, seas and rivers. These chemicals contain various effluents including Cadmium, Mercury, Lead, Nitrogen, Phosphorus etc

### (iii) Surface Run off:-

This is the natural cause of eutrophication. The nutrients deposited on surface are washed off by rainwater into water bodies leading to the growth of algae on water surface.

### (iii) Preventive Measures for Eutrophication

Eutrophication is a serious issue. It not only pollutes water bodies but also kills the flora and fauna under lake or sea. To prevent this phenomena, following techniques are important.

#### (a) Use of bio-fertilizers

Synthetic fertilizers contain harmful nutrient and chemicals. Bio-fertilizers is environment friendly alternatives which can help to prevent eutrophication. They are made through the action of microorganisms. One such alternative is compost which is humerus like black substance obtained by decomposition of solid waste through microorganisms (fungi, bacteria).

#### (b) Oyster Reef concentration

The issue of eutrophication can be solved by increasing underwater oyster reef concentration. Oyster helps to decompose excess nutrients present on surface of water. Moreover, they also provide habitats to various species, thus improving biodiversity.

### (c) Bioaugmentation and Biomanipulation:

These both techniques are useful to combat the issue of eutrophication. Bioaugmentation involves microorganisms which decompose and eat away excess nutrients, especially Nitrogen and Phosphorus.

Biomanipulation is changing the existing marine ecosystem by adding any exotic fauna species which is capable ~~for~~ of ingesting excess nutrient concentration.

### (d) Dredging

Dredging is a physical method ~~to~~ of dealing with eutrophication. In this method, heavy machinery like excavators or bulldozers are used to reduce sediments from water. However, it is a risky method and should be used carefully.