

# THREATS TO BIODIVERSITY

Topic:2.3.2.2.11



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**1. Learning Outcomes:** On completion of this topic student should be able to.

- *Understand the current threats to biodiversity.*
- *Explain the effects of over exploitation, Pollution, habitat loss and hunting on biodiversity*
- *Realize the role of each species and its importance in sustaining the biodiversity in the ecosystem.*
- *Assess how human interactions can affect ecosystem biodiversity.*

## **2. Threats to Biodiversity:**

Biodiversity is the variety of living things. An area with healthy biodiversity will have several varieties of life in it: animals, plants and microorganisms. All these different species linked to each other in a network called an ecosystem. Biodiversity is highly significant in balancing of natural processes. It provides food, clothing, medicine and many more. Economists call the economically valuable goods and services provided by the ecosystem (biodiversity) as “ecological services”. These services include water purification, nutrient recycling, crop pollination, stable climate, pollution control, protection from natural calamities etc. When there is sufficient biodiversity on this planet, these services maintain high sustainability of ecosystem.

But ecosystem services are closing down as species go extinct and the ecosystems grow weakened or disturbed. The increased growth of human populations, consumption levels and mobility are the origin of today’s most of the serious threats to biodiversity.

At present, there are many threats to biodiversity, they include:

- 1 Natural Calamities
- 2 Habitat Destruction and Fragmentation
- 3 Over Exploitation
- 4 Introduction of Exotic Species
- 5 Pollution
- 6 Predator and Pest Control

## 2.1. Natural Calamities:

Natural calamities like floods, earthquakes, droughts, wildfires, tsunamis volcanos etc. create a great loss of biodiversity. Due to flooding, large amount of nutrients from soil gets washed away. Drought results in the dryness of the soil and declines the level of water table which leads to the suffering of animals as well as plants. Similarly, wildfires in extremely dense forests and earthquakes significantly destroys the life of organisms and thus affects biodiversity.



Fig.1: Effect of floods  
Source: <https://rb.gy/1cobdq>



Fig.2: Effect of drought  
Source: <https://rb.gy/ixnsn7>



Fig.3: Wildfire  
Source: public domain



Fig.4: Volcanic Eruption  
Source: Public domain

Volcanoes smash-up the life of animals and plants nearby areas. Epidemics as well as pandemics seldom wipe out most of the population in the world.

## 2.2 Habitat destruction and Fragmentation:

Habitat destruction is an enormous destruction of the natural habitat of the species. It occurs when a particular area is converted from healthy habitat to unhealthy one. Deforestation, logging, filling wetlands for commercial or residential sites, mining, industrial activities, pollution, soil erosion,

depletion of nutrients, desertification, harvest of fossil fuels and water extraction are the main reasons of habitat loss. This eventually results in the extinction of species (i.e., Loss of biodiversity).



Fig.5: Deforestation  
Source: <https://rb.gy/gdl33d>



Fig.6: Logging  
Source: <https://rb.gy/5qwyf0>

Habitat Fragmentation refers to the loss of large units of habitat. It is another serious threat to biodiversity due to human developmental activities. Large wild areas are transformed into smaller fragments of land. This breakdown the habitats of animal and plant species, detach animal communities and finally reducing genetic diversity.



Fig.7: Habitat fragmentation by construction of road in a forest  
Source: <https://rb.gy/ui7zmo>

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or  
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## 2.3 Over Exploitation

Over exploitation is the massive collection of species from their native habitats. Actions like fishing, farming and logging can be done sustainably, but today they are often doing in ways that over exploit a resource. When large number of species or even just a few significant species, are taken out of the ecosystem, the entire network of life in that area can collapse. Over exploitation of medicinal plants have eventuated in their loss from native habitats. Many plants such as Pitcher plants, Drosera sp., Psilotum Sp., etc. are relentlessly hunted and collected for academic tutoring and laboratory experiments.

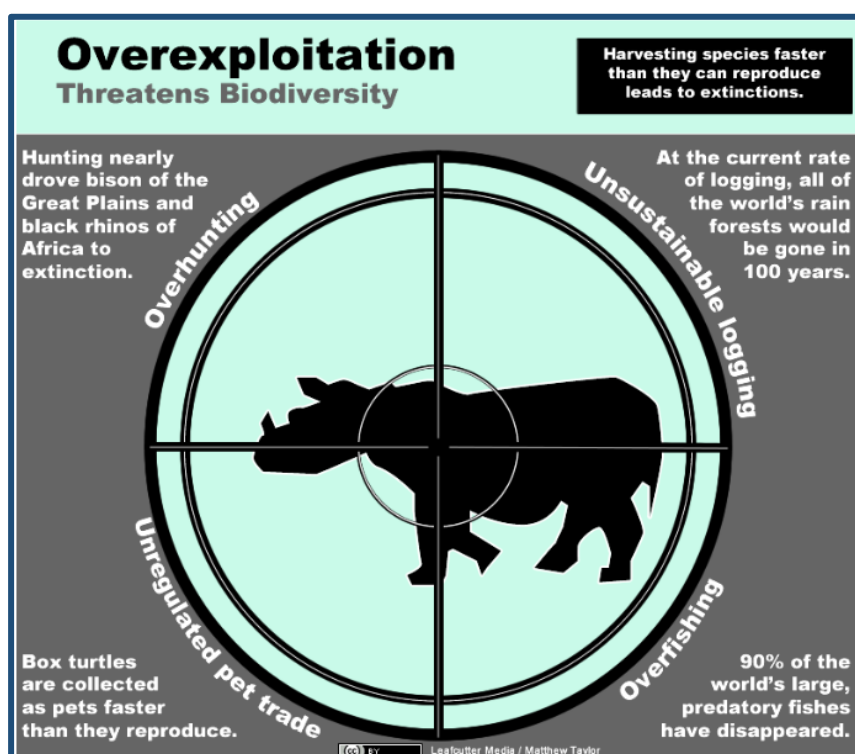


Fig.8: Over Fishing

Source: <https://commons.wikimedia.org/wiki/File:Overexploitation.png>

### 2.3.1 Hunting

Hunting is the human practice in search capturing or killing wildlife species. The most common reasons to hunt are to harvest food and valuable animal products (tusks, fur, horn, bone etc.), to eliminate predators dangerous to humans or domestic animals, for trade or tourism or for ecological conservation against over population of invasive species <sup>(1)</sup>. Hunting and harvesting of natural resources led to over exploitation of the environment. The species is no longer sustainable, if exploitation exceeds its limit.

\* Web reference: (1). <https://en.wikipedia.org/wiki/Hunting>

### 2.3.2 Poaching:

Poaching is the illegal hunting or catching of wild animals <sup>(2)</sup>. Various plants and animals are illegally collected for commercial utilisation of their products such as cosmetics, pharmaceuticals, perfumes and decoration purposes. For example, the poaching of elephants for their ivory and rhinos for their horns, which are used in traditional medicine, is a major threat to these species <sup>(3)</sup>.



Fig.9: Rhino Poaching  
Source: <https://rb.gy/qrpX1q>



Fig.10: Elephant Ivory tusks  
Source: <https://rb.gy/asdnav>

## 2.4 Introduction to Exotic Species

An exotic species is a species living outside its native area, but which has arrived there by human action, directly, indirectly or accidentally. It is also called as a foreign species, introduced species or non-native species. The influence of exotic species is highly variable. Some species may have a negative effect on local ecosystem in which they have introduced (in such case they are also classified more significantly as ‘invasive species’). Exotic species can cause competition for native species and change the functions of ecosystems. For example, invasive plants can alter nutrient recycling and hydrology in native ecosystems. Many exotic plant and animal introductions probably fail because of the low number of individuals introduced or poor adaptation to the ecosystem they enter <sup>(4)</sup>.

### 2.5 Pollution:

Water, air or soil pollution, in any form, pollution appears major threat to biodiversity. Vehicles, power plants and factories are primary sources of air pollution. In some cases, the pollutants are directly harmful (e.g., Lead), but in other cases the pollutants indirectly cause ecological damage when they are present in extremely high concentrations (for example, high concentrations of carbon dioxide emission leads to climate change-Global warming). Air pollutants like oxides of nitrogen and sulphur forms acid rain, which disrupts aquatic ecosystem as well as soil communities and plant growth.

\* Web reference: (2). <https://en.wikipedia.org/wiki/Poaching>  
(3) <https://rb.gy/fpna1t>  
(4) <https://rb.gy/tjngla>

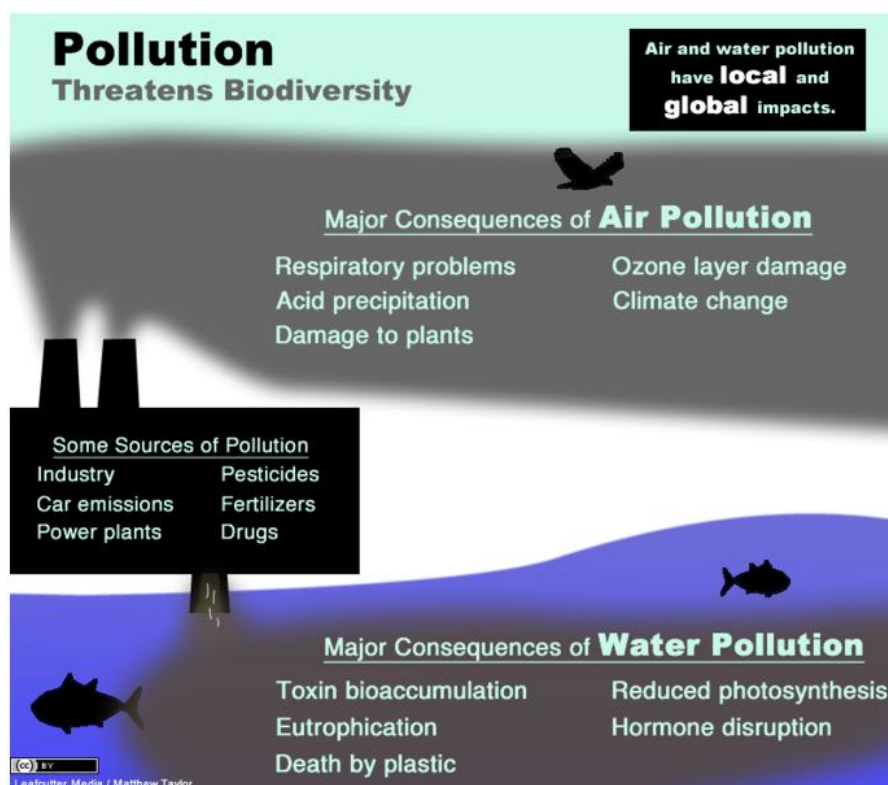


Fig.11: Pollution threatens biodiversity

Source: [https://commons.wikimedia.org/wiki/File:Pollution\\_Threatens\\_Biodiversity.png](https://commons.wikimedia.org/wiki/File:Pollution_Threatens_Biodiversity.png)

Heavy metals, pesticides, plastics, fertilizers and herbicides are some of the water pollutants. Heavy metals like mercury, lead, arsenic and zinc can leach into soil and water from mines. Nutrients from fertilizers like nitrogen and phosphorus promote plant growth, but when their concentration levels increased in water systems, they destroy the aquatic life <sup>(5)</sup>. Greater accumulation of nitrates and phosphate in healthy water bodies can result in “algal blooms”. This phenomenon is called eutrophication, which depletes the oxygen needed by aquatic animals in water bodies.

## 2.6 Predator and Pest Control:

Predators are the biological control agents that lives by capturing and feeding on another species. They are usually larger and more powerful than their prey. Most common predators attack variety of pest species and helps in their control. Some of the predators include ladybird beetles (controls scale insects, aphids etc.), flower flies (controls scale insects), nematodes (controls soilborne fungi, bacteria etc.) and spiders (controls leafhoppers) etc. Biological control agents of weeds include seed predators and plant pathogens.

\* Web reference: (5) <https://rb.gy/30i0wb>



Fig.12: Lady beetle as Predator

Source: <https://rb.gy/kvhwlv>

Fig.13: Praying Mantis as Predator

Source: Public domain

Predators also threaten biodiversity. Through predation, parasitism, competition or other attacks on non-target species, they damage the ecosystem. An introduced biological control does not always aim at pest species, it can also target native species<sup>(6)</sup>.

[Click Here](#) to watch animated video on Pest Control

or

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\* Web reference: (6)<https://rb.gy/xcpxyj>

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