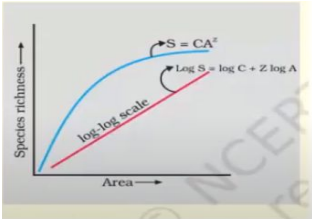
INTERESTING FACTS ABOUT DIVERSITY

- The total number of plant and animal species is more than 1.5 million and many of them are yet to be discovered in the tropical regions. Why in tropical regions? Because Tropical latitudes receive more solar energy than temperate regions, which leads to high productivity and high species diversity. Tropical regions have less seasonal variations and have a more or less constant environment. This promotes niche specialization and thus, high species richness. Temperate regions were subjected to glaciations during the ice age, while tropical regions remained undisturbed which led to an increase in the species diversity in this region.
- 70% of species are animals and 22% are plants.
- Out of 70%, 70% is insects.
- India is well placed because it has a long coastline and it serves as the livelihood of many people. Many countries do not have a coastline. Also, we get enough sunlight from 8-9 months.
- India has 2.4% of the world's land area and 8.1% share in global species diversity because we are in the domain of tropical region.
- We have almost explored 45000 species of plants and nearly 90,000 animal species and as per estimates around 1 lakh plant species and 3 lakh plant species yet to be discovered.
- Nature's biological library is burning even before we cataloged the titles of all the books stocked there. Here books refer to species. The meaning of this sentence is that before we could title books that is before we could discover species, species are threatened of getting extinct.

Patterns of Biodiversity

1. **Latitudinal Gradients-**Biodiversity is not uniformly distributed and shows uneven distribution, one of them is being latitudinal diversity. As we go way from latitudes diversity reduces to a large extent e.g.Columbia located near the equator has 1400 species of birds while New York has 105 species and Greenland has 56 species. India has more than 1200 species **Museum Of Biodiversity is Amazonian Forest.** It has more than 40000 species of plants, 3000 of fishes, 1300 of birds, 427 of mammals, 378 of reptiles, and more than 1,25,000 invertebrates because it has almost all kinds of nature and always something so that all life could survive.



2. **Species Area Relationships-** A german scientist observed that within a region species richness increased with increasing explored area that means as area of interest

increase,variety in species is seen. He gave a formula S=CA^Z or log(s)=log(C)+Zlog(A). Zis the variable which determines the diversity which is slope of straight line in the diagram. Z value is between 0.1 to 0.2. If species area relationship is studies for much bigger area then Z may extend 0.6 to 1.2. So increase in species will be 3 times earlier it was 0.2 and now it is >0.6.

Values Of Biodiversity

The central character in the biosphere is human beings. Around it, various species exist and the existence of human being to a large extent is decided by those lifeforms which surround human being that is dependence we have in various ways. Every ecosystem has ecological services like reducing runoff, conserving water, helping in climate regulation. If we try to monetize the contribution of species then it would be around 33 trillion dollars which is 3 times of global GDP.

Food-about 80k edible plants and 90% of present day food crop have been domesticated from the wild. Every wild variety has certain kind of genetic contribution and by genetic manipulation we can bring those genes into others and thus making other varieties and that's how wheat variety was introduced in India and thus grain production increased.

Drugs and medicines

TABLE 5.2 | Some Natural Medicinal Products

PRODUCT	SOURCE	USE
Penicillin	Fungus	Antibiotic
Bacitracin	Bacterium	Antibiotic
Tetracycline	Bacterium	Antibiotic
Erythromycin	Bacterium	Antibiotic
Digitalis	Foxglove	Heart stimulant
Quinine	Chincona bark	Malaria treatment
Diosgenin	Mexican yam	Birth control drug
Cortisone	Mexican yam	Anti-inflammation treatment
Cytarabine	Sponge	Leukemia cure
Vinblastine, vincristine	Periwinkle plant	Anticancer drugs
Reserpine	Rauwolfia	Hypertension drug
Bee venom	Bee	Arthritis relief
Allantoin	Blowfly larva	Wound healer
Morphine	Poppy	Analgesic

Biodiversity can aid ecological stability:- Overall balance is achieved by biodiversity. If some specie harm plants then there exists some other species which reduces its effect. It is estimated that the 95% of potential pests and disease-carrying microorganisms are controlled by natural predators and competitors. Maintaining biodiversity can be essential for pest control and other ecological functions.

Fuel:- forests have been used since ages for fuel wood. Fossil fuels are also products of Biodiversity. In rural area, a lot of families are surviving on this fuel.
Social Value:- many of the plants like tulsi, lotus, peepal etc are considered holy and sacred.

Hotspots Of Biodiversity

Biodiversity Hotspot is a biogeographic region with a significant reservoir of biodiversity that is threatened with destruction. An area is designated as hotspot when it contains at least 0.5% of plant species as endemic(native to a certain place) e.g. asiatic lion is seen only in Junagarh in Asia. There are 25 hotspots of biodiversity on a global level out of which two are present in India. These hotspots covering less than 2% of the world's land area are found to have about 50% of terrestrial biodiversity.

Examples-


Examples

- ✓ The hotspot includes all of Cambodia, Vietnam & Laos, and nearly the entire areas of Thailand, Myanmar & Bhutan as well as part of Nepal, far eastern India and extreme southern China.
- ✓ In addition, it covers several offshore Islands including Mainan Islands in the south China Sea and Andaman & Nicobar Islands in Indian Ocean.
- ✓ Western Ghats and Sri Lanka, also known as the "Sahyadri Hills" encompasses the Montana forests in the southwestern parts of India and on the neighboring Islands of Sri Lanka.

(i don't think he will ask it**)**

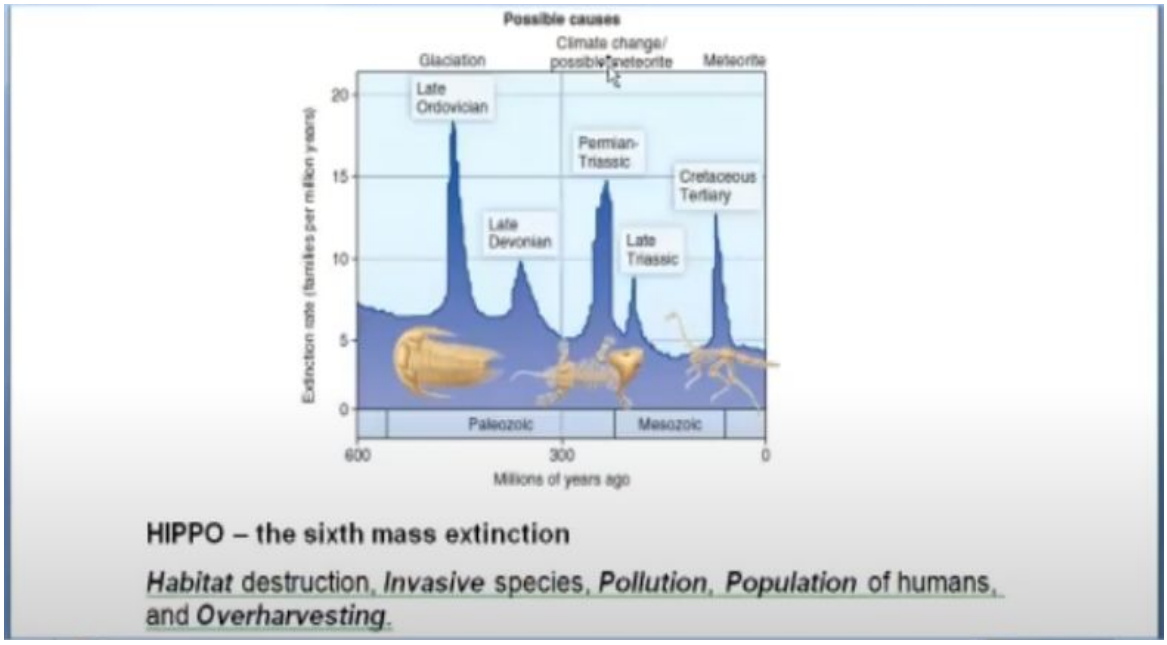
The entire extent of hotspot was originally about 182500 square kilometers but due to tremendous population pressure now only 12445 square kilometers or 6.8% is in pristine condition**.** That's a bad sign. The important population include asian elephant, indian tigers, and the endangered lion tailed macaque.

Criteria For determining hotspot

1. **Number of endemic species that is species which are found no where else should be 0.5% atleast.**
2. **Degree of threat which is measured in terms of Habitat loses and fragmentation.**

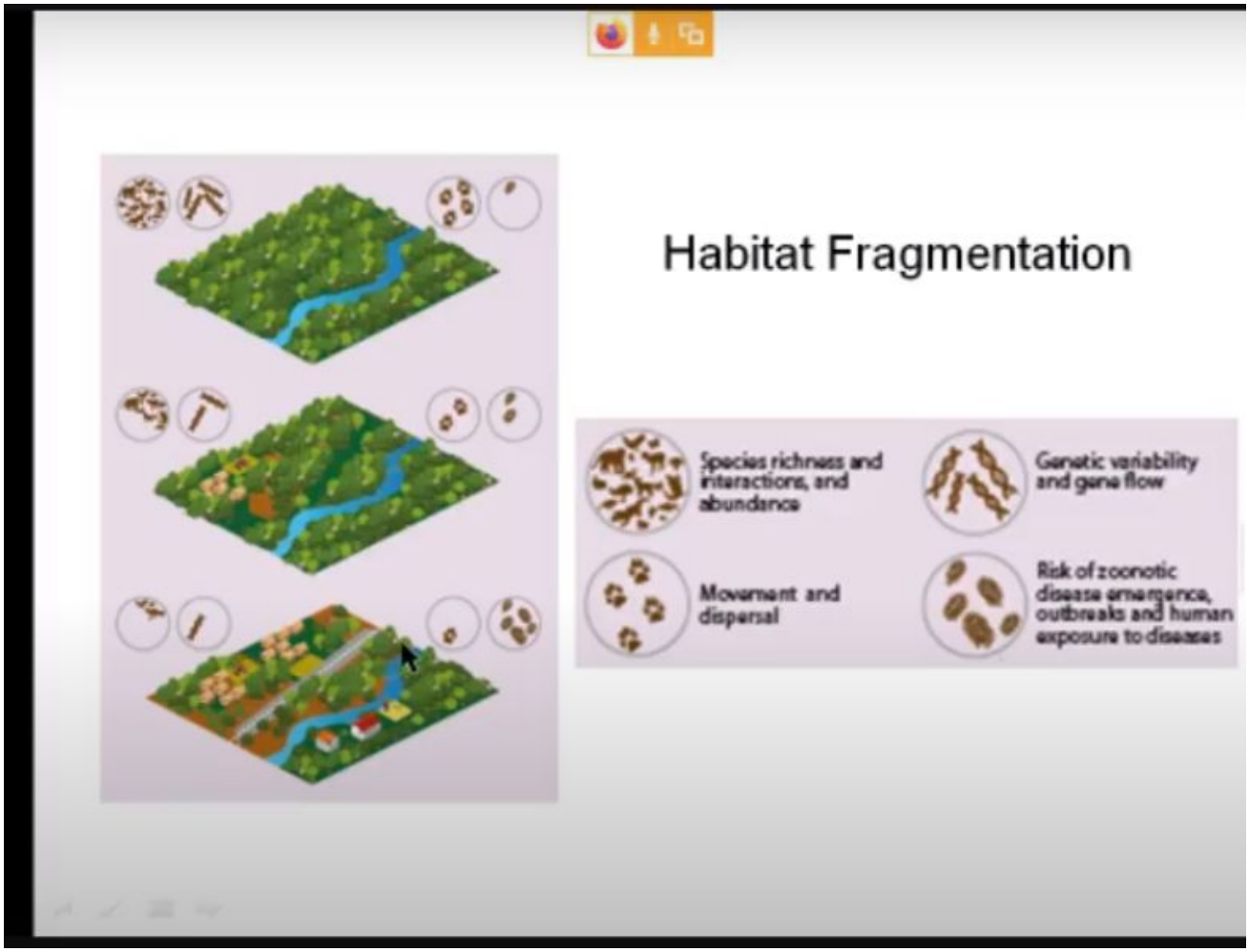
WHAT THREATENS BIODIVERSITY?

Extinction: Extinction of one species in a decade is normal.In last century more than 1000 species have become extinct due to human impact mostly invertebrates, fungi and microbes. In geographic history almost 99% of the species have become extinct before human being came into existence.



Hippo is the sixth mass extinction. Reasons - habitat destruction, invasive species, pollution, population of humans and over harvesting.

Habitat destruction, forests and grasslands to farm land is usually the main threat. Sometimes we destroy habitat as a side effect of resources extraction such as mining , damn building and indiscriminating fishing methods.
Fragmentation reduces habitat to small, isolated area. Breaking up habitat reduces biodiversity because many species such bears and large cats, require large territories to subsist.



In the above picture prof has tried to explain fragmentation effect . In first diagram there is only river so species richness is high, genetic variability is high, movement of species is high and risk of spreading diseases to human is low and now in second diagram more houses and constructions are made into the same area which has divided the forest and thus leading to low genetic variability and gene flow , specie richness has reduced and movement also reduced and the risk of zoonotic disease increased among human and it looked forward in third diagram where the forest is further divided into roads, houses and buildings

According to estimates, if we clear one hectare of tropical forest then we are loosing $6120 money in terms of food, air quality, water, medicines, climate regulation($2000), water supply regulation(around $1300-1500), erosion prevention, genetic resources, raw materials, waste/water purification. According to studies from last 40 years, if we loose x amount of money by cutting forests then we can restore atmost x/2 only. So maintaining biodiversity is essential.

Biodiversity Protection

- Protect enough habitats for viable populations of all native species in a given region.
- Manage at regional scales large enough to accommodate natural disturbances(fire,wind, climate changes etc.)
- Plan over a period of centuries so that species and ecosystem can continue to evolve.
- Allow for human use and occupancy at levels that do not result in significant ecological degradation.