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(c)  $\beta$ -richness:- refers to the rate of change in species composition across different habitats

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(d)  $\gamma$ -richness:- refers to the rate of change across large landscape gradient

$\alpha$ -richness is strongly correlated with physical environmental variables. For example, there are 100 species of tunicates in arctic waters, 400-species in temperate water & 600 in tropical sea. Thus, temperature seems to be the most important factor affecting  $\alpha$ -richness of tunicates

### Reason of Biodiversity

Habitat destruction is a major cause of biodiversity loss. Habitat loss is caused by deforestation, overpopulation, pollution, & global warming. Species that are physically large & those living in forests & oceans are more affected by habitat reduction.

There are many major causes for the loss of biodiversity.

✓ (1) Destruction of Habitat

✓ (2) Hunting

✓ (3) Exploitation of selected species

✓ (4) Habitat Fragmentation

(5) Collection for zoo and research

✓ (6) Introduction of Exotic species

✓ (7) Pollution

✓ (8) Control of pests and predators.

✓ (9) Natural calamities.

(10) Other factors like lamp, fire, etc.

Date: / /

(7)

## (1) Destruction of Habitat & (4) Habitat Fragmentation

Habitat destruction is a major cause of biodiversity loss. Habitat loss is caused by deforestation, over-population, pollution, & global warming. Species that are physically large & those living in forests or oceans are more affected by habitat reduction.

According to biologists, about 30% of all species on earth will be extinct by 2050. A/c to International Union for Conservation of Nature (IUCN), globally about  $\frac{1}{3}$  of all known species are threatened. It is estimated that 25% of all mammals will be extinct within 20 years.

(3) Hunting: — Sometimes, the loss of habitat is in instalments so that the habitat is divided into small & scattered patches, a phenomenon is called habitat fragmentation. There are many wild life species such as bears & large cats that require large territories to subsist. They get badly threatened. Due to habitat fragmentation, many song birds are vanishing.

(2) Hunting: — It is one of the major loss in biodiversity. Wild animals are hunted for the commercial utilization of their products such as hides and skin, tusk, fur, meat, pharmaceuticals, cosmetics, perfume & etc.



decoration purposes. In Africa, 95% of the black skin have been without horn. To-day Rhino horn fetches more than \$15,000 in the pharmaceutical market.

### (3) Exploitation of Selected species -

Exploitation of medicinally important plants has resulted in their disappearance from many of their natural habitats. The Pitcher plants, *Nepenthes khasiana*, *Orosia* spp., *Gnetum* species, *Psilotum* spp., *Discoetes* are decreased due to collection for teaching & Laboratory work.

Many other medicinally plants like *Podophyllum* sp, *Aconitum* sp, *Rauwolfia* spp, *Atropa* spp etc also disappearing rapidly due to over collection.

Today, only a- varieties of wheat occupy more than half of united states wheat fields. Almost 95% of the old strains of wheat grown in Greece before Second World war (1939 - 1945) have disappeared.

They are replaced by a few new hybrid varieties. (4) Habitat Fragmentation and Isolation (5) Collection for Zoo & Research

Animals & Plants are collected through throughout the world for zoos & biological laboratories for study & research in science medicine. For example, Monkeys & chimpanzees are sacrificed for research as they have

anatomical, genetic & physiological similarities to human beings.

### 6) Introductions of Exotic species,

Any species which is not a natural inhabitant of the locality but is deliberately or accidentally introduced into the system may be designated as an exotic species. Native species are subjected to competition for food & space due to the introduction of exotic species.

There are many examples when introduction of exotic species has caused extensive damage to natural biotic community of the ecosystem. The introduction of Nile Perch from north in Lake Victoria, Africa's largest Lake, has driven almost half of the 400 original fish species of the lake to near extinction.

7) Pollution:- Pollution is also one of the most important cause of biodiversity. Pollution alters the natural habitat specially, water pollution injurious to the biotic components of estuary & coastal ecosystems. Toxic wastes entering the water bodies disturb the food chain & so, the aquatic ecosystem. Insecticides, pesticides, sulphur, and nitrogen oxides, acid rain, ozone depletion & global warming too, affect adversely the plant & animal species. Noise pollution is also a cause of wild life extinction.



## 8) Control of Pests and Predators

Predator and Pest control measures, generally kill predators that are a component of balanced ecosystem and may also indiscriminately kill non-target species.

## 9) Natural Calamities:-

Natural calamities such as floods, drought, forest fires, earth-quakes, volcanic eruptions, epidemic (corona) etc take a heavy toll of plant & animal life.

Floods in tropical regions of the world inundate much of the ground vegetation. Forest fires in densely wooded localities often reduce to ashes a large number of plant & animal species.

Epidemic Sometimes destroy large portions of natural population (USA) by Covid-19 (14-lakhs people infected & ~~about~~ more than 90 thousand died on 19.5.2020).

## 10) Other factors:-

Other ecological factors that may also contribute to the extinction of plant & animal diversity are as follows:-

- a) Distribution range -
- b) degree of specialisation -
- c) Position of the organism in the food chain,
- d) Reproduction rate.