



BIODIVERSITY AND ITS MEASUREMENT

VULNERABILITY TO EXTINCTION



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WHAT IS BIODIVERSITY

- ▶ Biodiversity, or biological diversity, is the immense variety of all living forms on Earth, encompassing the different plants, animals, fungi, and microorganisms, the genes they contain, and the complex ecosystems they form. It operates at multiple levels—genetic, species, and ecosystem—and is essential for maintaining natural processes that provide food, clean air, water, and medicine.
- ▶ The biodiversity we see today is the result of 4.5 billion years of evolution, increasingly influenced by humans.

KEY ASPECT OF BIODIVERSITY

- ▶ **Species Diversity:** The variety of species in a particular area, ranging from bacteria to complex organisms like trees and whales.
- ▶ **Genetic Diversity:** The variation in genes within a single species, which allows populations to adapt to changing environments.
- ▶ **Ecosystem Diversity:** The variety of habitats and ecological communities (e.g., coral reefs, forests, deserts, wetlands) and the interactions between them.

WHY BIODIVERSITY MATTERS

Biodiversity is not just about counting species; it is the foundation of ecosystem health and provides critical balance to environmental well being and green growth.

Healthy communities are sustained by well-functioning ecosystems, which provide critical services such as clean air, fresh water, natural medicines and food security. These ecosystems also regulate diseases and help stabilize the climate

VUNERABILITY TO EXTINCTION

- ▶ Vulnerability to extinction in biodiversity refers to the susceptibility of a species, population, or ecosystem to a high risk of disappearing entirely from the planet within a foreseeable timeframe. It is a measure of a species' inherent fragility when confronted with environmental changes, pressures, or threats that exceed its ability to adapt or recover.
- ▶ This concept is central to conservation biology, focusing on identifying species at risk—such as those categorized as "Vulnerable," "Endangered," or "Critically Endangered" on the IUCN Red List—to prevent their extinction.

FACTORS AFFECTING VULNERABILITY TO EXTINCTION

- ▶ **small population size: the numbers game**
- ▶ Population size plays a critical role in extinction vulnerability. Small populations face what scientists call the “extinction vortex” – a downward spiral where small numbers lead to even smaller numbers. When a population drops below a certain threshold, typically around 50-100 individuals, genetic diversity plummets. This creates inbreeding depression, where harmful genetic traits become more common, weakening the population’s overall health and reproductive success.
- ▶ Small populations also struggle with random events. A single disease outbreak, natural disaster, or harsh winter can wipe out a significant portion of a tiny population. Large populations can absorb these shocks, but small ones cannot. It’s like the difference between losing ten people from a town of 100 versus losing ten people from a city of 100,000 – the impact is dramatically different.

Habitat destruction

- ▶ **Habitat destruction: the ultimate threat multiplier**

Habitat destruction often delivers the final blow. Human activities have transformed over 75% of terrestrial environments and 40% of marine systems, leaving many species without suitable places to live.

- ▶ Habitat fragmentation creates particularly insidious problems. When large, continuous habitats become broken into small, isolated patches, several negative effects cascade through ecosystems. Small habitat fragments cannot support large populations, increasing extinction risk through the small population effects described earlier. Fragments also have proportionally more “edge” habitat, where conditions differ from the interior, often favoring different species than those adapted to core habitat conditions.

EXAMPLES IN NIGERIA

- ▶ Nigeria is facing a severe biodiversity crisis, with many species at high risk of extinction due to rapid habitat loss, poaching, illegal trade, and poor law enforcement. A 40% decline in wildlife and habitat has been observed over the last 25 years, with 141 native animal species and 168 native plant species currently classified as threatened.
- ▶ Nigeria was once home to rhinos, giraffes and cheetahs, but sadly due to habitat destruction and poaching, they have become extinct here. But all hope isn't lost as Nigeria still has iconic wildlife species such as lions, elephants, Cross River gorillas, Nigeria-Cameroon chimpanzees. There are about 50 lions, fewer than 500 elephants, around 100 gorillas and between 1,400 to 2,300 chimpanzees surviving today.

Major Drivers of Extinction Risk

- ▶ Habitat Loss & Degradation: Deforestation (approx. 405,000 hectares per annum), agricultural expansion, and urban growth are destroying critical wildlife habitats.
- ▶ illegal Wildlife Trade & Poaching: Nigeria is a major transit hub for trafficking elephant ivory and pangolin scales (linked to ~50% of global seizures 2016-2019).
- ▶ Bushmeat Demand: High demand for bushmeat in major cities (Lagos, Abuja, Port Harcourt) drives the hunting of wild animals.
- ▶ Insecurity: Bandits and insurgents have taken over three of Nigeria's 7 national parks, leaving wildlife unprotected

Examples of Species at Risk of Extinction

- ▶ Cross River Gorilla (*Gorilla gorilla diehli*): With only about 100 individuals remaining, it is one of the most endangered apes in the world
- ▶ Nigeria-Cameroon Chimpanzee: Threatened by habitat loss and hunting
- ▶ African Forest & Savanna Elephants: Fewer than 500 elephants survive in Nigeria, threatened by ivory poaching and habitat loss.
- ▶ Pangolins: Heavily hunted and trafficked for their scales.

Birds

- ▶ African White-backed Vulture: Critically endangered due to poisoning and illegal trade of body parts.
- ▶ FISHES
- ▶ Niger Delta Fish Species: Nearly 92 fish species are threatened by pollution, oil exploration, and overfishing in the Delta region. Examples include the Silver Catfish and the heterotis neloticus
- ▶ PLANTS
- ▶ Costus Spectabilis (National Flower): Threatened by high rates of deforestation.
- ▶ Acacia species & Neem tree: Specifically in the Sahel region, overexploited for fuelwood

Conservation Challenges

- ▶ Despite the existence of laws protecting wildlife, enforcement is weak, and many, including law enforcement officials, are not fully aware of these laws. The economic pressures of poverty also drive local populations to exploit natural resources for survival.



THANK YOU FOR YOUR AUDIENCE

THE END