Forum: United Nations Environmental Programme (UNEP)

Issue: Resolving the crisis of species extinction and the decline of biodiversity

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Introduction

Species extinction and the decline of biodiversity are intricately linked and represent significant threats to the health of our planet, transcending borders and affecting communities worldwide. Due to the growth of the human population and increased human activity, environmental damage has significantly escalated over the past centuries, causing a rise in threatened species and extinctions, as well as a decline in the Earth's biodiversity. The United Nations has declared that one million of the world's estimated eight million species of plants and animals are threatened with extinction.

In recent years, species extinction continues to occur worldwide. The dusty blue bird, called Spix's Macaw, which earned attention through an animated film in the 2011 were declared extinct in 2018. Being marked as the rarest parrot species in the world, these parrots have been illegally traded in the wild. The suitable temperature in Brazil cultivates a unique type of tree (*Tabebuia caraiba*) that is especially critical to Spix's Macaw and became its habitat. However, habitat loss due to increase in agriculture damages is theorized to have led their decline. Until now, it is estimated that between 60 and 80 individuals are still alive in captivity. Money spends on reintroducing Spix's Macaw cost a lot; people spent a lot of money in breeding the species and protect them. The World Health Organization mentioned that 'biodiversity loss can have significant direct health impact if ecosystem services no longer meet societal need.' An extinction in one species can directly affect the food chain of the ecosystem, causing a huge impact on related species. Medical and pharma logical discoveries are made through greater understanding of biodiversity. Moreover, biodiversity decreases profound economic consequences. Estimation of global economic impact of biodiversity loss shows that nearly US$10 trillion annually, including healthcare costs from disease and agricultural loss.

The loss of a single species can have a domino effect, leading to further declines in other species within the ecosystem. This interconnectedness underscores the importance of addressing both ecosystem degradation and species extinction simultaneously to promote a healthier planet. In response to the ongoing loss of species and biodiversity, the United Nations Environment Programme, as the leading global environmental authority, coordinating international efforts to address environmental challenges, and advocating sustainable use of natural resources to balance human needs with biodiversity preservation, urges nation states to deliberate on this pressing matter with urgency and commitment.

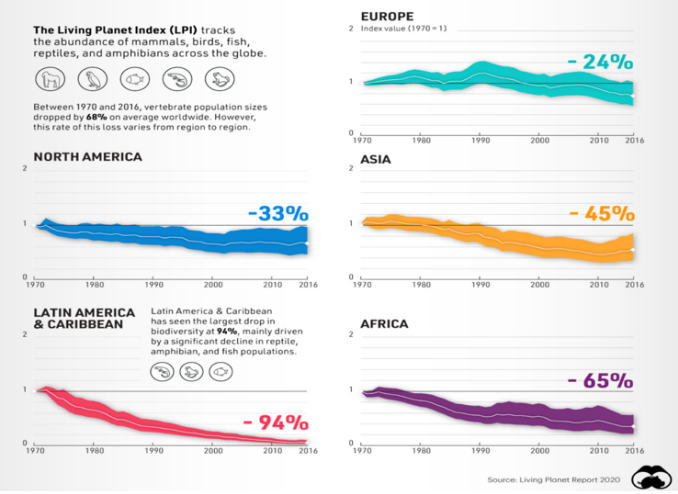

Figure 1： Percentage decrease in biodiversity until 2016

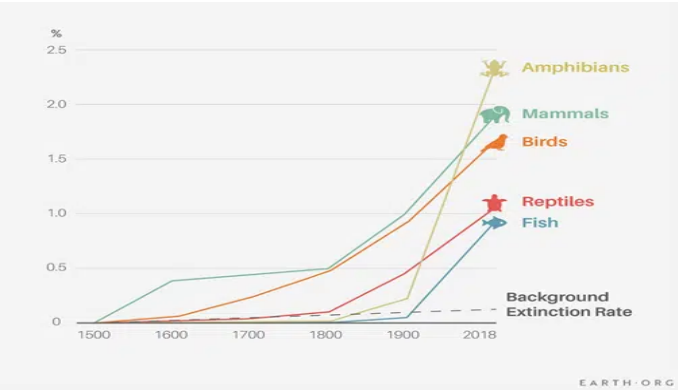

Figure 2: Extinction rate until 2018

Key Terminology

Alien Species

Plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health

Biodiversity Lose

Refers to the reduction of any aspect of biological diversity in a particular area through death (including extinction), destruction or manual removal; it can refer to many scales, from global extinctions to population extinctions, resulting in decreased total diversity at the same scale, like habitat destruction and climate change, threatening ecosystem resilience

Alien Species

Outputs, conditions, or process of natural system that directly or indirectly benefit human or enhance social welfare. Ecosystem can directly or as inputs into the production of other goods and services

Extinction Risk

The likelihood of a species becoming extinct, which is an important factor to consider when deciding whether to allocate resources for conservation efforts

Habitat Degration

Human origin that make the habitats less suitable or less available

Habitat Degration

The outright does of natural ecosystems, an inevitable consequence of expanding human populations and human activities

Invisible Species

Species which, under normal circumstances are not detectable by the human eye or can through some natural means render themselves such.

Mass Extinction

When species banish much faster than they are replaced. This is usually defined as about 75% of the world's species being lost in a short period of geological time-less than 2.8 million years

Over Exploitation

The removal of a species from its environment faster that it can repopulate itself. This eventually leads to the species becoming extinct

Background

History of species extinction and the decline of biodiversity

Throughout the history of Earth, speciation and extinction acts as the major process which lead to dramatic change in the number of species as reflected in the fossil record. Paleontologists have identified five events in geological history of sudden and dramatic losses in biodiversity, with more than half of all extant species disappearing from the fossil record.

Table 12.2.*a*: Summary of the five mass extinctions, including the name, dates, percent of biodiversity lost, and hypothesized causes.

Geological Period	Mass Extinction Name	Time (millions of years ago)	Loss in Biodiversity	Hypothesized Cause(s)
Ordovician–Silurian	end-Ordovician O–S	450–440	85% of marine species	Global cooling and then warming, gamma-ray burst from supernova removed ozone layer
Late Devonian	end-Devonian	375–360	79-87% of all species	Unknown
Permian–Triassic	end-Permian	251	96% of marine species and 70% of terrestrial (land) species	Volcanic activity, decrease on dissolved oxygen in the oceans
Triassic–Jurassic	end-Triassic	205	76% of all species	Climate change, asteroid impact, volcanic eruptions
Cretaceous–Paleogene	end-Cretaceous K–Pg (K–T)	65.5	50% of animals and plants	Asteroid impact

Figure 3. five mass extinctions

The effect of human affecting global biodiversity first appeared as modern people IG rated from Africa to occupy the other continent. Between 60000 and 10000 years ago, a wave of

extinction of giant animals (mammoths) followed the arrival of people, use as one of the major of food supply and other basic needs due to the fossil record. Between 5000 and 5000 years ago people discovered and settled oceanic islands. This causes distinction in whatever animals on the island. Many smaller vertebrates succumbed to the combined pressure of hunting, forest removal, and impacts of alien species.

Critical ecological relationships at stake

Organisms within an ecosystem engage in a spectrum of interactions, each with distinct effects on the species involved. Competition exists and arises when two or more organisms feed on the same limited food exist in nature. Interaction such as predation, mutualism, and competition cause population to fluctuate over time. For example, in a predator-prey relationship, an increase in prey's population can also cause an increase in predator's population. More resources can be gain from upper food chain which boost their number of animals exist in their population. On the other hand, a decrease in the amount of prey can also lead to a decrease in predator. This interaction between species helps them promote their growth, decline, and stability of population. Natural selection also plays an important role as it choose the best adaptive feature according to the environment and eliminate those who cannot survive under selection power.

Causes of species extinction and the decline of biodiversity

Species extinction and decline of biodiversity can be caused by both natural and man-made. Natural changes remarkably contribute to the decrease in biodiversity and species extinction. The onset of winter causes a temporarily reduce in biodiversity, as warm-adapted insects died and migrating animals leave. Moreover, natural disasters such as volcano, wildfires, and hurricane also draws down the number of species in an ecosystem. The consequences of these unpredictable natural disasters cause significant jeopardize to their availability of food, habitat, and territories.

Global warming, a continuous alarming issue exist on our planet, contributes to habitat loss of several species, shifting ecosystem dynamics. As temperature becomes higher, some animals

are unable to switch their living habit and adapt to new environment, causing threats on the existence of the species. For instance, polar bears are losing their habitat as the global temperature rises. In the case of continuous melting of glaciers, polar bears are unable to rest, however, switching their territory constantly to find a stable glacier. This issue directly impacts their ability to hunt and survive.

Species endangerment and extinction have other three major anthropogenic causes—over hunting or overharvesting; introduction of nonnative species, including the spread of disease; and habitat degradation or loss. All three causes probably were factors in prehistoric as well as Mordor times. For the most species in decline and for most of those on the edge of extinction today, the most serious threat appears to be habitat degradation of loss. Habitat destruction is the primary threat to most endangered and threatened plants and animals.

Consequences of species extinction and the decline of biodiversity

Biodiversity loss has far-reaching and long-lasting destructive consequences. As human rely on a variety kind of animals and plants, a decrease in biodiversity and species significantly harm the economic system and human activity. The lose of biodiversity among these critical natural resources threatens global food security. The world of scarcity among goods and services will become more hazardous due to the decrease in supply of animals and plants, driven down the world's GDP as a whole. To be sure, the decrease in ecosystem also effects the amount of Carbon Dioxide release in the atmosphere, increases global temperatures as plants are unable to process photosynthesis. Individuals who are subsistence in what ecosystem provide will turn into extreme poverty. The inflow of their income and their maintainance of live eventually decrease since species are lost in their environment. Ecological effects are far more crucial. The lose of genes and individuals threatens the long-term survival of a species, as mates become scarce and risks from inbreeding rise when closely related survivor mate. Declining biodiversity lowers an ecosystem's productivity and lowers the quality of the ecosystem's services. Biodiversity loss also threatens the structure and proper functioning of the ecosystem. Although all ecosystems can adapt to the stress's associates with reductions in biodiversity to some degree, biodiversity loss reduces an ecosystem's complexity, as roles once played multiple interacting species or multiple

interacting individuals are okayed by fewer or none. As parts are lost, ecosystem loses the ability to recover form a disturbance.

Many extinctions will affect species that biologist that have never been discovered. These 'invisible' species that will become extinct in tropical rainforest. These rainforests are the most diverse ecosystem on the planet and are being destroyed rapidly by deforestation to provide timber and space for agriculture. Deforestation can be one of the most crucial reasons of species extinction and lose of biodiversity on Earth. The Spix's Macaw is the rarest parrot species in the world, and completely extinct in the wild. These parrots were native to the arid lowland forests in the interior and northeast of Brazil. Researchers found that *Tabebuia caraiba* (a species of trees) was critical to these birds' habitat. Habitat loss due to agriculture, combines with illegal trapping for the per trade led to the decline of this species. Until now, it was estimated that only 60 and 80 individuals are still alive in captivity.

Biodiversity is key to sustaining the strength and adaptability of ecosystems, enhancing their stability and resilience to challenges like climate change, disease, outbreaks, and invasive species. Consequently, a decrease in biodiversity can diminish an ecosystem's ability and resilience to recover form such disruption, heightening the risk of ecosystem collapse. This can lead to increased soil erosion, which not only affects agricultural productivity but also impairs the ecosystem's ability to support plant and animal life.

Beyond its effects on ecosystems, the decline in biodiversity also influences human health. We are fundamentally dependent on ecosystems' goods and services, such as the provision of fresh water and fuel sources, maintaining our well-being and ensuring sustainable livelihood. The loss of biodiversity can result in significant direct impacts on human health when ecosystem services no longer adequately meet social needs. These diminishing ecosystems pose a significant threat to those who are directly depends on different ecosystem for essential supplies.

Major Parties Involved

International Union for Conservation of Nature (IUCN)

The ICUN is the world's largest and most influential environmental network, including 1400+ member organization such as governments, NGOs, and scientists. To combat the issue of

the loss of biodiversity, ICUN maintains its Red List of Threatened species, tracks the conservation status of more than 157000 species. Classifying species into different states including data deficient (DD), least concern (LC), near threatened (NT), vulenrable (VU) etc. As a result, guided conservation effort on protecting Giant Pandas and Gorillas. Moreover, IUCN also establish protected areas, lead species recovery programs, combat illegal trade, and promote solutions to solve this alarming issue worldwide.

United States Fish and Wildlife Service (FWS)

U.S. Fish & Wildlife service removes Native Carolina Plant from Endangered Species List. When the plant was listed as threatened under the Endangered Species Act in 1989, there were 24 known populations disturbed across eight North Caroline countries. Since then, documented populations have increased to 119 across 10 North Carolina and three South Carolina countries. Of those 119 populations, 28 contain more than 1000 plants. The North Carolina Department of Transportation secured land for conservation, including areas now part of the Broad River Greenway.

European Union (EU)

The EU's biodiversity strategy for 2030 is a comprehensive ambitious and long-term plan to protect nature and reserve the degradation of ecosystems. The strategy aims to put Europe's biodiversity on a path to recovery by 2030, and contains specific actions and commitments. It establishes a large EU-wide network of protected areas on land and at sea, launch an EU nature restoration plan, and introduce measures to enable the necessary transformative change etc. Aiming to ensure better implementation and track progress, improve knowledge, financing and investments, moreover, better respecting nature in public and business decision-making. Aiming for a wider protection of nature, they enlarge existing natura 2000 areas, which cover almost one fifth of land and one tenth of surrounding seas with strict protection for areas of very high biodiversity and climate value. Implementation of two online track tools track progress in implementing the strategy; producing up-to-date information of the action and shows progress to the quantified biodiversity targets set by the strategy.

Timeline of Events

Date	Description/Note
Late Devonian Extinction, 375-360 million years ago	Triggered by glaciation and sea-level drop, this event wiped out 85% of marine species, including trilobites and brachiopods, marking the first mass extinction in Earth's history
Cretaceous-Paleogene Extinction, 66 million years ago	A massive asteroid impact caused global wildfires, climate disruption, and the demise of non-avian dinosaurs, alongside 75% of species, enabling mammalian dominance
Dodo Extinction, 1662-1690	Dodo's population experienced a rapid decline primarily due to the arrival of European settlers and the introduction of invasive species
Steller's Sea Cow, 1768	Hunters hunting their meat and skin for use cause their extinction, the extinction happens right after their discoveries
Passenger Pigeon, 1914	Migratory bird hunted to extinction by humans
The Tasmanian tige's extinction, 1936	After the Tasmanian Wolf became extinct, the number of quolls it preyed on skyrocketed, triggering a wave of extinction among small mammals
Yangtze River Dolphin, 2006	overfishing and human activity drove it to the brink of extinction and it hasn't been seen in decades.
Bramble Cay Melomys Extinction, 2016	The first mammal that went extinct due to climate change

Previous Attempts/Solutions

Previous attempts have been used to reduce biodiversity loss and species extinction. 196 parties and 168 signature of national governments such as Canada, China, France, and Peru have conserved portions of their territories under the Convention on Biological Diversity (CBD). A list of 20 biodiversity goals, called the Aichi Biodiversity Targets, was unveiled at the CBD meeting held in Nagoya, Japan, in October 2010. The purpose of the list was to make issues of biodiversity mainstream in both economic markets and society at large and to increase

biodiversity protection by 2020. Since 2010, 164 countries have developed plans to reach those'd targets. By January 2019 some 7.5% of the world' oceans had been protected various national governments in addition to 14.9% of land areas.

Many successful conservations have been taken to protect ecosystem and endangered species. The American bald eagle, which faced nearly extinction due to habitat loss and the use of pesticide DDT, recovered with their population through banning harmful chemical and habitat protection. In marine ecosystem, the establishment of marine protected area (MPAs) has proven effective in preserving marine life and their ecosystem. MPAs restrict human activities such as fishing and tourism's visit, allowing the protected area to recover from damage. The result of Great Barrier Reef Marine Park in Australia shows the importance of restrictions significantly. The strict regulations have helped protect coral reefs and their associated species from overexploitation and degradation.

Potential Solutions

1. Call upon all member states to formulate and implement comprehensive strategies for biodiversity conservation
2. Urges all member states to launch public awareness campaigns on species extinction and biodiversity loss, such as but not limited to;

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