

Measures to Preserve Biodiversity and Avoid Land Degradation

Forum: Environment Commission

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Introduction

The term biodiversity refers to “the multitude of living things that make up life on Earth”, while land degradation indicates “reduction or loss in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes”. The issue of loss of biodiversity and increasing land degradation is acknowledged by the fifteenth goal of the United Nations’ 17 Sustainable Development Goals: Life on Land. At the United Nations Conference on Sustainable Development, also known as Rio+20, member states recognized “the severity of global biodiversity loss and degradation of ecosystems”, which was communicated in the outcome document, the Future We Want.

Background

Biodiversity today is the result of nearly 4 billion years of evolution. The history of biodiversity can be marked by periodic massive losses of diversity, and most biologists agree that the emergence of humans influenced a new period of mass extinction. Interest in the natural world grew in the twentieth century as wildlife media was rapidly developed and broadcasted. By the 1980s, the public became increasingly aware of the threats to the natural world, including the loss of biodiversity, and supportive of green activists.



Biodiversity in nature

Biodiversity reduction decreases an ecosystem’s complexity as the number of interacting species decline. As a result, the ecosystem loses its ability to recover from disturbances to the point that it may cease to be what it was. Yet, biodiversity underpins modern society. People rely on natural resources to live while some industries, such as construction, agriculture, and food and beverages, require nature to operate. Therefore, about \$44 trillion of economic value creation, more than half of the world’s GDP, is heavily dependent on nature. In addition, nature protects people from the spread of disease or provides many drugs to cure them. Nevertheless, today, the rate at which species are disappearing from the planet is 1,000 times more than it has ever been.

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Land degradation predates history but continues to be a harmful presence to people. Like the loss in biodiversity, land degradation is detrimental not only to the ecosystem but livelihoods in various ways. The process results in significant costs to the economy and hinders poverty reduction.

At the present, approximately a quarter of land has been degraded. Land degradation is often accompanied by desertification, a process in which fertile land becomes a desert. During the processes, soil is eroded and loses its ability to retain water or to accommodate plants. Over half of global agricultural land are in drylands, but these processes have increased risks of food insecurity. Thus, land degradation has negatively impacted 3.2 billion people worldwide, especially those without power to defend themselves, such as rural communities, smallholder farmers, and the poor. Research speculates that nearly 95% of Earth's total land area can become degraded in the next thirty years.

Problems Raised

Increasing Health Risks

Declining biodiversity and increasing land degradation pose detrimental health risks to humans. According to the World Health Organization (WHO), “as land is degraded and deserts expand in some places, food production is reduced, water sources dry up and populations are pressured to move to more hospitable areas.” A lack of clean water causes more water and food-borne diseases while reduced food and water supplies lead to malnutrition. An increase in atmospheric dust induces respiratory diseases, and population migration drives the spread of infectious diseases. Moreover, research shows that 60% of human infections are caused by animals. Loss in biodiversity and closer contact with animals will only increase this risk. In addition, nature is a major source of modern medicine; for instance, nearly 70% of cancer drugs are inspired by nature. In other words, losing healthy land and its inhabitants means facing more threats to our health.

Climate Change

Land degradation and biodiversity have crucial roles in climate change as well. Earth's soil holds more carbon than the sum of Earth's biomass and atmosphere. However, the loss of soil organic carbon is a key signal of land degradation. In other words, when land degradation occurs, carbon is released into the atmosphere and contributes to climate change. Since the 19th century, approximately two-thirds of all carbon stores from soils and vegetation have been released. Other than land, healthy ecosystems with great biodiversity also help reduce carbon in the air. Land and oceans absorb over half of all greenhouse gas emissions while forests, wetlands, and other ecosystems can hamper destruction from extreme weather.



Land degradation in Tanzania

Nonetheless, the continuous loss of biodiversity and healthy land have hindered nature’s ability to protect itself and has exacerbated the issue of climate change.

International Actions

United Nations Convention to Combat Desertification (UNCCD)

The United Nations Convention to Combat Desertification (UNCCD) addresses desertification and the effects of drought around the world. Drafted in 1994 and effected by 1996 as the result of the Rio Conference’s Agenda 21, the convention has been ratified by the European Union and all 193 UN member states. One of the goals for UNCCD is Land Degradation Neutrality (LDN), “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services to enhance food security remain stable, or increase, within specified temporal and spatial scales and ecosystems.” The three actions they utilize are to maintain existing healthy land, adopt sustainable land management practices to slow degradation and increase efforts to restore degraded lands. The convention reports that they have worked on around 70% of ice-free land and predicts that they will cover 90% by 2050.

United Nations Convention on Biological Diversity (CBD)

The United Nations Convention on Biological Diversity (UNCCD) aims to conserve biological diversity and to equally share the benefits of genetic resources. Along with the UNCCD, CBD was also open for signature at the Rio Conference in 1992 and has been ratified by 196 nations. They cover all possible domains either directly or indirectly related to biodiversity, such as biotechnology, politics, education, and many more. Its governing body, the Conference of the Parties (COP), holds a biennial meeting to review progress and set plans. The CBD established seven thematic programs of work for each major biome on Earth as well as cross-cutting initiatives between them.

International Union for Conservation of Nature (IUCN)

The International Union for Conservation of Nature (IUCN) is a membership organization made up of both governmental and non-governmental organizations. It provides the knowledge and tools for all 1,400 member organizations to protect the status of the natural world. They meet every four years to set priorities and agree on projects. The union is one of the main organizations that strive to save species from extinction and deter biodiversity loss. For instance, they implemented the IUCN Red List of Threatened Species, which is a comprehensive inventory of the global conservation state of biological species that makes use of exact criteria to assess the extinction risk of countless species and subspecies.

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE)¹

Criterion	Critically Endangered	Endangered	Vulnerable
A. Population size reduction (Population reduction projected or inferred over 10 years or 3 generations)			
A1	≥ 90%	≥ 70%	≥ 50%
A1, A1.1 & A1.2	≥ 90%	≥ 80%	≥ 50%
A1.1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased. A1.2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. A1.3 Population reduction projected, inferred or suspected to occur in the future (up to a maximum of 100 years) (not caused by A1.2). A1.4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the cause of reduction may not have ceased OR may not be understood OR may not be reversible.			
A2 Direct observations (over A1) OR an index of abundance appropriate to the taxon. A3 A decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality. A4 Actual or potential levels of exploitation. A5 Effects of introduced taxa, hybridization, pathogens, parasitism, competition or parasites.			
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
B1a	Severely fragmented OR number of locations	< 5	< 10
B1b	Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals.		
B2	Continuing fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals.		
C. Small population size and decline			
Number of mature individuals	< 250	< 1,000	< 10,000
AND at least one of C1 or C2			
C1	An observed, estimated or projected continuing decline of at least 30% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:		
(a)	Number of mature individuals in each subpopulation	< 50	< 250
(b)	% of mature individuals in one subpopulation	90-100%	50-100%
(c)	Extreme fluctuations in the number of mature individuals		100%
D. Very small or restricted population			
D1. Number of mature individuals	< 50	< 250	< 1,000
D2 OR applies to the CR category. Restricted area of occupancy or number of locations with a stochastic future threat that could drive the taxon to CR or EX in a very short time.			
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	> 50% in 10 years or 3 generations, whichever is longer (100 years max.)	> 20% in 20 years or 5 generations, whichever is longer (100 years max.)	> 10% in 100 years

¹ Use of this summary sheet requires full understanding of the IUCN Red List Categories and Criteria and Guidelines for Using the IUCN Red List Categories and Criteria. Please refer to the full document for explanations of these and category codes.

IUCN Red List Criteria Summary Sheet

Possible Solutions

Natural Regeneration

As there are many aspects to this problem, many solutions can be proposed. One solution is to foster natural regeneration. For example, 70% of Cuba's coasts bear mangroves, and when the country faced the loss of these mangroves, the United Nations Development Programme (UNDP) helped native communities plant new mangroves, clean canals, and support coastal forest growth. As a result, the country experienced an increase in sea animal population and controlled flooding. Revitalizing ecosystems can also help prevent land degradation since soil erosion is one of the major factors of land degradation. Planting trees or small plants with high soil binding capacity will enable this development.



Planting mangroves in Cuba

Effective Use of Natural Resources

While reducing all human activities that cause harm to nature is a simple and powerful solution, a more feasible solution is using natural resources effectively. For instance, people may implement terrace and contour farming, conserve watersheds, or store rainwater to improve water retention. To develop and execute these conservation efforts, however, we also cannot underscore the value of education, training, and capacity building.

Glossary

Biodiversity: the multitude of living things that make up life on Earth.

Land degradation: reduction or loss, in arid, semi-arid, and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns.

United Nations Convention to Combat Desertification (UNCCD): the UNCCD is a legally binding convention ratified by all UN member states, and it has played a key role in leading international actions for sustainable land management around the world

United Nations Convention on Biological Diversity (UNCBD): the UNCBD is a treaty ratified by all UN member states except for the United States, and it has worked globally to conserve Earth's biodiversity.

United Nations Development Programme (UNDP): the UNDP is an agency of the United Nations that aims for the elimination of poverty and sustainable economic growth.

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International Union for Conservation of Nature (IUCN): the IUCN is an international organization that works to conserve nature by tackling climate change, biodiversity loss, and pollution.

Greenhouse Gas: gases that trap heat in the Earth's atmosphere. The main gases include carbon dioxide (CO₂), Methane (CH₄), and Nitrous oxide (N₂O). Each type of gas remains in the atmosphere for varying lengths of time and affects climate change in different magnitudes. Increasing concentrations of greenhouse gases act as a blanket, warming the Earth and leading to climate change.

Timeline

1948 – International Union for Conservation of Nature is established

1992 – United Nations Conference on Environment and Development (UNCED), also known as Rio Conference, is held

1993 – United Nations Convention on Biological Diversity is established

1994 – United Nations Convention to Combat Desertification is established

2002 – the World Summit on Sustainable Development is held

2012 – the United Nations Conference on Sustainable Development (UNCSD) is held

2015 – the 17 Sustainable Development Goals (SDGs) are adopted by the United Nations

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