



THE LOSS OF BIODIVERSITY AND ECOSYSTEMS: A THREAT TO THE FUNCTIONING OF OUR PLANET, ECONOMY AND HUMAN SOCIETY

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ABSTRACT

Loss of biodiversity appears to affect ecosystems as much as climate change, pollution and other major forms of environmental stress that also disrupts the functioning of ecosystems, making them more vulnerable to perturbations and less able to supply humans with needed services. This study, is therefore investigating the cause and effect of loss of biodiversity and ecosystems and as it poses threat to the functioning of our planet, economy and human society. The study disclose that biodiversity loss has negative effects on several aspects of human well-being and the economy, such as food security, vulnerability to natural disasters, energy security, and access to clean water and raw materials for production, which are caused by deforestation, overpopulation, pollution, and global warming resulting from biodiversity and ecosystems losses. However, human activities also impact the ecosystem which triggered climate change, soil erosion, poor air quality, and undrinkable water. The study was concluded human livelihoods, such as those of farmers, fishers and timber workers, are dependent on biodiversity as it provides ecological life support, functioning ecosystems that supply oxygen, clean air and water, pollination of plants, pest control, wastewater treatment and many ecosystem services, therefore a loss of biodiversity and ecosystems and as it poses threat to the functioning of our planet, economy and human society. Based on the study, ways to protect and conserve biodiversity was recommended which includes; Government legislation. Nature preserves. Reducing invasive species. Habitat restoration, Research, Reduce climate change.

Keywords: Loss, Biodiversity, Ecosystems, Threat, Planet, Economy, Human Society.

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INTRODUCTION

Each organism on Earth represents the successful lines of millennia of natural selection, and each species fills specific roles in the ecosystems it inhabits and shapes. We still rely directly on many wild plants and animals for food, and many have been the source of important pharmaceuticals or the inspiration for technological breakthroughs. Beyond their economic value to humans, plants and animals bring us joy and enrichment in their beauty and novelty. Our lives would certainly be less beautiful and interesting without songbirds, majestic giraffes, wildflowers, thrilling sharks, or exuberant rainforests. While organisms have always come and gone over the course of our planet's history, modern biodiversity loss is human-caused, and extinctions. This loss of biodiversity could have disastrous effects on the supply of seafood to the human population and on the economy. There is increasing evidence that species diversity is important for marine fisheries, both in the short term, by increasing productivity, and in the long term, by increasing resilience, while genetic diversity is important particularly for the latter.

A 2006 study by Worm et al. (2006) concluded that all of the world's commercial fisheries are likely to have collapsed in less than 50 years unless current trends are reversed. It found that low diversity is associated with lower fishery productivity, more frequent "collapses", and a lower tendency to recover after overfishing than naturally species-rich systems. The security value of biodiversity can be compared with financial markets. A diverse portfolio of species stocks, as with business stocks, can provide a buffer against fluctuations in the environment (or market) that cause declines in individual stocks (Duffy, 2007). This stabilizing effect of a "biodiverse" portfolio is likely to be especially important as environmental change accelerates with global warming and other human impacts.

Nonhuman life on Earth is suffering greatly at human hands with more human action triggering a vast cascade of environmental problems that now threaten the continued ability of both natural and human systems to flourish. Biodiversity loss describes the decline of plants, animals, and other organisms in many places around the world (Ki-moon, 2008). Populations of all sorts of nonhuman life (and their precious genetic diversity) have been shrinking because of human threats. Many species are now endangered and at risk of extinction, and sadly many thousand have already been lost forever. Solving the critical environmental problems of global warming, water scarcity, pollution, and biodiversity loss are perhaps the greatest challenges of the 21st century which this study intend to highlight its major threats to biodiversity and what can be done to keep our organisms from being lost forever.

CONCEPTUAL CLARIFICATION

Biodiversity

Biodiversity is the shortened form of two words "biological" and "diversity". It refers to all the variety of life that can be found on Earth (plants, animals, fungi, and micro-organisms) as well as to the communities that they form and the habitats in which they live (Worm et al. 2006).

The Convention on Biological Diversity (2017) gives a formal definition of biological diversity (biodiversity), as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Biological diversity is often understood at three levels according to the Convention on Biological Diversity (2017):

- species diversity refers to the variety of different species (plants, animals, fungi, and micro-organisms) such as palm trees, elephants or bacteria;
- genetic diversity corresponds to the variety of genes contained in plants, animals, fungi, and micro-organisms. It occurs within a species as well as between species. For example, poodles, German shepherds, and golden retrievers are all dogs, but they all look different;
- ecosystem diversity refers to all the different habitats - or places - that exist, like tropical or temperate forests, hot and cold deserts, wetlands, rivers, mountains, coral reefs, etc. Each ecosystem corresponds to a series of complex relationships between biotic (living) components such as plants and animals and abiotic (non-living) components which include sunlight, air, water, minerals, and nutrients.

Biodiversity is not only the sum of all ecosystems, species, and genetic material. Rather, it represents the variability within and among them. It can be distinguished from the expression "biological resources", which refer to the tangible components of ecosystems. Biological resources are real entities (a particular species of bird, a wheat variety grown in a field, oak wood, etc.) while biological diversity is rather an attribute of life (the variety of bird species, the genetic variability of wheat around the world, forest types, etc.). It is valuable because:

- diversity is the base of the stability and sustainable functions of natural systems;
- of its enormously wide range for potential and unexplored uses;
- here there is evidence that removal of ecosystem components can have negative impacts; and
- variety is inherently interesting and more attractive.

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (Mwanza, 2006). The importance of this definition is that it draws attention to the many dimensions of biodiversity. It explicitly recognizes that every biota can be characterized by its taxonomic, ecological, and genetic diversity and that the way these dimensions of diversity vary over space and time is a key feature of biodiversity. Thus only a multidimensional assessment of biodiversity can provide insights into the relationship between changes in biodiversity and changes in ecosystem functioning and ecosystem services (Mwanza, 2006).

Biodiversity forms the foundation of the vast array of ecosystem services that critically contribute to human well-being. Biodiversity is important in human-management as well as natural ecosystems. Decisions humans make that influence biodiversity affect the well-being of themselves and others.

Millennium Ecosystem Assessment (2005), biodiversity is the foundation of ecosystem services to which human well-being is intimately linked. No feature of Earth is more complex, dynamic, and varied than the layer of living organisms that occupy its surfaces and its seas, and no feature is experiencing more dramatic change at the hands of humans than this extraordinary, singularly unique feature of Earth. This layer of living organisms the biosphere through the collective metabolic activities of its innumerable plants, animals, and microbes physically and

chemically unites the atmosphere, geosphere, and hydrosphere into one environmental system within which millions of species, including humans, have thrived (Millennium Ecosystem Assessment, 2005). Breathable air, potable water, fertile soils, productive lands, bountiful seas, the equitable climate of Earth's recent history, and other ecosystem services are manifestations of the workings of life. It follows that large-scale human influences over this biota have tremendous impacts on human well-being. It also follows that the nature of these impacts, good or bad, is within the power of humans to influence.

Biodiversity includes all ecosystems managed or unmanaged. Sometimes biodiversity is presumed to be a relevant feature of only unmanaged ecosystems, such as wildlands, nature preserves, or national parks. This is incorrect. Managed systems are plantations, farms, croplands, aquaculture sites, rangelands, or even urban parks and urban ecosystems have their own biodiversity. Given that cultivated systems alone now account for more than 24% of Earth's terrestrial surface, it is critical that any decision concerning biodiversity or ecosystem services address the maintenance of biodiversity in these largely anthropogenic systems (United Nations Environment Programme, 1995).

Biodiversity is a term that describes every living organism within a single ecosystem or habitat, including numbers and diversity of species and all environmental aspects such as temperature, oxygen, and carbon dioxide levels and climate. Biodiversity can be measured globally or in smaller settings, such as ponds.

Loss of Biodiversity

Biodiversity loss is the extinction of species (plant or animal) worldwide, and also the local reduction or loss of species in a certain habitat. The ecological effects of biodiversity are usually counteracted by its loss. Loss of biodiversity definition: refers to either the ongoing extinction of species at a global level or the local reduction or loss of species in a given habitat.

To Rafferty (2019), biodiversity loss, also called loss of biodiversity, is a decrease in biodiversity within a species, an ecosystem, a given geographic area, or Earth as a whole. Biodiversity, or biological diversity, is a term that refers to the number of genes, species, individual organisms within a given species, and biological communities within a defined geographic area, ranging from the smallest ecosystem to the global biosphere. (A biological community is an interacting group of various species in a common location.) Likewise, biodiversity loss describes the decline in the number, genetic variability, and variety of species, and the biological communities in a given area. This loss in the variety of life can lead to a breakdown in the functioning of the ecosystem where the decline has happened (Rafferty, 2019). Biodiversity loss is occurring on two levels. First, plant and animal species are becoming extinct at an unprecedented rate that far exceeds the natural historical rate (although there is some uncertainty because only 1.75 million out of an estimated 14 million species have been scientifically described).

Second, entire ecosystems in coastal and marine areas, inland watersheds, forests, and drylands (i.e. deserts, grasslands, and savannahs) are being destroyed by pollution, land conversion, and climate change. In total, the Living Planet Index (LPI), developed by the World Wildlife Fund based on population trends for hundreds of species, has found that animal populations were, on average, one third smaller in 2008 than in 1970.

Ecosystem

An ecosystem is a community of living organisms in conjunction with the nonliving components of their environment, interacting as a system. These biotic and abiotic components are linked together through nutrient cycles and energy flows.

Species composition matters as much or more than species richness when it comes to ecosystem services. Ecosystem functioning, and hence ecosystem services, at any given moment in time, is strongly influenced by the ecological characteristics of the most abundant species, not by the number of species. The relative importance of a species to ecosystem functioning is determined by its traits and their relative abundance. Thus conserving or restoring the composition of biological communities, rather than simply maximizing species numbers, is critical to maintaining ecosystem services (Millennium Ecosystem Assessment, 2005).

Local or functional extinction, or the reduction of populations to the point that they no longer contribute to ecosystem functioning, can have dramatic impacts on ecosystem services. Local extinctions (the loss of a species from a local area) and functional extinctions (the reduction of a species such that it no longer plays a significant role in ecosystem function) have received little attention compared with global extinction (loss of all individuals of a species from its entire range). Loss of ecosystem functions, and the services derived from them, however, occurs long before global extinction. Often, when the functioning of a local ecosystem has been pushed beyond a certain limit by direct or indirect biodiversity alterations, the ecosystem-service losses may persist for a very long time (Millennium Ecosystem Assessment, 2005b).

Changes in biotic interactions among species predation, parasitism, competition, and facilitation can lead to disproportionately large, irreversible, and often negative alterations of ecosystem processes. In addition to direct interactions, such as predation, parasitism, or facilitation, the maintenance of ecosystem processes depends on indirect interactions as well, such as a predator preying on a dominant competitor such that the dominant is suppressed, which permits subordinate species to coexist. Interactions with important consequences for ecosystem services include pollination; links between plants and soil communities, including mycorrhizal fungi and nitrogen-fixing microorganisms; links between plants and herbivores and seed dispersers; interactions involving organisms that modify habitat conditions (beavers that build ponds, for instance, or tussock grasses that increase fire frequency); and indirect interactions involving more than two species (such as top predators, parasites, or pathogens that control herbivores and thus avoid overgrazing of plants or algal communities) (Millennium Ecosystem Assessment, 2005).

Many changes in ecosystem services are brought about by the removal or introduction of organisms in ecosystems that disrupt biotic interactions or ecosystem processes. Because the network of interactions among species and the network of linkages among ecosystem processes are complex, the impacts of either the removal of existing species or the introduction of new species are difficult to anticipate.

THE LINK BETWEEN BIODIVERSITY AND ECOSYSTEM SERVICES

People depend on biodiversity in their daily lives, in ways that are not always apparent or appreciated (WHO, 2020). Human health ultimately depends upon ecosystem products and services (such as availability of freshwater, food, and fuel sources) which are requisite for good human health and productive livelihoods. Biodiversity loss can have significant direct human

health impacts if ecosystem services are no longer adequate to meet social needs. Indirectly, changes in ecosystem services affect livelihoods, income, local migration, and, on occasion, may even cause political conflict.

Biodiversity according to WHO (2020), plays an important role in ecosystem functions that provide supporting, provisioning, regulating, and cultural services. These services are essential for human well-being. However, at present, there are few studies that link changes in biodiversity with changes in ecosystem functioning to changes in human well-being. Further work that demonstrates the links between biodiversity, regulating and supporting services, and human well-being is needed to show this vital but often unappreciated value of biodiversity (Millennium Ecosystem Assessment, 2005b).

Biodiversity affects key ecosystem processes in terrestrial ecosystems such as biomass production, nutrient and water cycling, and soil formation and retention—all of which govern and ensure supporting services (high certainty). The relationship between biodiversity and supporting ecosystem services depends on composition, relative abundance, functional diversity, and, to a lesser extent, taxonomic diversity. If multiple dimensions of biodiversity are driven to very low levels, especially trophic or functional diversity within an ecosystem, both the level and stability (for instance, biological insurance) of supportive services may decrease (Millennium Ecosystem Assessment (2005).

Region-to-region differences in ecosystem processes are driven mostly by climate, resource availability, disturbance, and other extrinsic factors and not by differences in species richness (high certainty). In natural ecosystems, the effects of abiotic and land use drivers on ecosystem services are usually more important than changes in species richness. Plant productivity, nutrient retention, and resistance to invasions and diseases sometimes grow with increasing species numbers in experimental ecosystems that have been reduced to low levels of biodiversity. In natural ecosystems, however, these direct effects of increasing species richness are usually overridden by the effects of climate, resource availability, or disturbance regime (Millennium Ecosystem Assessment (2005).

Even if losses of biodiversity have small short-term impacts on ecosystem function, such losses may reduce the capacity of ecosystems for adjustment to changing environments (that is, ecosystem stability or resilience, resistance, and biological insurance) (high certainty). The loss of multiple components of biodiversity, especially functional and ecosystem diversity at the landscape level, will lead to lowered ecosystem stability (high certainty). Although the stability of an ecosystem depends to a large extent on the characteristics of the dominant species (such as life span, growth rate, or regeneration strategy), less abundant species also contribute to the long-term preservation of ecosystem functioning. There is evidence that a large number of resident species, including those that are rare, may act as “insurance” that buffers ecosystem processes in the face of changes in the physical and biological environment (such as changes in precipitation, temperature, pathogens) (UNEP, 1995). As tragically illustrated by social conflict and the humanitarian crisis over droughts, floods, and other ecosystem collapses, the stability of ecosystems underpins most components of human well-being, including health, security, satisfactory social relations, and freedom of choice and action.

IMPORTANCE OF BIODIVERSITY

Biodiversity is important to humans for many reasons. Biodiversity is also considered by many to have intrinsic value that is, each species has a value and a right to exist, whether or not it is

known to have value to humans (Cresswell & Murphy, 2016). The Commonwealth Scientific and Industrial Research Organisation (CSIRO) as cited in Cresswell, and Murphy (2016); Morton and Hill (2014) describe 5 core (and interacting) values that humans place on biodiversity:

Economic: Biodiversity provides humans with raw materials for production and consumption. Many livelihoods, such as those of farmers, fishers, and timber workers, are dependent on biodiversity.

Ecological Life Support: Biodiversity provides functioning ecosystems that supply oxygen, clean air, and water, pollination of plants, pest control, wastewater treatment, and many ecosystem services to support ecological life.

Recreation: Our tourism industry depends on biodiversity. Many recreational pursuits rely on our unique biodiversities, such as bird watching, hiking, camping, and fishing.

Cultural: Human culture is closely connected to biodiversity through the expression of identity, spirituality, and aesthetic appreciation. Indigenous of a nation have strong connections and obligations to biodiversity arising from spiritual beliefs about animals and plants.

Scientific: Biodiversity represents a wealth of systematic ecological data that helps us to understand the natural world and its origins life.

Maintaining the Balance of the Ecosystem: Recycling and storage of nutrients, combating pollution, and stabilizing climate, protecting water resources, forming and protecting soil, and maintaining eco-balance.

Provision of Biological Resources: Provision of medicines and pharmaceuticals, food for the human population and animals, ornamental plants, wood products, breeding stock, and diversity of species, ecosystems, and genes.

Social Benefits: Recreation and tourism, cultural value and education, and research.

Any loss or deterioration in the condition of biodiversity can compromise all the values outlined above and affect human wellbeing. The Millennium Ecosystem Assessment (2005) explained the effort to examine links between human wellbeing and biodiversity globally. The assessment found benefits to societies from biodiversity in material welfare, the security of communities, resilience of local economies, relations among groups in communities, and human health. It also emphasized the term 'ecosystem services' under 4 broad categories (Morton & Hill, 2014), viz:

- provisioning services: the production of food, fiber and water;
- regulating services: the control of climate and diseases;
- supporting services: nutrient cycling and crop pollination; and
- cultural services: such as spiritual and recreational benefits.

Ecosystem Services are the benefits nature provides to human well-being. Although the term is quite new while our connection to nature is not new. Humans depend on nature for its survival without healthy ecosystems, human drinking water is not clean nor is the air we breathe. The human also enjoys nature, with studies showing that people who spend time in nature tend to be happier than those that do not. It can even act as a natural anti-depressant. With industry and urban sprawl expanding at unprecedented rates, Ecosystem Services attempt to translate the benefits humans receive from nature into economic terms so man can better understand the trade-offs he/she is making between nature and industrial development.

IMPORTANCE OF ECOSYSTEM SERVICES TO MAN AND SOCIETY

Never-ending Nature Benefits

Understanding nature in economic terms, while not perfect, allows us to put everything into the same comparison unit. Despite nature being such an integral part of human existence, it is sometimes an afterthought in today's economy. Nature and money are often on competing terms, so to make a more level playing field, environmental economists have tried to bridge this gap by placing a monetary value on the benefits nature provides.

Valuing nature in a way that can speak to decision-makers, may help promote conservation efforts in the future. It brings nature back into the cost-benefit discussion in a way that can be easily understood.

The Basis for Sustainable Development

Ecosystem Services often, impact on industrial development has on the economy and job creation overshadows the cost it will have on surrounding lakes, forests, keystone species, and so on with the help measure of the true cost of industrial development. Assigning a value to these lakes and forests, and the Ecosystem Services they provide helps adjust the cost-benefit analysis by evaluating the negative effects development will have on the natural environment.

The use of Ecosystem Services has become common by institutions in conservation offset planning, where they can buy and sell credits to offset a development or set aside land to meet a specific offset. Sustainable development supports the maintenance of a healthy economy while also protecting the ecological process for future generations.

Necessities Essential to our Survival

Society now depends on healthy ecosystems to do many things; to purify the air so we can breathe properly, sequester carbon for climate regulation, cycle nutrients so we have access to clean drinking water without costly infrastructure, and pollinate our crops so we do not go hungry. As the world's population continues to grow, so too does our dependence on healthy ecosystems to provide the necessities essential to our survival.

Every human wants to leave the planet in good condition for our future generation. Ecosystem Services valuation and assessment is one way to help make this happen. By clearly understanding their value, we can make the best and most informed decisions about how to manage our landscape to ensure this value is not lost.

CAUSES OF LOSS OF BIODIVERSITY

Over 99% of species currently extinction-threatened are so because of human activity. Biodiversity loss is a planetary scandal and a damning shame on us as a species. However, the loss of biodiversity is caused by the following drivers (UNEP, 2020).

Natural-Driven Biodiversity Loss

Destruction of Habitat: Natural forces can act to destroy habitat, species, and individual organisms. Obvious examples include volcanic eruptions, floods, and fire. Previous mass extinction events have been associated with an asteroid impact. The same factors can also drive habitat fragmentation. Fragmentation can isolate populations, reduce gene pools, and weaken species 'fitness' or ability to survive and reproduce.

Natural Climate Change: Environmental stress applied through heat loss or drought.

Invasive Species and Disease: Species newly introduced through natural means out-compete the local species for resources.

Human-Driven Biodiversity Loss

In contrast, biodiversity losses from disturbances caused by humans tend to be more severe and longer-lasting. Humans (*Homo sapiens*), their crops, and their food animals take up an increasing share of Earth's land area:

Climate change: The modification of Earth's climate caused by the burning of fossil fuels is caused by industry and other human activities. Fossil fuel combustion produces greenhouse gases that enhance the atmospheric absorption of infrared radiation (heat energy) and trap the heat, influencing temperature, and precipitation patterns.

Pollution: Pollution which is the addition of any substance or any form of energy to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harmless form contributes to biodiversity loss by creating health problems in exposed organisms. In some cases, exposure may occur in doses high enough to kill outright or create reproductive problems that threaten the species survival. For instance, water systems suffer aquatic nutrient load from fertilizers and agricultural by-products. Oceans are seeing rising acidity levels caused by man-made pollutant activity.

Habitat Destruction and Degradation: Any thinning or destruction of an existing natural habitat reduces or eliminates the food resources and living space for most species. Species that cannot migrate are often wiped out. Mining, agriculture, settlement, industries, highways, and construction being primary examples. Degradation caused by poor land use and deforestation.

Habitat Fragmentation: Fragmentation is one of the most serious causes of erosion of biodiversity. Fragmentation leads to artificially created 'terrestrial islands' with microclimatic effects markedly different from those that existed in the large tracks of habitats before fragmentation.

Over-Exploitation: The harvesting of game animals, fish, or other organisms beyond the capacity for surviving populations to replace their losses results in some species being depleted to very low numbers and others being driven to extinction. Overfishing has reduced some commercial fish stocks by more than 90%.

Introduction of Invasive (Aka '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. Non-native species that significantly modify or disrupt the ecosystems they colonize may outcompete native species for food and habitat, which triggers population declines in native species. Invasive species may arrive in new areas through natural migration or through the human introduction. Native species are subjected to competition for food and space due to the introduction of exotic species.

Human Overpopulation: Humans may be considered the 'worst-case' exotic species for most organisms. Human activity and an increasingly 'consumption-intensive' lifestyle mean that future human population growth spells disaster going forward unless attitudes, behaviors, and lifestyles change.

Recreational Hunting and Collecting: Hides, skin, tusk, meat, fur, chemical content is taken for monetary or aesthetic value or simply ego in the case of hunting with no purpose other than the thrill of the kill.

All drivers are strongly influenced by the continued growth of the human population and its consumption of natural resources while the interactions between two or more of these drivers increase the pace of biodiversity loss.

LOSS OF BIODIVERSITY AND ECOSYSTEM THREAT TO PLANET, ECONOMY AND HUMAN SOCIETY

Biodiversity loss and ecosystem impose serious threats to our planet, economy, and human society. This lack of biodiversity and ecosystem among crops threatens food security, because varieties may be vulnerable to disease and pests, invasive species, and climate change. Biodiversity is said to benefit the planet through 'ecosystem services' which are provided as a result of the interconnected web of life and the way this web interacts with the environment (Rafferty, 2019). The natural world can be viewed as being an enormous bank account of capital assets capable of paying life sustaining dividends indefinitely, but only if the capital is maintained.

Ecosystem services have been broadly categorized into three streams:

- Provisioning services which involve the production of renewable resources, for example, food, wood, and freshwater,
- Regulating services which are those that lessen environmental change, for example, climate regulation, pest and disease control, and
- Cultural services representing human value and enjoyment, for example, landscape aesthetics, cultural heritage, outdoor recreation, and spiritual significance.

However, the threat of biodiversity loss and ecosystem on our planet, economy, and human society are highlighted below (Bio Explorer, 2020):

The Threat of Biodiversity Loss and Ecosystem on the Environment

Food Chain Impact and Ecosystem Weakening: Biodiversity is the web of life. Reductions in biodiversity damage this delicate web. Some species appear to be "keystones in the arch," supporting entire ecosystems, such as the sea otter in the Pacific coastal ecosystem. When these keystone species disappear, the web of life unravels as complex interrelationships of predator, prey, parasite, or mutual benefit are lost. We also know little about how these complex relationships change as climate change, habitat loss, or other pressures alter ecosystems. It is a reckless gamble to lose, through apathy or greed, something that we might one day realize was vital.

Ecosystem Services: While we know a great deal about how many ecosystems function, they involve unfathomable complexity and scale. For example, the breakdown and decomposition of dead organisms and wastes; the recycling of nutrients for a new life on land, in rivers, lakes, and streams, and in the oceans; and the regulation of climate.

Consider Temperate Forests: They serve as sinks for CO₂ by storing carbon in trees and soils, thereby helping to mitigate human-caused climate change; maintain the water cycle and precipitation levels, thereby stabilizing local climates, through the uptake of water by tree roots, transport through the trees, and evaporation from the leaves back to the atmosphere; reduce soil erosion by dampening the power of rain, and by tree roots binding soils; purify the air by filtering particulates and providing chemical reaction sites on leaf surfaces where pollutants can be converted into harmless compounds; purify water by soils acting as massive filters that bind toxic substances.

A square kilometer of the coastal ecosystems such as mangrove forests can store up to five times more carbon than the equivalent area of mature rainforest. Unfortunately, these coastal systems are being destroyed by human activity three to four times faster than rainforests which have the effect of reducing the carbon store or increasing the amount of carbon dioxide into the atmosphere and the ocean, contributing to climate change and ocean acidification.

Bacteria break down organic material, thus building and fertilizing the soil. Wetlands filter pollutants from drinking water. Insects pollinate many of our crop species. Bats, spiders, and other insectivores eat harmful pests. Trees and plants return oxygen to the air. Vast South American forests create rainfall on a continental scale and store carbon as a buffer against global climate change.

THREAT OF BIODIVERSITY LOSS ON ECONOMY AND HUMAN SOCIETY

Biodiversity loss affects economic systems and human society. Humans rely on various plants, animals, and other organisms for food, building materials, and medicines, and their availability as commodities is important to many cultures. The loss of biodiversity among these critical natural resources threatens global food security and the development of new pharmaceuticals to deal with future diseases. Simplified, homogenized ecosystems can also represent an aesthetic loss.

Food production relies on biodiversity for a variety of food plants, pollination, pest control, nutrient provision, genetic diversity, and disease prevention and control. Both medicinal

plants and manufactured pharmaceuticals rely on biodiversity. Agriculture, forestry and fisheries products, stable natural hydrological cycles, fertile soils, a balanced climate, and numerous other vital ecosystem services depend upon the conservation of biological diversity.

Basic Human Sustenance: People rely heavily on biodiversity in their day-to-day lives. This reliance is not always obvious or appreciated.

Human Health: Human health depends massively upon ecosystem products and outputs such as availability of food, freshwater and fuel sources. Biodiversity of all types of flora and fauna provides insight and knowledge which have huge impacts on health, pharmacological, and biological sciences.

Traditional medicine continues to play an essential role in health care, especially in primary health care. Traditional medicines are estimated to be used by 60% of the world's population and in some countries are extensively incorporated into the public health system. Medicinal plant use is the most common medication tool in traditional medicine and complementary medicine worldwide. Medicinal plants are supplied through the collection from wild populations and cultivation. Many communities rely on natural products collected from ecosystems for medicinal and cultural purposes, in addition to food.

Infectious Diseases: Human activities are disturbing both the structure and functions of ecosystems and altering native biodiversity. Such disturbances reduce the abundance of some organisms, cause population growth in others, modify the interactions among organisms, and alter the interactions between organisms and their physical and chemical environments. Patterns of infectious diseases are sensitive to these disturbances.

Sustainable Agriculture: Biodiversity plays a crucial role in human nutrition through its influence on world food production, as it ensures the sustainable productivity of soils and provides the genetic resources for all crops, livestock, and marine species harvested for food. The nutritional composition between foods and among varieties/cultivars/breeds of the same food can differ dramatically, affecting micronutrient availability in the diet. Healthy local diets, with adequate average levels of nutrients intake, necessitates the maintenance of high biodiversity levels.

Spiritual and Cultural: Biodiversity loss and the current state of species decline is a planetary scandal and yet it still fails to instill any significant change in human activity. Mainstream media paying fleeting attention to what is a looming crisis. The separation of the spirit from matter seems to be the prevailing philosophical and economic approach in recent times. Aided and abetted by a western-originated capitalist system of excessive greed and consumption without ever questioning the bigger picture. A re-evaluation of human consciousness is being shaped by the major religions of the world, in response to the global environmental crisis. This may have a profound repercussion on the way individuals and their societies perceive the environment, leading to more responsible actions. One can have hope but must also remember that action needs to occur at an individual level as we are collectively responsible for our actions.

Commerce: Many industrial materials derive directly from biological sources. These include building materials, fibers, dyes, rubber, and oil. Biodiversity is also important to the security of resources such as water, timber, paper, fiber, and food.

Ecotourism: Ecotourism is big business even when counting only the value of tourism, other recreational activities, and what commercial fishing contributes to any nation's GDP. Ironically, the reef itself is under severe threat of destruction. Ocean acidification is taking its toll on this globally iconic natural wonder.

Biodiversity loss can lead to increased transmission of diseases to humans and increased healthcare costs. The outdoor tourism industry relies on biodiversity to create and maintain that which tourists come to see, as does the multi-billion-dollar fishing and hunting industry.

WAYS OF REDUCING BIODIVERSITY LOSS AND ECOSYSTEM

Dealing with biodiversity loss is tied directly to the conservation challenges posed by the underlying drivers. Conservation biologists note that these problems could be solved using a mix of public policy and economic solutions assisted by continued monitoring and education (Rafferty, 2019).

Governments, nongovernmental organizations, and the scientific community must work together to create incentives to conserve natural habitats and protect the species within them from unnecessary harvesting, while disinvesting behavior contributes to habitat loss and degradation. Sustainable development (economic planning that seeks to foster growth while preserving the environmental quality) must be considered when creating new farmland and human living spaces (Rafferty, 2019).

The government must ensure to make laws that will help to protect and reduce wildlife crime (tackling wildlife crime) that are perpetrated by highly sophisticated, organized criminal syndicates. Laws that prevent poaching and the indiscriminate trade in wildlife must be improved and enforced, and

The government must ensure inspection stowaway organisms and shipping materials at ports.

HUMAN ACTIONS PLAN TO REDUCE BIODIVERSITY LOSS

Participating in biodiversity conservation increase our knowledge of environmental issues and our awareness of the impacts of biodiversity loss as human, to enable us to reduce biodiversity loss.

We can become educators and role models as stewards of the environment by aiding in the recovery of species at risk and preventing other species from becoming at risk. Habitat stewardship consists of activities that range from enhancing the quality of soil, water, air, and other natural resources to monitoring and conserving wildlife species and their habitat by donating or leasing property to a land trust.

Participating in Biodiversity Conservation: Identify locations of critical wildlife habitat for species at risk and the threats to these areas. Where possible, eliminate threats, and maintain

natural areas. Leave critical wildlife habitat undisturbed, especially nesting and denning sites. Promote wildlife use by setting up bird and bat houses. Eradicate and control introduced weeds on your property. Keep vehicles on main roads to reduce the spread of weeds and disturbance to wildlife.

Use natural products and methods for pest control: Use pesticides that have minimal residual effects such as pyrethrums, insecticidal soaps, and dormant oil sprays; use a high-pressure water stream from a hose to control aphids; use barriers and collars around plants to keep pests away.

CONCLUSION AND RECOMMENDATION

Positive relationships between diversity and ecosystem to the functioning of the planet, economy, and human's society, because the natural environment provides the basic conditions without which they could not survive; food, water, raw materials, medicine, fuel, etc. The interaction of all these natural processes forms a complex web of life. If any part breaks down, the future of planet, economy, and human's society is threatened. Humans are in many cases degrading and destroying the ability of biological diversity to perform the services mentioned above. However, the most effective way to prevent continued biodiversity loss is for the government to formulate policies, laws, creating awareness, etc. as to protect the remaining species from overhunting and overfishing and to keep their habitats and the ecosystems they rely on intact and secure from species invasions and land use conversion as well as increasing support for government policies and actions that conserve our valuable ecosystems.

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