



## LOSS OF BIODIVERSITY: BEGINNING OF 'THE END'?

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### ABSTRACT:

Biodiversity forms the life support system of biosphere. We share the environment with other organism in a complex network. Biodiversity maintains the resilience of ecological network through stabilizing environment, purifying water, keeping the soil fertile that helps to smooth running of the ecosystem.

Human induced climatic transformation and habitat destruction are causing rapid loss of biodiversity consequently weakening biotic links among organism and is the spurting the threat of vanishing whole life on planet earth. The present biodiversity is the outcome of 3.5 billion years of work of nature. Today, world is witnessing the eradication of hundreds of species of flora and fauna from the world, every day. Despite knowing about biodiversity's importance for a long time, human's direct activity has been causing massive extinctions. A substantial and largely irreversible loss in the diversity of life on Earth, with some 10-30% of the mammal, bird and amphibian species threatened with extinction, due to human actions.

**KEYWORDS:** Loss of Biodiversity, ecological network.

### INTRODUCTION

The International Union for Conservation of Nature (IUCN, 2008) has noted that 75% of genetic diversity of agricultural crops has been endangered, 75% of the world's fisheries are fully or over exploited, and up to 70% of the world's known species are at risk to extinction. If the global temperatures rise by more than 1°C, most of reef-building corals around the world are threatened with extinction. Every second a parcel of rainforest the size of a football field disappears. Over 350 million people suffer from severe water scarcity.

Loss of biodiversity is not only a threat to ecology but it is a threat to the economy also because it supports the livelihood of people providing ground for basic economic activities. Actually, our demand for natural resources has pushed the planet earth beyond its replenishment capacity. Urgent remedial action is essential because species loss and ecosystem degradation are inextricably linked to human well-being.

Extinction of more than 20,000 species every year – isn't it the beginning of the end of life on the planet earth? Therefore, loss of biodiversity is an ethical as well as survival question before humanity that requires immediate attention.

**Present paper tried to highlight issues of –**

- Role of Biodiversity in Survival of our Life
- Loss of biodiversity – the HIPPO Dilemma

**1.2: Discussion and Analysis 1.2.1: The Role of Biodiversity**

Biodiversity has been most generally defined as the "full variety of life on Earth" (Takacs, 1996). More specifically, biodiversity is the study of the processes that create and maintain variation. It is concerned with the variety of individuals within populations, the diversity of species within communities, and the range of ecological roles within ecosystems (Graham Bell, pers.comm.).

If this seems like a vague definition, that's because it is. There is no agreement on what exactly biodiversity means. It can refer to genetic diversity, to species diversity or to the diversity of environments or habitats. Some believe that it has simply replaced the terms "nature" or "wilderness" (Chadwick, 1993).

Our food and energy security strongly depend on biodiversity and so does our vulnerability to natural hazards such as fires and flooding. Biodiversity loss has negative effects on our health, material wealth and it largely limits our freedom of choice. As all cultures gain inspiration from or attach spiritual and religious values to ecosystems or their components – e.g. landscapes, trees, hills, rivers or particular species - biodiversity loss also strongly influences our social relations. Every decision we take that affects biodiversity, also affects our lives and the lives of other people. Biodiversity is crucial to human wellbeing, sustainable development and poverty reduction. But people - particularly those in the developed world - have become so far removed from nature that they have forgotten how much they, and others, rely on it.

In the long term, the value of services lost may greatly exceed the short-term economic benefits that are gained from transforming ecosystems. When we modify an ecosystem to improve a service it provides, this generally also results in changes to other ecosystem services. For example, actions to increase food production can lead to reduced water availability in terms of quantity and quality for other users. This can result in the degradation of many services, such as fisheries, water supply, and protection against natural hazards, seriously affecting people's well-being.

Maintaining healthy biodiversity can play a significant role in climate change mitigation and the world's protected areas - national parks, marine reserves, wilderness areas and so on - are essential in safeguarding this role.

Already, protected areas through the vegetation they contain, store 15% of the world's terrestrial carbon. They have enormous untapped potential considering that as much as 20% of greenhouse gas emissions come from deforestation and other land use changes. Through active restoration of forests or mangroves and through natural regeneration within protected areas, the ability of protected areas to store carbon can be significantly increased. Multiple benefits can be seen on the ground: protected areas in the Brazilian Amazon are likely to prevent an

estimated 670,000 km<sup>2</sup> of deforestation by 2050, representing 8 billion t of avoided CO<sup>2</sup>, and in Bolivia, Mexico and Venezuela, protected areas contain 25 million ha of forests, storing over 4 billion t of carbon, worth between USD 39 and 87 billion.

By safeguarding the health of ecosystems, protected areas also help us respond to and reduce the risks of climatic disasters which, with 60% of global ecosystem services already degraded, are becoming more frequent. Protected areas provide space for floodwaters to disperse; their ability to stabilize soil can prevent or slow landslides; strengthened coastal ecosystems provide a buffer to storms, and limiting human encroachment into fire-prone areas can reduce the number of wildfires.

Protected areas also help maintain the ecosystem services on which we depend including water purification, protection of fish stocks, other food resources and traditional medicines. Again, wide-ranging benefits can already be seen: 33 of the world's 105 largest cities derive their drinking water from forest protected areas and in Kenya, coral reef protection has resulted in improved fishery health, bringing economic benefits to local people.

### **1.2.2: Threats to Biodiversity: HIPPO Dilemma:**

Extinction is a natural event and, from a geological perspective, routine. We now know that most species that have ever lived have gone extinct. The average rate over the past 200 million years is 1-2 species per year, and 3-4 families per my. The average duration of a species is 2-10 million years (based on last 200 million years). There have also been occasional episodes of mass extinction, when many taxa representing a wide array of life forms have gone extinct in the same blink of geological time.

The modern era, due to human actions, species and ecosystems are threatened with destruction to an extent rarely seen in earth history. Probably only during the handful of mass extinction events have so many species been threatened, in so short a time.

What are these human actions? There are many ways to conceive of these - let's consider two.

First, we can attribute the loss of species and ecosystems to the accelerating transformation of the earth by a growing human population. As the human population passes the six billion mark, we have transformed, degraded or destroyed roughly half of the world's forests. We appropriate roughly half of the world's net primary productivity for human use. We appropriate most available fresh water, and we harvest virtually all of the available productivity of the oceans. It is little wonder that species are disappearing and ecosystems are being destroyed.



Figure 1.1: Factors responsible to Animal Extinction

Source: World Conservation Monitoring Centre, "Global Biodiversity" Chapman & Hall, London, (1992)

Second, we can examine few specific types of human actions that threaten species and ecosystem. Over-hunting has been a significant cause of the extinction of hundreds of species and the endangerment of many more, such as whales and many African large mammals. Most extinction over past several hundred years is mainly due to over-harvesting for food, fashion, and profit.

Commercial hunting, both legal and illegal (poaching), is the principal threat. The pet and decorative plant trade falls within this commercial hunting category, and includes a mix of legal and illegal activities. The annual trade is estimated to be at least \$5 billion, with perhaps 1/4 to 1/3 of it illegal. Sport or recreational hunting causes no endangerment of species where it is well regulated, and may help to bring back a species from the edge of extinction. Many wildlife managers view sport hunting as the principal basis for protection of wildlife. While over-hunting, particularly illegal poaching remains a serious threat to certain species, for the future, it is less important than other factors mentioned next

The great biologist E.O. Wilson (Wilson 2002) sums up the situation with the acronym, 'HIPPO', or: H for Habitat Destruction, disturbance and fragmentation. This is possibly the greatest cause of species decline. Fragmented habitats lead to isolated small populations of species. Small populations are especially vulnerable to genetic in-breeding, random genetic drift, demographic factors and random events from warfare to extreme weather. This results in a loss of genetic variability, which leads to a reduction in the reproductive fitness of individuals and the adaptability of populations. Therefore, there is lower reproduction and higher mortality. Populations become even smaller. The result may be a spiraling vortex to extinction.

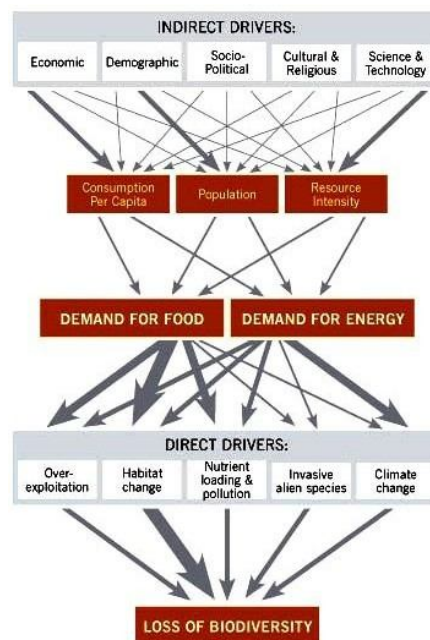
I is for Invasive Species. It is said that a single lighthouse keeper's cat wiped out the last Stephen Island wrens, a species endemic to a small island off New Zealand. Island species are especially vulnerable to introduced rats, pigs, dogs and other aliens. Introduced species often become invasive when they breed and out-compete or eat the natives. American mink, escaped or liberated from fur farms, have decimated the UK's water vole population and the Nile perch has played havoc with the ecosystem of several African rift lakes.

P is for Pollution. The industrialized 'west' has been polluting en masse for two centuries since the industrial revolution. Now, nearly emerging economies of India and China are following their example. Can the west blame them for aspiring to improved standards of living? After all, lifting people out of poverty is a worthy ambition. More importantly, what are the alternatives, for every country? How far one can go to change own life? A recycled plastic bag? A self-inflicted ban on flying? Breeding... or notbreeding?

P is for Population – human population. There are rather a lot of us – 6.7 billion at the present time with projections of an increase and peaking at 9.2 billion by 2050. Not all places have similar population growth rates. The rate is negative in central and eastern Europe and South Africa, for example, but increasing in Latin America, the Middle East and sub-Saharan Africa.

We do not consume equally. The richer nations far outstrip the poorer ones in terms of consumption. As a species, we have become predominantly urban and increasingly disconnected from nature. We are drawing on nature's capital rather than living off its interest – our ecological footprint currently exceeds the capacity of Earth resources to support us by 25%.

O is for Over-Exploitation. From tiger medicines to elephant tusks, from forest trees to oceanic fish, we are living beyond our means – consuming the equivalent of what three planets would produce per year.



**Figure 1.2: Links of Direct and Indirect Drivers of Biodiversity Loss**  
Source: Global Biodiversity Outlook-2, pg 65 (2006)

Dilemma over HIPPO issues is due to our limitation over controlling HIPPO factors because pursuit of modern life demands a lot of energy of energy and natural resources. Our demand for food and energy generates direct and indirect drivers that accelerate loss of

biodiversity. In the above figure, width of the arrow indicates magnitude of the factor and arrow represents the interrelationship among factors. Our economic, demographic, socio-political, cultural, religion, science and technology produce direct drivers of biodiversity loss that are controlled by consumption of resources, intensity of resource utilization and population. Demand for food and demand for energy creates indirect drivers of loss of biodiversity. Indirect drivers accelerate over exploitation of resources, climate change, pollution, invasive species and habitat change. All these factors further accelerate loss of biodiversity of the planet.

### **1.3: CONCLUSION**

Biodiversity is being lost at rates unprecedented in human history. Rates of decline in biodiversity in this sixth mass extinction match or exceed rates of loss in the five previous mass extinction events in the fossil record. Loss of biodiversity results in the loss of natural capital that supplies ecosystem goods and services.

Today, the world is poised on the brink of the largest wave of extinctions since the disappearance of the dinosaurs 65 million years ago. Farming to feed the growing human population-- including modern and traditional farming, ranching, aquaculture, fishing, and forestry-- is one of the chief causes of extinction.

If present trends continue one half of all species of life on earth will be extinct in less than 100 years, as a result of habitat destruction, pollution, invasive species, and climate change. Therefore, to save life on earth, preserving biological diversity should be the top priority of the nations.

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