

Extinction of Species and its Management for Ecological Balance

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Abstract

Millions of biological species constitute the life on earth. New species have been regularly discovered. Around 8000 new species are identified each year. Preserving these species and their habitats from extinction is very important as the loss of the species can affect the biodiversity largely. This paper focus on primarily focus on 'Extinction and loss of bio-diversity'. This passage shows as how extinction has become a source for loosing the biological richness. The major causes of the extinction of species were discussed as Overexploitation, Pollution, Habitat degradation, Deforestation, Introduced species, Invasive species, Global warming, Disease eradication, Co extinction of a species etc. Managing the loss of species is analysed with mainly Selective Breeding and Cloning. Again the History of Extinction, effects of extinction and managing the loss of species are discussed.

Keywords: Extinction and loss of bio-diversity- The History of Extinction- Threats Causing Extinction- Effects of extinction-Managing the loss of species.

Introduction

Millions of biological species constitute the life on earth. The variety of life on Earth and its biological diversity is commonly referred to as 'biodiversity'. The United Nations declared the year 2010 as the International Year of Biodiversity. New species have been regularly discovered. Around 8000 new species are identified each year. Most of these newly identified species have not yet classified. It is said that nearly 90% of all arthropods are not yet classified. Most of these species are newly formed ones due to mutation. These newly formed species helps in maintaining biodiversity as so many species are getting extinct each year. So, modern biodiversity may not be much different from biodiversity 300 million years ago.

India, Brazil, Colombia, Ecuador, Peru, Mexico, Madagascar, Zaire, Australia, China, Indonesia and Malaysia are the twelve mega biodiversities in the world. These countries contain most of the species population.

Preserving these species and their habitats from extinction is very important as the loss of the species can affect the biodiversity largely.

Extinction and loss of bio-diversity

Human intervention has led to imbalance in the ecological diversity. Extinction refers to the complete end of a species. Species become extinct when they are no longer able to survive in changing conditions or against superior competition. It is said that a typical species becomes extinct

within a million years of its first appearance. About 99.9% of all species that have ever lived are now extinct. Prior to dispersion of humans across the earth, extinction generally occurred at a continuous low rate. But now it is accelerated by human intervention. Now, around 140,000 species get extinct each year. This figure indicates unsustainable ecological practices, as only a small number of species evolve each year.

Biologist E. O. Wilson estimated that if current rates of human destruction of the biosphere continue, one half of all species of life on earth will be extinct by 2100. 30% of all natural species will be extinct by 2050. He further said that extinctions are occurring about 100 times higher than before.

The History of Extinction

Bio-diversity, the result of 3.5 billion years of evolution, consisted of protozoan and single - celled organisms until 600 million years ago. The growth in the population of species during the starting of the Phanerozoic (540 million years ago) is very rapid. Over the last 100 million years, global diversity showed little overall trend, but was marked by massive losses of diversity classified as *mass extinction events*

The period since the emergence of humans has shown a steep reduction in biodiversity. This reduction is named the Holocene extinction. It is caused due to the destruction of the species' habitat.

The International Union for Conservation of Nature (IUCN) says that there has been at least *five mass extinctions* in the history of life on earth, and four in the last 3.5 billion years in which many species have disappeared in a relatively short period time¹.

The Cretaceous–Tertiary extinction event which took place 65 million years is known to have wiped out the non-avian dinosaurs, among many other species. A massive eruptive event is considered to be the cause of the "Great Dying" about 250 million years ago, which is estimated to have killed 90% of species existing at the time. The dinosaur extinction took place 65 million years ago wiping out most of the dinosaur species. The Permian extinction of 245 million years ago wiped out 96% of all marine species.

Threats Causing Extinction

The list of the causes that can contribute directly or indirectly to the extinction of a species is endless. Any species that is unable to survive or reproduce in its environment, and is also unable to move to a new environment where it can do so, dies out and becomes extinct. Extinction of a species may come suddenly a species loses out in competition for food to better adapted competitors.

Among many reasons, Humans contribute the maximum to extinction through over harvesting, habitat destruction, loss and fragmentation, over exploitation, Pollution, Invasive alien species, introduction of new predators and food competitors, over hunting, Co-extinction and other

¹ Sahney. S and Benton. M.J.(2008), 'Recovery from the most profound mass extinction of all time'(PDF), Proceedings of the Royal Society: Biological 275(1636): 759-65. DOI: 10.1098/rspb.2007.1370.PMC 2596898. PMID

influences. Explosive, unsustainable human population growth is an essential cause of the extinction crisis.

The major causes of the extinction of species are discussed below.

Overexploitation refers to the hunting which is done at a rate above the maximum sustainable yield. If the number of individuals that are hunted are higher than the number of individuals that will be born, the population will decline. About 25% of world fisheries are now overexploited.

Pollution destroys the purity of the biodiversity by making the habitats of species unfit. It is one of the major reasons for the mass death of many species. Pollution may also poison the species directly.

Habitat degradation is the main cause of species extinctions. Destruction of ocean floors by bottom trawling and pollution destroy the originality of the habitats. The degradation of a species' habitat may alter the fitness landscape to such an extent that the species is no longer able to survive and becomes extinct.

Deforestation is partially linked to the previous point. Increased human encroachment upon wild areas, increased resource extraction destroys the habitat of the species. Around half of the original forests have disappeared, and they are still being removed at the rate of 10% higher than any possible level of regrowth.

Introduced species are the next threat. Humans have been transporting animals and plants from one part of the world to another, sometimes deliberately and sometimes accidentally. *Invasive species* can affect native species directly by eating them, competing with them, and introducing pathogens or parasites that sicken them or degrade their habitat.

Global warming affects the ecosystem largely. The species which is not capable of adapting to the new climate gets extinct.

Disease eradication process has prompted humans to work towards the extinction of many species of viruses and bacteria.

Co extinction of a species is the loss of one species due to the extinction of another. The extinction of one species' wild population can often have knock-on effects, causing further extinctions. It is referred to as chains of extinction. If any one species is removed from the ecosystem, the cycle can break down, and the community may become dominated by a single species.

Effects of extinction

Firstly, when an species becomes extinct, the food chain gets disrupted. This may affect the other organisms in the food chain and even lead to the extinction of other species. As discussed earlier, we call this 'the chains of extinction'.

Sometimes, due to disruption in ecosystem due to extinction, the nutrient cycles affected. In some ecosystems, single species may account for up to 50% of recycled nutrients. However, species that heavily recycle N are not always the same ones that recycle the most phosphorus. In some special cases, the surviving species may be able to compensate for lost species by increasing their

roles in nutrient recycling. The Bio diversity is completely uprooted and the other species population will be greatly affected.

Extinction of many edible and medicinal species can be considered as a huge loss to humanity. Many such valuable herbs and animals have become extinct.

Managing the loss of species

Selective breeding is a method used by scientists to create domestic animals with the characters they need. All the domestic animals have their wild ancestors. The wolf became the dog, the wild boar became the pig, the aurochs became the domestic cattle, the tarpan became the horse, etc. People bred the animals that had the characteristics that they needed. In this way, some of the wild ancestors have completely disappeared from earth, such as aurochs and the tarpans. In the selective breeding experiment, the scientists have tried to recreate the wild ancestors such as the aurochs and the tarpan. This can be done to bring back the wild breed of animal that has become extinct or is in the verge of becoming extinct.

Cloning² is used to revive animals by using its DNA from the remains of an extinct species, through the process of cloning, the species can be "brought back to life". In order for such a program to succeed, a sufficient number of individuals will be cloned from the DNA of different individuals to create a viable population. Though bioethical and philosophical objections have been raised, the cloning of extinct creatures seems a viable outcome of the continuing advancements in science and technology.

Many times, some species are wrongly judged as extinct. About one-third of the mammals declared extinct have been rediscovered within few years.

Mostly, the loss of a species is compensated by another species. The substitute make up the absence of the extinct species.

For easy proliferation of the endangered species, the governments must set a higher bar for critically endangered species. The will prove helpful to the scientists involved in breeding.

Afforestation must be promoted. Though there is no substitute for undisturbed forests, we can try our best to create a close-to-natural habitat for the endangered species. When deforestation is checked and over fishing is stopped, most of the endangered species can be removed from that list.

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