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Popular Article

Novel Strategies to Save The Endangered Species of Animals and Future Trends: An Indian Perspective

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Abstract

The environment is an intricate ecosystem composed of many species, each of which is represented by a number of strains that have distinct genetic identities. Because of this diversity, the environment cannot be sustained over the long term, and preserving its integrity is consequently necessary to support human life. The diversity's global distribution is steadily declining as a result of numerous human-caused factors. The loss of biodiversity or the extinction of several species is currently a hotly contested topic among environmentalists worldwide. Even though we are well aware that every species is an essential component of the ecosystem and that the extinction of some species negatively impacts the survival of the other species, including humans, we are nonetheless witnessing a rapid loss of species. As a result, it is critical to stop current wildlife crimes, formulate strategy to increase the number of endangered species, rescue exotic and extinct animals, and rebuild natural ecosystems. In order to curtail these issues concerning consistent loss of wildlife, it is essential to explore and implement novel strategies. In this article, we will discuss numerous novel approaches being implemented to decelerate the loss of wildlife.

Keywords: Habitat loss, Next generation sequencing, Artificial intelligence, e-DNA, Metagenomics

Introduction

The basic, independent building blocks of biodiversity that both laypeople and scientists may readily connect to are species. The thriving of a plethora of flora and fauna in their natural habitats is requisite for the maintenance of biodiversity and ecological balance of Earth. Wildlife crime is a global challenge in addition to the alarming change in global climate which has prompted rapid loss of wild animals. The rampant poaching of animals for their consumption as food, cosmetics, medicine or ornaments has greatly contributed to the loss of wildlife. In addition to this, rising man-animal conflicts as well as international socio-economic inequalities have also attributed to this grave issue.

An endangered species is defined as any plant, animal or microorganism possessing an immediate risk of extinction. In recent years the major threat to endangered species such as Elephant, Black buck, Tigers, Asiatic lion, Snow leopard, Vulture, Indian bustard and others have presented to be the prime concern of many scientists. The Indian subcontinent was previously endowed with an abundance of natural resources, including lush forests, the water-filled Himalayan mountains, abundant fisheries along the coast, fruitful estuaries, lush grasslands, and abundant river systems. This plenitude was enhanced by rich soils and copious amounts of rain. But years of poor management have had disastrous effects, damaging our coastline, poisoning our aquifers, and destroying our forests. The IUCN lists 172 species of animals in India (2.9% of all animal species) as internationally threatened. 53 species of mammals, 69 species of birds, 23 species of reptiles, and 3 species of amphibians are among them. The rest of the world is home to just about 1500 or less tigers, with India home to the greatest number of tigers with 50% of them located in Madhya Pradesh, Karnataka, and Uttarakhand. However, tiger poaching occurs frequently; it is particularly common in the states of Maharashtra, Karnataka, Tamil Nadu, and Assam, as well as in the northeast and Mumbai border regions. According to government statistics, 596 tigers are believed to have died between 1994 and 2002; however, a nongovernmental organization claims a significantly higher number. There are less than 1000 great Indian bustards left in the world, making it an endangered species. Ironically, it is almost endangered despite being the state bird of Rajasthan and a sign of the health of the plains grassland environment in India. Conventionally, conservation strategies have developed considering the animals that can be useful to humans. Government conservation programs, on the other hand, have up until recently focused on charismatic or scientifically interesting species. Whether traditional or governmental, our concern for the survival of species has been and will continue to be a primary driving force in conservation. Ecosystems of any complexity are species rich. On the other hand, the space, money, and manpower that can be allocated for the preservation of these species are always quite restricted. Thus, novel strategies providing efficient safeguard to the endangered animals of our country are necessary to be explored and enforced with great vigour and enthusiasm.

Recent developments in status of endangered species of animals

Animals such as Red panda and Asian elephant are listed as endangered in the IUCN list due to rapid decrease in its population attributed to loss of nesting trees, habitat loss, negative human interactions as well as loss of red pandas primary food source i.e bamboo. Similarly, tigers have also been enlisted as endangered due to increased poaching, rising sea levels and alarming change in global climate. In addition, mammals, such as Asiatic lion and Gangetic dolphin has also lost significant

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portion of its population owing to poaching, deforestation, alteration in sea levels, water pollution etc. Snow leopard population is also rapidly progressing towards endangered due to loss of habitat and man-animal conflicts. However, on a rather positive note the population of the great one horned rhino has seen progressive growth and has been hailed as the tremendous achievement in conservation projects of animals in Asia. The efforts exerted by India and Nepal is greatly appreciable with this constant work towards conservation leading to bringing an endangered animal back from the brink of extinction.

Challenges

The major challenges faced by the endangered animals in our country are human coexistence and conflict with wildlife, shortage of wildlife laboratories, workforce and funding, dynamism of crime and international politics, unlicensed trade, disguised marketing and prosperity charm, habitat destruction, climate change, pollution, invasive species, exploitation of laws, lack of amendment in law and punishment of offenders causing damage to wildlife (Rana and Kumar, 2023).

Novel approaches for conservation of endangered species of animals

Conservation of endangered animals is necessary because a healthy ecosystem depends on various factors such as the relationships between plant, animals and their foundations. In case of endangering of either an animal or plant, the ecosystem starts collapsing due to it being an intricate web where each organism plays a vital role. The species are the building blocks of a thriving ecosystem and provide a variety of raw materials, food and medicine to humans. If the extinction of a species goes unchecked then in future it can lead to a catastrophe consequently causing lack of oxygen, water and food resources. Traditionally, approaches such as setting up zoos, wildlife sanctuaries, biodiversity reserves as well as many governmental and NGO implemented projects have been utilized to conserve the endangered wildlife. Moreover, controlling pollution, pesticide usage, poaching infiltration, disposing waste properly, establishing wildlife corridors, measuring biodiversity, reducing carbon footprint as well as organizing awareness programmes among common masses have been some other strategies to minimize loss of wildlife. In the recent era technologies utilizing artificial intelligence (AI) has proven to be helpful in the monitoring the status of wildlife by tracing the movement of animals in real time with quick update on cellular phones. Moreover, artificial intelligence technologies such as GPS tracking, microchipping of animals, drone surveillance, infrared cameras, sensors and Spatial Monitoring and Reporting Tool (SMART) have proven to be equally efficient in assessing the status of wild animals. Similarly, usage of metagenomics to study the environmental DNA (e-DNA) shed by animals in soil, vegetation or water is useful for monitoring of

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the physically unreachable animals. Mapping and visualization of habitats using Google earth by scientists have also been helpful in establishing habitats and identifying novel species. Next generation sequencing can be used to sequence the genome and ascertain genetic information regarding various diseases and to act on them to prevent the extinction of an animal for example the Tasmanian devil was saved from extinction from an infectious tumour namely devil facial tumor by utilizing this technology. A software developed by IBM (International Business Machines) concerning the predictive analysis of wildlife emphasizing on the location of animals, hunting behaviour of poachers and opinions of people on wildlife can also help us to formulate precise conservation efforts.

Future trends

The advancements in science and technology have given rise to a number of novel technologies which can prove to be helpful for the conservation of endangered species. Some of these conservation trends such as regenerative agriculture, wetland rejuvenation, carbon sink, facial recognition tool for wildlife, virtual ecosystems, Radio Frequency Identification (RFID), ecological restoration as well as de-extinction of mammals under scrutiny by employing CRISPR can be revolutionary in the near future.

Conclusion

Worldwide, there is a problem affecting wildlife habitat and species. According to estimates, by 2050, global warming might lead to the extinction of 15–37% of species. The incidence of poaching, the sale of animals, and the smuggling of their parts and products especially endangered animals is increasing alarmingly, despite the provisions of India's wildlife laws and the government's numerous wildlife projects. Encouraging policies and actions that can save many other endangered species as well as entire ecosystems depends on the protection of iconic endangered species. Nevertheless, many more species that are less well-known and provide crucial ecological functions need to be included in species conservation initiatives. Incentives for local people to conserve them should also be established by such endeavors, particularly when sustainable use is seen to be the only or most efficient course of action. Ultimately, there is a need to devote more financial resources and utilize more novel tools to monitor the status and activity of the wildlife.

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