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Wildlife in the perspective of environmental degradation: A review

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Abstract

After the existence of an organism, it strives hard to live in its surrounding environment. All the animals interact with its environment for energy gain and loss, to protect itself, and for all other activities. But in recent years world human population increased so fast that depleted the natural resources, degraded the environment and destroyed the habitat of animals. The main factors responsible for environmental degradation are land use, topography and population's evolution. As a result wildlife species that are utilized for food and commercial purposes are going to decline or extinct. The wildlife that is the integral part of biodiversity can't be saved until we tackle and solve the issues behind their extinction.

Keywords: Environmental degradation, wildlife, environment, habitat, biodiversity

Introduction

Organism's environment is its interactions with biotic and abiotic components of ecosystem that is required for its survival and continuity of species. When resources in an environment got depleted or disturbed by natural or manmade factors it is termed as environmental degradation which poses serious threats to the wildlife leading to its extinction [1].

The major factors that are responsible for environmental degradation are Habitat loss [4], soil erosion, deforestation, desertification [6], Climate shift, flooding, resource depletion, invasive species and habitat fragmentation [4]. All these factors are responsible to upset the environment and the resulting environment is unfit for the survival of animals, so major biodiversity is lost [2]. The human population growth is the major driving force for degradation of environment [30]. The population of world increasing continuously, according to the estimation of 1999 there are 6 billion people in the world and in 2150 population will reach to 8-10 billion. Due to overpopulation urbanization trend increases, in each year about 20-30 million people leave rural areas for urban areas [7]. Overpopulation leads to poverty so there is an increasing pressure on natural resources for the sustainment of life. The natural resources such as freshwater, coral reefs, fossil fuels are continuously depleted due to overpopulation and diminished the quality of life [8]. Human population grow at unprecedented rate due to which urbanization and industrial revolution have major impact on global health, food scarcity, global warming and environmental change [1]. It is considered that overpopulation and poverty is the major cause of environmental degradation, there is negative relationship between poverty and stable environment and if we reduce the human population and poverty these are the important factors to save the environment [3].

Impact of Environmental Degradation on Wildlife

Sr#	Environmental degradation factors	Effect on wildlife
1	Habitat loss/Fragmentation	Affect the animal's breeding, foraging, dispersal behaviors and predation rate
2	Deforestation	Increase human and wildlife conflict, soil erosion, water pollution and habitat loss.
3	Soil Erosion	Affect the productivity of all natural ecosystems, loss of biodiversity.
4	Global climate change	Affect the linked food chains, circulation of nutrients and ocean flow.
5	Desertification	Affect the Climate shift, species migrate to other areas, and there is a disturbance in biogeochemical cycles
6	Effect of roads on wildlife	Effect on animal behavior, hindrance in animal movement, home range alteration, loss of reproductive success, and change in physiological conditions
7	pollution	Diseases, mortality, bioaccumulation and physiological stress.

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Habitat loss/Fragmentation

The special features (food, shelter, water, space) of an area that are necessary for the survival is the habitat of animal. When large area is converted into smaller patches and these patches are isolated from each other it is termed as habitat fragmentation. Habitat fragmentation includes both loss of habitat and fragmentation of habitat and it have negative impact on wildlife. The fragmentation and destruction of natural habitat leads to reduction of population size and abundance, change of genetic diversity and extinction of wildlife. Due to patches of habitat the food chain length become smaller, which change the species interaction and reduce the specialists and large species of wildlife. Habitat loss also affect the animal's breeding, foraging, dispersal behaviors and predation rate [10].

Deforestation

Deforestation is the disturbance of forest ecosystem due to Agricultural activities, grazing and Industrial development and cause shrinkage of forest land, change forest cover (Constantino) biodiversity loss, change global water cycle and enhancing greenhouse effect [32]. People contribute to degradation process when they illegally cut the trees for wood and construction, as a result it leads to increase human and wildlife conflict, soil erosion, water pollution and habitat loss [11]. Forests are the major storehouses of wildlife, e.g. tropical forests contain 2/3rd of all species and many wildlife endangered species [32].

Soil Erosion

The loss of soil (due to rain or wind) from land surfaces affects the productivity of all natural ecosystems. Loss of biodiversity due to soil erosion is potential problem throughout the world. The food and productivity depends upon the fertility of the soil and human induced changes over soil are significant resulted in valuable soil become unproductive. In addition the valuable plants, microbes and animals are destroyed and it leads to wildlife extinction because they depends upon plants and soil organisms for their food [12].

Global climate change

Sometimes the effect of climate change is local and sometimes other regions are also affected through linked food chains, circulation of nutrients and ocean flow. Some species get benefit from these environmental changes while other species negatively affected and some species adapt these changes and they are able to live in that habitat. And the species that are affected may be due to unavailability of food, habitat loss, or due to difficulty in migration from one place to other. Several other climate changes, for example rise in temperature, change of rainfall pattern, humidity and other weather changes. Due to climatic changes there is an extinction of species and it reduces the biodiversity. But it is argued that climate change is not harmful for all species it may be beneficial for some species for example migratory birds migrate for breeding. So some scientists say that is not always depraved even if some species become extinct because there is a greater biodiversity in the tropical region and warm conditions and greater rainfall are beneficial for these species. Scientists also said that due to climate change some species develop particular traits and behavior and they are adapted according to these conditions. But climate changes are occurred much more rapidly and species evolution is a very slow process [13].

Some affects due to global climate change are following:

Range Shifts

Many species are expected to shift their ranges to higher latitudes and altitudes as a result of climate warming [14]. Though marine range shifts are likely to continue more slowly than marine introductions, the community-level effects could be as great, and in the same direction, as those of introduced species. It is well established that introduced species are a primary threat to global biodiversity, just like introductions, range shifts have the potential to seriously affect biological systems. In addition, it is supposed that ranges shift faster in marine than terrestrial environments; marine communities might be affected faster than terrestrial ones as species shift with climate change [15].

Phenological Changes

There are changes in phenology of plants and animals due to recent global changes in climate such as increasing temperature, but the effects are not same in all species. The future study will consider climate change impacts on phenology of plants and birds at a local scale in order to illuminate the spatial range and variation across species and trophic levels. Phenological changes at high trophic levels can be direct or indirect. Direct phenological changes shift the timing of life cycle events when species are affected by changes in temperature. Indirect effects may arise from changes in the timing of phenophases at lower trophic levels. These may result in a mismatch in the timing of phenophases between higher trophic levels and their food source [16].

Pathogens

Global climate shift affect the emergence and spread of infectious diseases. Diseases spread either due to whole climate change or change in any individual factor such as rainfall, temperature and humidity. Because the temperature, humidity etc. are important factors for growth and survival of pathogens so these changes can effect animals and spread many pathogen in wild as well as other animals [17].

Ocean Acidification

When carbon dioxide is absorbed by the oceans it forms carbonic acid due to the reaction of carbon dioxide and sea water which is termed as ocean acidification. Ocean acidification negatively affects the coral reefs and marine biodiversity. Ocean acidification occurs due to excessive carbon dumping into the atmosphere [18].

Melting Sea Ice

Arctic sea ice is the habitat for diverse animals such as polar bears, walrus, sea and some animals use it for breeding, shelter, hunting, resting and molting purposes. When temperature rises due to climate change it melts the sea ice and the habitats of these animals are in danger. Animals that depend upon the ice also play a significant role for people. Without the habitat and shelter they are in danger of losing of their population [19].

Sea-Level Rise

Due to melting of sea ice the sea level increased and it destroy the habitat of various animals that are dependent on sea ice leading to extinction of these animals. Low lying coastal areas are mainly affected by sea level rise. It is predicted that there is an increase in sea levels between 0.18 m and 2m in the next 100 years due to melting ice and thermal expansion. Due to rise in sea level floods are the major problem in low lying coastal areas and it increased erosion [20].

Invasive Species

Invasive means any organism that is outside of its native geographic range and it may be harmful for other animals and natural environment. There are a number of terms that are used interchangeably with “invasive” including, “noxious”, “alien”, “non-indigenous” and “exotic”. In distinction, “invasive or noxious species” means an alien species whose introduction can harm the wildlife and human health due to competition between native and non-native species for food, shelter, water and other resources which are necessary for survival [21].

Desertification

Desertification is the disturbance in ecosystem due change in soil, vegetation and climate [22]. Due to desertification that particular area become unproductive and spread to large area. Human activities such as over cultivation, deforestation, overgrazing, poor irrigation practices and other unsuitable land-use practices are responsible for desertification [23]. As a result of desertification there is a climate shift, species migrate to other areas, and there is a disturbance in biogeochemical cycles [22]. Desertification cause decreasing production and increasing poverty, because due to overpopulation people become poor and they exploit the land for survival [23].

Effect of roads on wildlife

Roads have negative effect on aquatic as well as terrestrial ecosystems. Roads are responsible for mortality of animals, overall environmental modification and introduction of exotic species. Construction of road is dangerous to invertebrate animals that are living near to road or beneath the road. Both vertebrates and invertebrates species are affected by vehicle and vehicle accidents. One of the major effect of roads on animal behavior are hindrance in animal movement, home range alteration, loss of reproductive success, and change in physiological conditions. Due to construction of roads soil compactness as well as soil water content is changed. Roadside environment changes due to change in light, temperature, sedimentation of heavy metals due to surface runoff. Exotic species are encouraged by roads by providing corridors. Hunting and fishing activities are also increased by construction of roads. Roads may not affect all ecosystems equally but it generally change the species distribution and species richness [27].

Pollution

Air pollution

Air pollution decreases the native population of animals and have very bad effect on wild birds as well as wild mammals. The pollutants from industry cause diseases, mortality, bioaccumulation and physiological stress. Some pollutants such as heavy metals, noise, environmental xenobiotics; changed the wildlife animal distribution [24].

Water Pollution

Agricultural and urbanization are the major cause of water pollution. Phosphorus, nitrogen and many other nutrients are added to aquatic ecosystems continuously by agriculture and urban activities. Atmospheric deposition is another source of nitrogen. These inputs are very difficult to measure and regulate because these are not coming from any fixed source so these are flexible due to weather effect and these are called non-point sources. The nutrients comes from these sources cause diverse problems in aquatic ecosystem, that cause

eutrophication, oxygen limitation, toxic algal blooms, loss of biodiversity and threat to important species of recreation. Due to eutrophication it spoil the water use for drinking, agriculture, industry and for other purposes [25]. Some pesticides (organochlorine, organotin) that are used in agriculture disrupt the normal physiology of wild animals. A dioxin like compound is accumulated in the body of marine mammals and wild birds and cause risk to wildlife [26].

Soil Pollution

The characteristics of Soil are affected by pollution, land use, current activities and location. The major causes of soil pollution are human activities. Leakage of oil and chemicals also contaminate the soil. The overall soil contents and microorganisms in the soil are negatively affected by high level of contamination. Due to soil contamination the crop yield is highly reduced and it effects the organism that depends upon the plants for their food, nutrition and habitat [28].

Noise pollution

Noise pollution cause stress, loss of reproductive success, physiological disturbance, and limit the long term survival of wild animals. Animal health and its survival are greatly affected by noise pollution. So it is our duty that that we protect the wildlife and reduce the noise pollution in natural habitats of animals [29].

Conclusion

All the physical, biological and chemical activities are responsible for environmental degradation. Natural resources are our assets and required for balance and stability of environment but overpopulation is the serious threat to environmental degradation and causing strain on natural resources. All around the world environmental degradation occurred too rapidly and human contribution to environmental degradation is a major factor than anything else. Due to depletion of resources it have adverse effects on us as well as on all other animals on earth. Because of misuse and overuse of natural resources it causes environmental degradation as a result wildlife facing many problems and some species going to extinct.

Recommendations

We should know that natural resources are limited. We should try to stop and reduce the environmental degradation process and should take care of own country and whole world, and provide awareness to the people about its consequences. It is our duty that we provide the environmental education to the people, so they protect the environment. We should use all resources wisely so our next generations also get benefit from it. We should take planned actions for the protection of wildlife.

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