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Effect of Climate Change on Wildlife

*Hafiza Salma [1], Muhammad Nadeem [1], Nimra Khalid [1], Muhammad Imran Ashraf [2, 3], Haq Nawaz [4] Muhammad Ashar Ayub [*1]*

Abstract

Climate change is a global catastrophe that disrupts the balance of ecosystem by altering the climatic measures. Human being are not the only living species on earth that is affected by climate change. All the inhabitants on Earth are dependent on suitable living conditions for their survival. All human and non-human species on Earth either directly or indirectly relying on each other. Wildlife is the key indicator of climatic changes in the environment as they are part of various biological and ecological cycles in the atmosphere. Over the century, the atmospheric temperature has increased around 1.1°C. Changes in climatic conditions is affecting the terrestrial and aquatic biomes in plenty of ways. Limiting basic living conditions of animals by destruction of their natural habitation and its transformation into urban lands which intensifies the human-wildlife interactions. Migration of temperature sensitive species to the areas of higher altitude. High temperatures have increased the occurrence of wild-land fires, floods and droughts five times more than past 50 years. Animals naturally respond to altering climatic conditions by exhibiting changes in their general and reproductive behavior, growth patterns, increased zoonotic diseases. All these above cited effect put them to the status of endangered species and ultimately to the extinction. Strategic approaches i.e., protection, management, planning and evaluation of natural biomes to conserve the Earth's biodiversity must be opted to avoid the extinction of wild species.

Keywords: Climate Change, Wildlife, Biodiversity, Ecosystem, Habitat destruction, Wildfires, Migration, Endangered species, Extinction, Conservation.

[1] Institute of Agro-Industry and Environment, The Islamia University of Bahawalpur, Pakistan, [2] Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, [3] Agri Services Department, Fauji Fertilizer Company Ltd. Pakistan, [4] R&D Department, Rawalpindi Medical University, Pakistan.
***Correspondence:** (ashar.ayub@iub.edu.pk)
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1. Introduction

At present, climate change is considered to be one of the most significant and wide-ranging ecological hazard mankind facing. A wide range of sectors diligently working to understand the impacts of climate change likely to occur in present and after time and its circle of influence on humanity and their supporting structures i.e., socio-economic systems. Advanced measures are being developed to decrease the likelihood of both long-term and short term impacts of greenhouse gases released from the anthropogenic sources and how to cope up with these inevitable impacts of climate change at the moment. There are clear evidences on how the changes in climate affecting worldwide population of wildlife on Earth. A plethora of documented responses of climate change on wildlife such as changes in population growth, reproductive behavior, migration of species, animal extinction continue to amplify in coming decades if the climatic conditions change at the same pace. Over recent years, ecological experts and conservationists have been investigating the degree of impact of climate change in present and subsequent years on wildlife, globally.[1]

Impact of climate change on Wildlife

Our Earth is nearly 1.1°C warmer in comparison to the Earths' temperature in 18th century. On the basis of recent analyses, by the end of this century, it will rise to 2.7°C. Fluctuations in one area stimulate the changes in other regions as well and animals will be affected clearly by this change in the environment.[2]

Habitat Destruction

Loss of natural habitat is one of the major affecting wildlife and is the primary cause of animal extinction all across the world. There are several factors that directly or indirectly disrupt the natural habitat such as deforestation and rising temperature. Deforestation is the human driven factor due to increase in global population resulting in land destruction by cutting down trees and transforming the natural area into land suitable for human population to live. According to a WWF report, about half of the forests worldwide have been removed and still being removed at 10 times higher pace.[2] Temperature rise is the major issue contributing to habitat loss because increasing temperature destroy vegetation, shrink water sources. Thus, causing them to die off by upsetting their living conditions. For instance, if the climate change increase apace along with illegal hunting, we are

likely to lose the African Elephant in next four decades.[3]

Human-wildlife conflict

Sharing the land between human beings and wildlife has been intensified due to climate change and more precisely, due to habitat destruction. This ecosystem change lead to the farther roving of both people and wild animals resulting in distressing impacts particularly on wildlife. For instance, leopards and jaguars may intervene the human livelihood to obtain food and in response to that humans capture or kill them will eventually favors their extinction as they are already threatening species.[3] According to a survey report shared by 'Animal Matters', one out of every vehicle incident in the US, involves an animal and 1.5 million of these animals are deer. As per the Federal Aviation administration, recorded cases of collision between birds and aircrafts are more than 11,000.[4]

Natural disaster

Climate change triggers extreme weather conditions. Catastrophes have increased five times more than they used to occur in past five decades. The catastrophes includes wild-land fires, droughts, floods and hurricanes.[3] Rise in temperature, changes in patterns and frequency of rainfalls, variations in humidity affect wild as well as domestic animals by causing serious health issues and mortality.[5] As per the BBC report, the extreme forest fire in Australia i.e., Black Summer bushfire counted as worst disaster of present times resulting in approximately 3 billion animals being killed or misplaced.[6]

Species Migration

Apparently a dynamic increase has been observed in pole-wards shifting of wild species due to climate change. Approximately 1°C increase in the aquatic temperature has been recorded by the 18th century till date. Warming of the oceans lead the marine life to shift towards the pole side from the equator. The abundant record of most marine species in pole side regions and substantially less count in the equatorial regions demonstrated the major shifting of aquatic life with the rise in the ocean temperature over the century.[7]

Melting glaciers

Temperature rise collapse the Arctic ecosystem and lead to Animal extinction. Melting of permafrost and arctic region will endanger of not only wild species of that region but will seriously affect the human life in the worst possible way. As the ice will melt, the animals in that region will go extinct or become adaptable to the changing environment and will intrude the human life in that region for refuge. Permafrost melting is potentially hazardous because as it melts, it releases methane, a perilous greenhouse gas that is responsible for increasing the atmospheric temperature. This phenomenon will fasten the phenomenon of temperature rise, globally.[8]

Importance of Wildlife in Sustaining Healthy Ecosystem

The natural ecosystem and animals are our significant ally in order to fight against climate change. Trees on land and phyto-planktons in marine environment can absorb large amount of carbon dioxide that otherwise traps in the atmosphere and heat up the Earth. Land animals and birds walk and fly across the land help in seed dispersal. Their dung serve as soil fertilizer. Naturally driven healthy ecosystem reduce the transmission of zoonotic diseases.[9]

Strategies for Biodiversity Conservation

The fundamental strategies to reduce the likelihood of biodiversity loss for ecosystem restoration are protection and the management of lands and wetlands, direct management of the animal species, planning and evaluation and lastly, formation and implementation of legislation.[10]

Conclusion

Lastly, it is evident that the impacts of climate change will become more pronounced in near future. Wildlife plays an important role in linking the food chain supply of all living inhabitants of Earth. We must protect and conserve all living species by adopting possible mitigating measures to minimize the effect of deteriorating climatic conditions. In this regard, formation of a sound legislature and its implementation must be monitored to protect the biodiversity of all biomes.

References

1. Green RE, Harley M, Spalding M, Zöckler C. Impacts of climate change on wildlife. Impacts of climate change on wildlife. 2007. DOI: 10.5555/20083156444
2. https://wwf.panda.org/discover/our_focus/wildlife_practice/problems/habitat_loss_degradation
3. https://www.ifaw.org/international/journal/impact-climate-change-animals
4. https://www.animalmatters.org/facts/wildlife/
5. Hofmeister EK, Rogall GM, Wesenberg K, Abbott RC, Work TM, Schuler K, Sleeman JM, Winton J. Climate change and wildlife health: direct and indirect effects. US Geological Survey; 2010. DOI: 10.3133/fs20103017
6. https://www.bbc.com/news/world-australia-53549936
7. Hastings RA, Rutterford LA, Freer JJ, Collins RA, Simpson SD, Genner MJ. Climate change drives poleward increases and equatorward declines in marine species. Current Biology. 2020 Apr 20;30(8):1572-7. DOI: 10.1016/j.cub.2020.02.043
8. Miner KR, D'Andrilli J, Mackelprang R, Edwards A, Malaska MJ, Waldrop MP, Miller CE. Emergent biogeochemical risks

from Arctic permafrost degradation. Nature Climate Change. 2021 Oct;11(10):809-19. DOI: 10.1038/s41558-021-01162-y
9. Miner KR, D'Andrilli J, Mackelprang R, Edwards A, Malaska MJ, Waldrop MP, Miller CE. Emergent biogeochemical risks from Arctic permafrost degradation. Nature Climate Change. 2021 Oct;11(10):809-19. DOI: 10.1038/s41558-021-01162-y
10. Mawdsley JR, O'MALLEY RO, Ojima DS. A review of climate-change adaptation strategies for wildlife management and biodiversity conservation. Conservation Biology. 2009 Oct;23(5):1080-9. DOI: 10.1111/j.1523-1739.2009.01264.x