

The Effect of Climate Change on Humans and Animals

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Abstract

We must remember that climate change's impacts on biodiversity are linked with its own impacts. Human activity contributes to the accumulation of greenhouse gases and disrupts the natural balance of atmospheric greenhouse gases, which in turn contributes to the loss of biodiversity. Coastal habitats might be flooded, and the ocean's nitrogen supply to land ecosystems could be halted if sea levels rise. Wildlife's behavior, growth, foraging, migration, and reproduction are directly impacted by climate change. Environmental factors such as ecosystem productivity, hydrological balance, biomass production, and interactions among trophic levels might be harmed if global warming continues. Natural disasters are becoming more intense, and the patterns of natural disturbance are shifting as a result of climate change. Such processes put terrestrial ecosystems under physiological and environmental stress, which has a negative impact on their resistance and resilience. In addition, the warming atmosphere shifts the thermal optimum to higher latitudes and higher altitudes, resulting in more extreme temperatures. Plants and animals in the terrestrial biota adapt quickly to temperature changes by shifting their geographic ranges toward more hospitable climatic circumstances. Photoperiod, for example, is a climatic element that drives life history events, but the time of spring weather is altering as a result of greenhouse gasses. Phenomenological elements like as mating and breeding, hibernation, and post-hibernation activity might be mismatched, resulting in certain species being handicapped while others benefit. As a consequence, new ecologies will emerge. As the temperature rises, parasites and disease-causing agents in animals are able to reproduce and thrive at a much higher rate, as well as transmit their

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Dr. Smt. Sunanda. I. Kittali

diseases. Changes in the climate disrupt the interrelationships between species, as well as a wide range of ecological services. When it comes down to it, global warming threatens native terrestrial fauna and changes ecological processes.

Keywords: Climate change, Human, Animal, Global warming.

INTRODUCTION

Ecosystem services and functions may be compromised as a result of species extinction due to climate change. Reducing fitness losses (i.e. decreases in survival or reproduction rates) may be avoided or minimized when populations respond adaptively to changes in the environment via changes in morphological and physiological characteristics, as well as changes in behavior. Such "adaptive response" phenotypic changes might be the result of phenotypic plasticity, microevolution, or some combination of the two (to climatic change). Alterations in a species' geographic range may also bring about these changes. adaptive responses may be used to predict species abundances and distributions and ameliorate the effects of climate change on biodiversity by devising strategies tailored specifically to the species' ecologies if they can be measured or shown to be absent.(Radchuk et al., 2019)

Climate change's negative consequences on human health are well documented. 'The human consequences of climate change are clear and perhaps irreversible,' experts warn in the 2017 Lancet Countdown on Climate Change and Health. When it comes to climate change, it is no longer only an imminent apocalyptic scenario we should all try our best to avert at all costs. WHO estimates that "well-known impacts of climate change" would cause an extra 250,000 deaths year between 2030 and 2050 Heat-related fatalities and illnesses, an increase in vector-borne infections (such as dengue fever and malaria), respiratory disorders and mortality from extreme weather events are some of the repercussions.(Hayes et al., 2018)

Humans, animals, ecosystems, and energy are all affected by climate change. There have been both long-term and short-term cycles of climate change, with many of them being spectacular and quick in their onset. The average global temperature has risen by 1.1 degrees Fahrenheit in the preceding 30 years. Since the start of the twentieth century, the temperature has risen by 1.4 degrees Fahrenheit. Temperature increases of 2 to 11.5 degrees Fahrenheit each century are projected, based on data from the Intergovernmental Panel on Climate Change (IPCC). Human-caused climate change is a big worry, mostly owing to greenhouse gas emissions from the burning of fossil fuels, such as CO₂ and methane, which are released into the atmosphere. Carbon is released into the atmosphere when forests are cleared for development. As a consequence of greenhouse gas emissions, the Earth's surface is unable to transmit heat to space at the rate it should. This has led to a rise in atmospheric carbon dioxide concentrations unprecedented in the previous 6,50,000 years. Disease-causing bacteria thrive in environments with high temperatures and high humidity. A greater body temperature results in all metabolic responses occurring

Recent Trends in Humanities, Literature, Sociology and Psychology

at a faster rate (the Q10 effect), limiting the body's ability to combat sickness inside its own systems. The animal's ability to withstand sickness is further harmed by the disintegration of its immune system. Climate change has been linked to a rise in FMD outbreaks in recent years. When it comes to parasite and disease vectors, a combination of high temperatures and humidity, as well as water logging, is ideal. As a result of climatic change in South-east Asia, the growth rate of sheep and goats is reduced by 25 and 23 to 63 percent, respectively. According to current estimates, the worldwide decrease will be about 12 percent.(Padodara & Jacob, 2013)

Impact of Climate Change on Animal Health

Changes in air temperature, relative humidity, precipitation, and the frequency and magnitude of extreme events are among the key drivers of climate change's potential direct or indirect impacts on animal health (i.e., heat waves, severe droughts, extreme precipitation events, and coastal floods). However, even though this focuses on environmental factors, it's important to note that the mechanisms leading to climate change's health effects are extremely complex, encompassing not only environmental forces, but also ecological and social components, financial interests and personal and group activities. Two of the most direct effects of climate change on health are the rise in sickness and death rates associated with exposure to higher temperatures. Microbial density and spread, vector-borne diseases, food shortages and foodborne infections are examples of indirect repercussions of climate change. With regard to the health of food-producing animals, the current state of knowledge concerning the influence of environmental factors, including climate change, is the subject of this section.(Lacetera, 2019)

According to experts, climate change will have a major effect on wildlife, domestic animals, and human illnesses. Higher global temperatures; a rise in sea levels; changes in worldwide precipitation patterns, such as increased quantities and unpredictability; and an increase in midcontinental dryness throughout the summer are all predicted by 'Intergovernmental Panel on Climate Change (IPCC)'. Scientists believe that rising temperatures, together with changes in rainfall and humidity, may have a considerable influence on wildlife, domestic animal, and human illness. This shift might exacerbate already restricted water supplies and increase habitat damage, allowing further more possibilities for infectious illnesses to spread from one species to another as a result of the growth of human populations worldwide. Zoonotic diseases—diseases that may be transmitted between animals and humans—have been on the rise in recent years. These illnesses are on the rise because wildlife, domestic animals, and humans have become more intertwined. This has led to increased interaction with sick animals, as well as infected vectors and human carriers. As a result, it is difficult to distinguish between the impacts of climate change on wildlife and the effects of climate change on human health.(Range, 2010)

Research on the effects of climate change on domesticated animals is lacking. The health of farm animals will very certainly be adversely affected by climate change, particularly global warming. This influence will be both direct and indirect. Temperature-related disease and mortality, as well as animal morbidity during severe weather events, are examples of direct consequences. Animals' efforts to adapt to a changing temperature environment or the impact of climate change on microbial populations, the

Dr. Smt. Sunanda. I. Kittali

development of vector-borne illnesses, host resistance to infectious agents, and the advent of food-borne diseases are just some of the indirect consequences that come from climate change. (Nardone et al., 2010)

It is primary goal of animal production in order to maximize growth and output, such as milk or wool, while making the most effective use of the resources and inputs required to accomplish this goal. The easiest way to describe animal development is to think of it as a rise in size. Increased size, on the other hand, has several consequences. In terms of growth, it might be quite different whether you're talking about the growth of a whole animal, or just cells, tissues, and organs or development before and after puberty. Body proportions and composition fluctuate as an animal develops from conception to maturity, due to the fact that growth rates of various organs and tissues of the body vary with respect to the overall development of the creature. For all farm animals, the sequence in which different tissues develop is consistent and seems to be predicated on the relative necessity of the various bodily parts and tissues to the animal's survival. Genetic and environmental factors influence the rate at which a person grows. Variables like as the amount of nutrients in the animal's diet, the activity of hormones and enzymes in its system, and the temperature in its habitat all have an effect on its average daily gain (ADG). (Padodara & Jacob, 2013)

Effect of Climate Change on Health of Humans

Humans have had an impact on the environment for millennia. In contrast, it wasn't until the Industrial Revolution that human activity began to have a worldwide influence. Because of mounting scientific evidence of the atmosphere's rising concentration of greenhouse gases and the planet's shifting climate, environmental issues have risen to the top of the human priority list. Temperatures throughout the world are rising, and the distribution and quantity of rainfall is changing. As a result, climate change and global warming have become a worldwide concern that transcends national and physical boundaries. Increasing greenhouse gas emissions are causing the Earth's atmosphere to heat up. This phenomena is referred to as global warming. For every degree of industrialization, the Earth's temperature has grown by 0.7 degrees. If nothing is done, temperatures might rise by 5 degrees by 2100. Increasing the frequency and severity of weather events, as well as the widespread extinction of many animal and plant species, are all anticipated outcomes of this increase in global average temperature. Deforestation and fossil fuel burning are the primary sources of CO₂ emissions, but other sources of greenhouse gas emissions include agriculture, waste, and industry, as well as emissions from these sources, such as methane and nitrous oxide. The increased warming of the Earth is due to these additional greenhouse gases. That's the exacerbated impact of global warming. Greenhouse gases may be detected in the atmosphere. Industrialization has led to a dramatic increase in CO₂, CH₄, and N₂O concentrations, all of which are greenhouse gases. In 1750, CO₂ levels were roughly 30% higher, N₂O levels were 50% higher, and CH₄ levels were nearly doubled. There has been an increase in the quantity of greenhouse gases released into the atmosphere owing to the burning of more fossil fuels and changes in land use. There has been a rise in the amount of solar heat received by atmosphere of Earth, heat that otherwise would have been reflected back into space, owing to an increase in greenhouse gases such as carbon dioxide (CO₂),

Recent Trends in Humanities, Literature, Sociology and Psychology

methane (CH₄), and nitrogen dioxide (N₂O).As a consequence of greenhouse effect, this rise in temperature has triggered changes in the climate.(Gulzar et al., 2018)

Drought, flooding and wildfires are becoming more frequent and severe as a result of climate change, and this has a direct effect on human health and well-being. As a matter of fact, the most recent Lancet Countdown research, which investigates 43 indicators of the relationship between climate change and human health, achieved its most catastrophic conclusion since the beginning of its annual work. According to this study, the health consequences of climate change are worsening and are felt on every continent, but they are disproportionately and unequally harming diverse populations. In the absence of an early international action to curb climate change, authors warn that these health effects will continue to deteriorate.(Rocque et al., 2021)

It's no secret that climate and weather have always had an impact on people's well-being. There are consequences for human health and well-being when environmental factors like as climate variability and weather extremes impair the environment's ability to provide basic necessities like fresh air, food, water, shelter, and security. People's health and well-being are threatened in many ways by climate change and other natural and man-made stresses.(Crimmins et al., 2016)

It is hard to separate the effects of ozone depletion and climate change on human health since they are likely to have a synergistic effect. Increased UV-B radiation from the Earth may weaken the human immune system, making people more susceptible to viral and parasitic diseases. It is possible to categorize climate change's potential health effects on human health as either direct or indirect depending on whether they are primarily caused by climatic variables affecting human biology or influenced by climate-induced changes in other biological and chemical systems. Healthy people have a working heat regulation system that permits their bodies to cope effectively with the effects of heat stress. The risk of (mostly cardiovascular) sickness and mortality rises significantly when the temperature exceeds comfortable limits in both the warm and cold ranges.(Nwoke et al., 2009)

Recommendation for Reducing Climate Change or Global Warming

The Earth's temperature is rising at an alarming pace, necessitating drastic action to slow the process. Overshooting +2° is quite rare, even if adaptation does occur within that range. The only way to avoid such a significant rise is to reduce greenhouse gas emissions. The fundamental cause of temperature rises, according to scientists, is greenhouse gas emissions. As a result, in order to tackle the issue, society must develop methods to minimize greenhouse gas emissions via conservation and the use of renewable energy sources that do not generate carbon dioxide or other elements that cause heat. The usage of alternative energy sources is one method of reducing emissions of greenhouse gases. For example, reducing the quantity of CO₂ emitted into the environment would be achieved by switching from coal to gas in power plants. Wind, solar, and hydroelectric power are examples of renewable sources of electricity. Another option is nuclear power, which has been demonstrated to be reliable throughout Europe. Since the vast majority of biofuels release more amounts of carbon dioxide throughout the

Dr. Smt. Sunanda. I. Kittali

agricultural and energy-production processes than they collect during plant development, each individual application should be evaluated on its own merits.(Lopez, 2017)

More severe weather patterns are predicted by scientists in the future. Several models anticipate that drought will worsen in certain regions of Africa, while others expect floods. Small island states are at risk from rising sea levels and severe storms. The pace of climate change cannot be slowed, but it may be moderated. Although global socioeconomic progress and health initiatives have raised the average living standard recently, the worsening global environmental circumstances or causes that have resulted have now started to harm human health. Two of the most significant global environmental phenomena that have a direct influence on human health are climate change and ozone depletion. A crucial part of protecting human health from climate change is mitigating the consequences of socioeconomic and technological expansion on the global environmental conditions.(Nwoke et al., 2009)

According to the research, there are three basic ways to combat climate change. Renewable energy, fuel switching, energy efficiency improvements, nuclear power, carbon capture and storage, and other decarbonization technologies and techniques that reduce CO₂ emissions are employed in conventional mitigation efforts to reduce greenhouse gas emissions, as are carbon capture and storage technologies and methods. Most of these technologies have been around for a while and bear a manageable risk level.(Fawzy et al., 2020)

A second approach is made up of a new set of tools and methods that have just recently been proposed as an alternative. These systems, which have the capacity to absorb and sequester CO₂ from the atmosphere, are known as negative emissions technologies or carbon dioxide removal methods because they can do so. Wetland construction and restoration, ocean fertilization, soil carbon sequestration, bioenergy carbon capture and storage, biochar, increased weathering, and alternative negative emissions methods such as mineral carbonation or using biomass in building construction have all been extensively studied as potential approaches to reducing emissions.

Finally, the Earth's radiation balance may be altered by controlling solar and terrestrial radiation. The Earth's atmosphere may be stabilized or cooled using geoengineering techniques based on radiative forcing. Negative emissions technologies do not alter greenhouse gas quantities in the atmosphere. Some of the primary radiative forcing geoengineering technologies discussed in the literature include aerosol injection into the stratosphere, brightness of the oceanic sky, cirrus cloud thinning, space-based mirrors, surface brightening, and other radiation management approaches. Because they are in the early stages of development, all of these plans carry a significant amount of risk and uncertainty when it comes to large-scale execution. Geoengineering approaches that use radiative forcing are not yet incorporated in policy frameworks.(Fawzy et al., 2020)

Conclusion

The effects of climate change on biodiversity are already being seen throughout the world, and this trend is only expected to worsen. Many species, especially those that are dependent on a certain

Recent Trends in Humanities, Literature, Sociology and Psychology

ecosystem, may become extinct as a result of these changes. As a consequence of global climate change, numerous species are already showing phenological changes that enable them to better adapt to their surroundings. Research on global climate change is substantially biased. Phenological shifts, range shifts, and future distribution of species have been examined in several studies due to the projected climate shift. In light of climate change, biodiversity study should expand to embrace a broader variety of topics. For example, more research was needed on the effects of climate change and global warming on animal and natural ecosystems' disease ecology and dynamics. We also need to know how different ecosystems and ecological processes will change as a result of global warming. Climate change isn't the main challenge to biodiversity conservation, though. Climate change should be seen as one of several causes that, when coupled with other issues like habitat loss and overfishing, pose a danger to the world's biodiversity. Climate change impacts on biodiversity may be studied, understood, and predicted using cutting-edge technology such as GIS (Geographic Information Systems) and remote sensing, according to the World Resources Institute. It is imperative that current scientific and technical developments be used to find ways to reduce biodiversity loss in the face of climate change. Action plans for the protection of biodiversity and animals at the national and global levels should include such actions as a preventative strategy.(Surasinghe, 2010)

Our generation's health must be protected against climate change if we are to begin developing and implementing ecologically sound practices in all of our endeavors. To put it another way, the sustainability of our socioeconomic undertakings should ensure that the biosphere and its components ecosystem continue to be healthy and active, enabling life on Earth to continue receiving sustenance from them. Climate change is already a danger to the well-being of the community. It's not only a financial problem; it also poses a danger to our social safety net. For decades to come, medical professionals will play a critical role in the mitigation of climate change and the preparation and management of its severe health consequences. Rapid implementation of mitigation measures and proactive adaptation programs established via cross-sectoral cooperation at local, national, and international levels are necessary to decrease and stabilize the health consequences of climate change on humans. In light of the alarming speed of environmental change and the possible impact of climate change on human health, we must act quickly. All levels of government, health experts, and other interested parties should be able to connect our generation's socioeconomic progress with the global ecosystem's sustainability. Achieving Climate Change concern to Health Protection hinges on how we solve climate change and ozone layer depletion concerns.(Nwoke et al., 2009).

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Dr. Smt. Sunanda. I. Kittali

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